

STRUCTURE OF
ELECTIVE COURSES
OFFERED BY
REGULATORY BODIES

**COURSE CURRICULUM FOR FIRST PROFESSIONAL BAMS
(PRESCRIBED BY NCISM)**



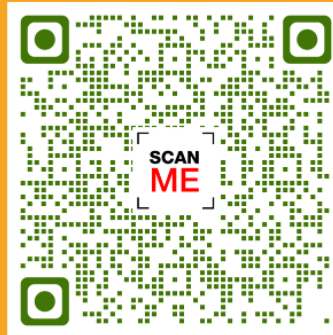
**PADARTHA VIJNANAM
(SUBJECT CODE- AyUG-PV)
FUNDAMENTAL PRINCIPLES OF AYURVEDA AND QUANTUM
MECHANICS**

(Applicable from 2021-22 batch onwards for 5 years or until further notification by NCISM, whichever is earlier)



प्राणाभिसरः प्राणायतनानाम्

**BOARD OF AYURVEDA
NATIONAL COMMISSION FOR INDIAN SYSTEM OF MEDICINE
NEW DELHI-110058**



Padartha

NCISM

I professional Ayurvedacharya (BAMS)

Subject Code: AyUG-PV

Padartha Vijnanam

FUNDAMENTAL PRINCIPLES OF AYURVEDA AND QUANTUM MECHANICS

Total number of Teaching hours: 230			
Lecture hours (LH) - Theory		90 Hours	90 Hours (LH)
Paper I	45 Hours		
Paper II	45 Hours		
Non-Lecture hours (NLH) – Theory		140 Hours	140 Hours (NLH)
Paper I	70 Hours		
Paper II	70 Hours		
Non-Lecture hours (NLH) - Practical		Hours	

Examination (Papers & Mark Distribution)					
Item	Theory Component Marks	Practical Component Marks			
		Practical	Viva	Elective	IA
Paper I	100	100	60	10 (Set-FB)	30
Paper II	100				
Sub-Total	200	200			
Total marks	400				

PREFACE

All Medical sciences whether ancient or modern, needs frequent updating. Acharya Vagbhata stresses upon reform of Ayurveda according to the present time (yuganurupasandarbhā). The syllabus of Ayurveda also needs reformation for effective dissemination of principles of Ayurveda which is strongly based on Padarthavijnanam. Acharya Vagbhata says one who seeks long life should respect Ayurveda by four strategies that are knowledge (Adhiti), comprehension (Bodha) skill (Acharana) and Attitude (pracharana). These teaching methodologies are evolved from the ancient upanishadic way of teaching (Adhyapanavidhi). The new principles of teaching strategies of blooms taxonomy correlate with the ancient way of teaching and the syllabus of Padarthavijnanam has been revamped according to the need of hour.

Padartha Vijnanam is a unique and mandatory subject needed for learning the stream of Ayurveda. It is the combination of science and philosophy. One can say that the science and philosophy are the two sides of the same coin. The search behind “existence of world/self” when progresses outward it travels the path of science and when this search is inwards it becomes philosophy. Thus, Padartha Vijnanam is an essential base of Ayurveda education. When the foundation becomes strong building also becomes strong.

Padartha Vijnanam not only provides the platform to understand Ayurveda better but it also helps the students to appreciate the moral values benefiting them in developing the personality. As mentioned in graduate attributes this subject helps the student to become eloquent communicator and self-directed learner who constantly endeavors to advance knowledge and skills to improve healthcare and social well-being.

This syllabus reform of Padartha Vijnanam has taken care of adopting the modern teaching-learning methodology well-merging with the ancient one. This will definitely enhance the understanding of the subject in a better way.

Introduction of practicals is the zest for the subject. As we all know- “I hear, and I forget. I see and I remember. I do, and I understand”. The teaching learning process must be joyful along with lecture methods like group discussions, debate, roleplay and PBL. They are also mentioned and the flexibility is kept. Here in this syllabus, the activity book is introduced to induce activity-based learning. This will definitely create the interest in the subject. There are some self-learning activities also which will induce the thirst for the knowledge in the student. This will help the student to understand theoretical concepts in a lucid way and also provides hands on experience

Index

Course Code and Name of Course	5
Table 1- Course learning outcomes and matched PO.	5
Table 2 : Contents of Course AyUG-PV.....	6
Paper I	6
Paper II.....	8
Table 3: Learning objectives (Theory) of Course AyUG-PV	10
Paper I	10
Paper II.....	27
List of Practicals.....	41
Table 4: Learning objectives (Practical) of AyUG-PV	46
Table 5: Non Lecture Activities Course AyUG-PV.....	58
Table 6: Assessment Summary AyUG-PV	58
6 A - Number of Papers and Marks Distribution	58
6 B - Scheme of Assessment (formative and Summative).....	58
6 C - Calculation Method for Internal assessment Marks (30 Marks)	59
6 D -Evaluation Methods for Periodical Assessment.....	59
6 E- Paper Layout	60
Paper-I.....	60
Paper-II.....	60
6 F- Disribution of Theory Exam.....	61
Paper I	61
Paper II.....	61
6 G- Question paper blue print.....	62
Paper I –	62
Paper II.....	63
6 H Distribution of Practical Exam	64
7. References /Resourses.....	65

Course Code and Name of Course

	Course code	Name of Course
	AyUG-PV	Padartha Vijnanam (Fundamental Principles of Ayurveda and Quantum Mechanics)

AyUG-PV Course

Table 1- Course learning outcomes and matched PO.

CO	Course learning Outcomes (CO) AyUG-PV	Course learning Outcome matched with program learning outcomes.
	At the end of the course AyUG-PV, the student should be able to-	
CO 1	Illustrate the scope and utility of Ayurveda	PO1
CO 2	Explain Philosophical foundation of Ayurveda, Principles (Siddhantha) of Darshana along with their similarities and relevance in Ayurveda and contemporary sciences.	PO1, PO2, PO6
CO 3	Analyse and interpret Padartha (Prameya) in Darshana and Ayurveda. Recognize their applications in Ayurveda.	PO1, PO2, PO9
CO 4	Distinguish, analyse and apply concept of Pramana shastra (Epistemology) in Darshana and Ayurveda. Demonstrate their applications in Ayurveda.	PO1, PO2, PO9
CO 5	Analyse and apply concept of Karya Karana Bhava in Ayurveda.	PO1, PO2, PO9

Table 2 : Contents of Course AyUG-PV

Sr No	A2 List of Topics AyUG-PV	B2 Term	C2 Marks	D2 Lecture hours	E2 Non-Lecture hours
	Paper I				
1	Ayurveda Nirupana 1.1 Lakshana of Ayu, composition of Ayu. 1.2 Lakshana of Ayurveda. Swaroopaa and Prayojana of Ayurveda 1.3 Lakshana and classification of Siddhanta. 1.4 Introduction to Basic Principles of Ayurveda and their significance.	I		5	6
2	Padartha and Darshana Nirupana 2.1 Padartha Lakshana, Enumeration and classification of Padartha, Bhava and Abhava Padartha, Padartha according to Acharya Charaka (Karana-Padartha). 2.2 Etymological derivation of the word “Darshana”. Classification and general introduction to 9 Schools of Indian Philosophy with an emphasis on: Nyaya, Vaisheshika, Sankhya ,Yoga, Meemamsa and Vedanta darshana. 2.3 Ayurveda as unique and independent school of thought (philosophical individuality of Ayurveda). 2.4 Principles and examples in contemporary sciences which will enhance understanding concept of Padartha. 2.5 Relevance of Study of Darshana and Padartha Vignana in Ayurveda	I	25	10	14
3.	Dravya vijnaneeyam 3.1 Dravya: Lakshana, Classification and Enumeration 3.2 Panchabhuta: Various theories regarding the creation (theories of Taittiriyaopanishad, Nyaya-Vaisheshika, Sankhya-Yoga, Sankaracharya, Charaka and Sushruta), Lakshana and qualities of each Mahabhoota. 3.3 Kala: Etymological derivation, Lakshana , division / units and significance. 3.4 Dik: Lakshana ,division and significance. 3.5 Atma: Lakshana, classification, seat, Gunas, Linga according to Charaka, the method / process of knowledge formation (atmanah jnasya pravrittih). 3.6 Purusha: According to Ayurveda - Ativahikapurusha/ Sukshmarsharira/ Rashipurusha/ Chikitsapurusha/ Karmapurusha/ Shaddhatvatmakapurusha. 3.7 Manas: Lakshana, Synonyms, Qualities, Objects, Functions, dual nature of mind (ubhayaatmakatvam), as a substratum of diseases,Influence of Panchabhoutika aahara and aushadha (penta-elemental diet)on manas. 3.8 Role of Panchamahabhuta and Triguna in Dehaprakriti and Manasaprakriti respectively. 3.9 Tamas as the tenth Dravya. 3.10 Practical study/Application and Importance of each Kaarana dravya in Ayurveda. 3.11 Principles and examples in contemporary sciences	II	48	14	20

	which will enhance understanding concept of Kaarana dravya.				
4.	Guna vijnaneeyam 4.1 Etymological Derivation, Classification and Enumeration according to various Darshana and Charaka, 4.2 Lakshana and Classification of Sartha Guna, Gurvadiguna, Paradiguna, Adhyatmaguna (41 Guna) 4.3 Gunapradhanyata (Importance of Guna) 4.4 Practical / clinical application of each Guna in Ayurveda 4.5 Principles and examples in contemporary sciences which will enhance understanding concept of Guna.	II		4	6
5.	Karma vijnaneeyam 5.1 – Introduction of concept of Karma According to Darshanaand Ayurveda – Classification of Karma 5.3 - Practical application of karma 5.4 - Principles and examples in contemporary sciences which will enhance understanding concept	II		2	4
6.	Samanya vijnaneeyam 6.1 – Introduction of concept of Saamaanya According to Darshana and Ayurveda. – Classification of Saamaanya 6.3 - Practical application of saamaanya 6.4 - Principle and examples in contemporary sciences which will enhance understanding theconcept of Saamanya.	III		3	6
7.	Vishesha vijnaneeyam 7.1 – Introduction of concept of Vishesha according to Darshana and Ayurveda 7.2 - Classification of Vishesha 7.3 - Practical Application of vishesha 7.4- Principles and examples in contemporary sciences which will enhance understanding the concept of Vishesha	III	27	3	6
8.	Samavaya vijnaneeyam 8.1 – Introduction of concept of Samavaaya According toDarshana and Ayurveda. 8.2 – Practical application of Samavaaya 8.3- Principles and examples in contemporary sciences which will enhanceunderstanding theconcept of Samavaya	III		2	4
9	Abhava vijnaneeyam 9.1 – Introduction of concept of Abhaava According to Darshana and Ayurveda. 9.2 – Classification of Abhaava. 9.3 – Practical application of Abhaava 9.4- Principles and examples in contemporary sciences which will enhance understanding the concept of Abhava.	III		2	4

Paper II					
	A2 List of Topics – AyUG-PV	B2 Term	C2 Marks	D2 Lecture hours	E2 Non-Lecture hours
1	<p>Pariksha</p> <p>1.1. Definition, Significance, Necessity and Use of Pariksha.</p> <p>1.2. Definition of Prama, Aprama, Prameya, Pramata, Pramana.</p> <p>1.3. Significance and importance of Pramana, Enumeration of Pramana according to different schools of Philosophy.</p> <p>1.4. Four types of methods for examination in Ayurveda (Chaturvidha-Parikshavidhi), Pramana in Ayurveda.</p> <p>1.5. Subsumption of different Pramanas under three Pariksha.</p> <p>1.6. Practical application of methods of examination (Parikshavidhi) in Nidan and Chikitsa.</p>	I	26	6	12
2	<p>2. Aptopadesha Pariksha/Pramana</p> <p>2.1. Lakshana of Aptopadesha, Lakshana of Apta.</p> <p>2.2. Lakshana of Shabda, and its types.</p> <p>2.3. Shabdavritti-Abhidha, Lakshana, Vyanjana and Tatparyakhya. Shaktigrahahetu.</p> <p>2.4. Vaakya: Characteristics, Vaakyarthajnanahetu- Aakanksha, Yogyata, Sannidhi.</p> <p>2.5. Importance of Aptopadesha in maintaining Health, Prevention of Diseases, Diagnostics, Therapeutics and Research.</p>	I		6	10
3.	<p>3. Pratyaksha Pariksha/Pramana</p> <p>3.1. Lakshana of Pratyaksha, types of Pratyaksha- Nirvikalpaka- Savikalpaka with description, description of Laukika and Alaukika types and their further classification.</p> <p>3.2. Indriya-prapyakaritvam, six types of Sannikarsha.</p> <p>3.3. Indriyanam lakshanam, classification and enumeration of Indriya. Description of Panchapanchaka, Penta-elemental nature of Indriya (<i>Panchabhautikatwa</i> of Indriya) and similarity in sources (<i>Tulyayonitva</i>) of Indriya.</p> <p>3.4. Trayodasha Karana, dominance of Antahkarana.</p> <p>3.5. Hindrances in direct perception (<i>pratyaksha-anupalabdhikaarana</i>), enhancement of direct perception (Pratyaksha) by various</p>	II	42	8	14

	instruments/ equipments, necessity of other Pramanas in addition to Pratyaksha. 3.6. Practical study/ application of Pratyaksha in Sharir, Nidan (Diagnosis), Chikitsa (Treatment) and Anusandhan (Research).				
4.	4. Anumanapariksha/Pramana 4.1. Lakshana of Anumana. Introduction of Anumiti, Paramarsha, Vyapti, Hetu, Sadhya, Paksha, Drishtanta. Types of Anumana mentioned by Charaka and Nyayadarshana. 4.2. Characteristics and types of Vyapti. 4.3. Lakshana and types of Hetu, Description of Ahetu and Hetwabhasa. 4.4. Characteristics and significance of Tarka (logic). 4.5. Practical study/ application of Anumanapramana in Sharir, Nidan, Chikitsa and Anusandhan.	II		10	15
5.	5. Yuktipariksha/Pramana 5.1. Lakshana and description. 5.2. Importance in Ayurveda. 5.3. Practical study and utility in diagnostics, therapeutics and research.	III		2	2
6.	6. UpamanaPramana 6.1. Lakshana. 6.2. Application in Sharir, diagnostics, therapeutics and research.	III		2	4
7.	Karya- Karana Siddhanta 7.1. Lakshana of Karya and Kaarana. Types of Kaarana. 7.2. Significance of Karya and Kaarana in Ayurveda. 7.3. Different opinions regarding the manifestation of Karya from Kaarana: Satkaryavada, Parinamavada, Vivartavada, Asatkaryavada, Arambhavada, Paramanuvada, Kshanabhanguravada, Pilupaka, Pitharpaka, Anekantavada, Swabhavavada, Swabhavoparamavada. Importance/ Utility of each of these in Ayurveda 7.4 Study of cause effect relationship, causality, causation in Contemporary sciences.	III	32	11	13

Table 3: Learning objectives (Theory) of Course AyUG-PV

Paper I									
A3 Course outcome	B3 Learning Objective (At the end of the session, the students should be able to)	C3 Domain/sub	D3 Must to know/ desirable to know/Nice to know	E3 Level Does/ Shows how/ Knows how/ Know	F3 T-L method	G3 Assessment	H3 Format ive /summ ative	I3 Te rm	J3 Integ ration
Topic 1- Ayurveda Nirupana Time (Lecture: - _5 hours Non lecture 6 hours)									
CO1	Describe the Nirukti (etymology) and Definition of Ayu	Cognitive/ Recall	Must Know	Knows	Lecture Group discussion	Written and Viva	F and S	I	
CO1	Describe the components of Ayu	Cognitive/ Recall	Must Know	Knows	Lecture Group Discussion Enquiry Based learning	Written and Viva	F and S	I	
CO1	Explain Synonyms of Ayu with their meaning and importance	Cognitive Recall	Must Know	Knows	Lecture Group Discussion	Written and Viva	F and S	I	
CO1	Distinguish between 4 types Ayu namely Sukhayu, Dukhayu, Hitayu, Ahitayu	Cognitive Comprehension	Must Know	Knows	Lecture Group Discussion/ Problem Based Learning	Written and Viva, Quiz	F and S	I	
CO1	Realises that the balance between hitayu	Affective	Must know	Knows	Group Discussion/	viva	F	I	

	and Sukhayu will offer better living				Debate				
CO1	Describe Lakshana of Ayurveda and Enlist Synonyms of Ayurveda	Cognitive Recall	Must Know	Knows	Lecture Group Discussion	Written and Viva	F and S	I	
CO1	Explain different Swarupa of Ayurveda and Discuss Ayurveda Prayojana	Cognitive Comprehension	Must Know	Knows	Lecture Group Discussion/Problem Based Learning	Written and Viva Open Book Test	F and S	I	
CO1	Explain Trisutra of Ayurveda and discuss Nityatva (eternity) of Ayurveda	Cognitive Comprehension	Must Know	Knows	Lecture Group Discussion/ Debate	Written and Viva	F and S	I	
CO1, CO 2	Define Siddhanta	Cognitive Recall	Must Know	Knows	Lecture Presentation Discussion	Written and Viva	F and S	I	
CO1, CO 2	Distinguish the types of Siddhanta	Cognitive Comprehension	Must Know	Knows	Lecture Group Discussion/ Enquiry Based Learning	Written and Viva, Puzzle	F and S	I	
CO1, CO 2	Elaborate the Basic Principles of Ayurveda like Lokapurusha Samya Siddhanta Panchamahabhoota Siddhanta Tridosha Siddhanta Samanya Vishesha Siddhanta Karya Karana Siddhant	Cognitive Comprehension	Must Know	Knows	Lecture/ Group Discussion /Problem Based Learning/ Flipped Classroom	Written and Viva, quiz PBA CBA	F and S	I	

CO1, CO 2	Justify the Application of Basic Principles in Ayurveda	Affective	Must know	Knows	Lecture Demonstration/ Group Discussion	Written and Viva	F and S	I	
CO1, CO 2	Recite the concern verses from Tarkasangraha and Charak Samhita	Cognitive Recall	Desirable to know	Knows	Audio clips, classroom recitation	Viva, recitation competition	F and S	I	
Topic 2- Padartha and Darshana Nirupana Time (Lecture:- _10_ hours Non lecture __14_ hours)									
CO1, CO 2	Classify padartha, differentiate bhava, abhava padartha and Appreciate Shat karana of Acharya Charaka.	Cognitive Recall	Must Know	Knows	Lecture/ Discussions PBL	Written and Viva, puzzle	F & S	I	
CO1, CO 2	Discuss similarity and dissimilarity of padartha	Cognitive Comprehension	Desirable to Know	Knows	Lecture/ Discussions/ Activity based learning	Written and Viva	F & S	I	
CO2	Explain nirukti and vyakhya (definition) of darshana	Cognitive Recall	Must Know	Knows	Lecture	Written and Viva	F & S	I	
CO2	Describe Origin of darshana and Explain Importance of darshana (prayojana)	Cognitive Comprehension	Must know	Knows how	Lecture / Group Discussion	Written and Viva, Quiz	F & S	I	
CO1, CO 2	Analyse terms viz - philosophy, metaphysics, aesthetics, epistemology, psychology in relation with darshana	Cognitive Comprehension	Nice to know	Knows	Lecture / Group Discussion/ Activity Based learning	Written and Viva	F & S	I	
CO2	Classify darshana and differentiate between asthika, nasthika, asthikanasthika	Cognitive Recall	Must Know	Knows	Lecture / Enquiry Based Learning	Written and Viva	F & S	I	

	darshana								
CO1, CO 2	Enumerate darshana relevant for Ayurveda study and mention the pioneers of each darshana	Cognitive Recall	Must Know	Knows	Lecture/ Role play/Group Discussion	Written and Viva, Puzzle	F & S	I	
CO1, CO 2	Outline the reason for study of darshana in Ayurveda and Comprehend Philosophical foundation of Ayurveda	Cognitive Comprehension	Must Know	Knows how	Lecture/ Problem Based Learning/ Group discussion/Tutorial	Written and Viva, Open Book Test	F & S	I	
CO2	Explain meaning of nyaya and synonyms of nyayadarshana	Cognitive Recall	Must Know	Knows	Lecture Group discussion	Written and Viva	F & S	I	
CO2	Enumerate nyayoktha 16 padarthas, 12 prameyas	Cognitive Recall	Desirable to Know	Knows	Lecture /Enquiry Based Learning	Written and Viva	F & S	I	
CO2	Recall the content of nyaya sutra	Cognitive Recall	Nice to know	Knows	Lecture	Written and Viva	F & S	I	
CO2	Outline salient features of nyayadarshana viz- chaturvida pramana, pitharapaka, arambhavada.	Cognitive comprehension	Must Know	Knows	Lecture/ Group discussion / Activity Based Learning	Written and Viva , Quiz	F & S	I	
CO2	Explain meanings of vaisheshika and synonyms	Cognitive Recall	Must Know	Knows	Lecture/	Written and Viva	F & S	I	
CO2	Recall the content of vaisheshika sutra	Cognitive Recall	Nice to Know	Knows	Lecture	Written and Viva	F & S	I	

CO2	Identify salient features of vaisheshika darshana viz-shatpadartha, paramanuvada, peelupakavada	Cognitive comprehension	Must Know	Knows	Lecture group discussion/Activity based learning	Written and Viva, quiz, puzzle	F & S	I	
CO2	Explain the meaning of sankhya	Cognitive Recall	Must Know	Knows	Lecture	Written and Viva		I	
CO2	Enumerate, define and categorise 25 tatvas	Cognitive Recall	Must Know	Knows	Lecture discussion	Written and Viva puzzle	F & S	I	
CO2	Recall the trividhadukha, triguna, satkaryavada	Cognitive Recall	Must Know	Knows	Lecture/ Inquiry based learning	Written and Viva	F & S	I	
CO2	Define yoga and explain ashtangayoga	Cognitive comprehension	Must Know	Knows	Lecture Group discussion/demonstration	Written and Viva, quiz	F & S	I	
CO2	Recall content of yoga sutra	Cognitive Recall	Nice to know	Knows	Lecture	Written and Viva	F & S	I	
CO2	Enumerate chittavrutti, panchaklesha, ashtasiddhi	Cognitive Recall	Must Know	Knows	Lecture Debate /Group Discussion	Written and Viva, quiz	F & S	I	
CO2	Recall different type of yoga	Cognitive Recall	Nice to know	Knows	Lecture Self-Directed learning/Activity based learning	Written and Viva, open book test	F & S	I	
CO1, CO 2	Outline the salient features of meemamsa darshana and Vedanta darshana Viz. karma siddhanta, atma, maya, vivartavada,	Cognitive comprehension	Must Know	Knows	Lecture Group Discussion/ Debate	Written and Viva, Quiz	F & S	I	

CO1, CO 2	Explain similarity between Nyaya, vaisheshika, Sankhya, yoga, meemamsa and Vedanta darshana with Ayurveda	Cognitive comprehension	Must Know	Knows how	Lecture discussion PBL/ Flip classroom	Written and Viva	F & S	I	
CO1, CO 2	Explain Charvaka, Jaina and Bouddha darshana and their influence in Ayurveda	Cognitive comprehension	Must Know	Knows	Lecture Group Discussion	Written and Viva	F & S	I	
CO1, CO 2	Demonstrate Ayurveda as unique and independent school of thought (philosophical individuality of Ayurveda).	Cognitive Comprehension Affective	Must Know	Knows how/	Lecture/ Group Discussions PBL	Written and Viva	F & S	I	
CO 1 CO 2	Compare the the Srishtiutpatti krama by different darshanas with contemporary theories like- Big Bang, The multiverse, brane world, the hylographic universe, Simulation theory etc	Cognitive Comprehension	Nice to Know	Knows	Lecture with Videos, Group discussion/ self learning	Puzzle, viva	F	I	
CO 1	Respect ancient philosophy and Ayurveda	Affective	Must know	Know	Discussion	Discussion Debate	F	I	
CO1, CO 2	Enumerate padartha according to different schools of thought	Cognitive Recall	Desirable to Know	Knows	Lecture Group Discussion	Written and Viva, Puzzle	F & S	I	
CO1, CO 2	Find principles and examples in contemporary sciences	Cognitive/ Comprehension	Nice to know	knows	Lecture/ Discussions/ Self-learning,	-	F	I	

	which will enhance understanding concept of Padartha. For ex-matter and energy.								
CO1, CO 2	Analyse role of padartha in darshana and in Ayurveda and Demonstrate the role of Padarthavijnana in Ayurveda	Cognitive / Comprehension	Must Know	Knows how	Lecture/ Seminars /PBL	Written and Viva, Open Book Test	F & S	I	
CO2	Recite concern verses	Cognitive Recall	Desirable to know	knows	Edutainment Audio clips, classroom recitation	Viva, recitation competition	F&S	I	
Topic-3 Dravya vijnaneeyam Time (Lecture:- __14_ hours Non lecture _20_ hours)									
CO3	Explain Nirukti and Paribhasha (definition) of Dravya	Cognitive Recall	Must Know	Knows	Lecture	Written and Viva	F and S	II	
CO3	Classify Dravya and Differentiate between Karana and Karya dravya	Cognitive Recall	Must Know	Knows	Lecture Group Discussion/ Enquiry Based Learning	Written and Viva, Puzzle	F and S	II	
CO3	Enumerate Darvyas as per different schools of thoughts	Cognitive Recall	Must Know	Knows	Lecture Group Discussion	Written and Viva, puzzle	F and S	II	
CO3, CO1	Value Practical application of study of Dravya in Ayurveda	Affective	Desirable to know	Knows how	Lecture Group Discussion	Written and Viva	F and S	II	
CO3	Explain the various theories (theories of Taittiriyaopanisad, Nyaya-Vaisheshika,	Cognitive/ Comprehension	Must Know	Knows	Lecture Group Discussion /Activity Based	Written and Viva, Quiz	F and S	II	

	Sankhya-Yoga, Sankaracharya, Charaka and Sushruta) regarding creation of Panchamahabhoota				Learning				
CO3	Describe Prithvi Mahabhoota Explain qualities of Prithvi Mahabhoota	Cognitive / Comprehension	Must Know	Knows	Lecture Seminar/ Group Discussion	Written and Viva	F and S	II	
CO3	Describe Aap Mahabhoota Explain qualities of Ap Mahabhoota	Cognitive, Comprehension	Must Know	Knows	Lecture Seminar/ Group Discussion	Written and Viva	F and S	II	
CO3	Describe Teja Mahabhoota Explain qualities of Teja Mahabhoota	Cognitive, Comprehension	Must Know	Knows	Lecture Seminar/ Group Discussion	Written and Viva	F and S	II	
CO3	Describe Vayu Mahabhoota Explain qualities of Vayu Mahabhoota	Cognitive, comprehension	Must Know	Knows	Lecture Seminar/ Group Discussion	Written and Viva	F and S	II	
CO3	Describe Aakash Mahabhoota. Explain qualities of Aakash Mahabhoota	Cognitive, Comprehension	Must Know	Knows	Lecture Seminar/ Group Discussion	Written and Viva	F and S	II	
CO3, CO1	Value Practical application of Panchamahabhoota in Ayurveda	Affective	Must know	Knows	Lecture Group Discussion, Demonstration	Written and Viva, Open Book Test	F and S	II	

CO2	Compare elementary particles/subatomic particles with Tanmatra/triguna.	Cognitive/ Recall	NK	Know	Video clips, discussions SDL	Quiz	F	II	
CO3, CO1	Define the term <i>Kala</i> from various <i>darshanas</i> and <i>Ayurveda</i> .	Cognitive/ Recall	Must know	Knows	Lecture	Written and Viva	F & S	II	
CO3	Explain classification/types of <i>Kala</i>	Cognitive/ Recall	Must know	Knows	Lecture	Written and Viva	F & S	II	
CO3, CO1	Find illustrations of kala explained in Ashtang Hridaya.	Cognitive/ Comprehension	Must know	Knows	Lecture /Activity Based Learning	Written and Viva	F & S	II	
CO3, CO2 CO1	Give examples of importance of Kala in Ayurveda and time as per contemporary sciences	Cognitive/ Recall	Must know	Knows how	Problem Based Learning/ Group Discussion	Written and Viva, Quiz	F & S	II	
CO3	Define <i>the term Dik</i> . Explain classification/ division of <i>Dik</i> .	Cognitive/ Recall	Must know	Knows	Lecture /Activity Based Learning	Written and Viva, puzzle	F & S	II	
CO3, CO1	Illustrate significance of <i>Dishas</i> in Ayurveda with examples.	Cognitive/ Comprehension	Must know	Knows how	Lecture /Seminar	Written and Viva	F & S	II	
CO3	Find illustrations of <i>Dik</i> explained in Ashtangahridaya.	Cognitive/ Comprehension	Must know	Knows how	Group Discussion	Written and Viva, Open book test	F & S	II	
CO3	Define the term Atma,	Cognitive/ Recall	Must know	Knows	Lecture	Written and Viva	F & S	II	
CO3	Explain atma at different levels, seat, Gunas of Atma,	Cognitive/ Recall	Must know	Knows	Lecture	Written and Viva	F & S	II	

CO1 CO3	Explain Atma Linga according to Charaka Samhita.	Cognitive/ comprehension	Must know	Knows	Lecture / Flipped Classroom	Written and Viva	F & S	II	
CO3	Describe the method / process of knowledge formation (<i>atmanah jnasya pravrittih</i>).	Cognitive/ Comprehension	Must know	Knows how	Lecture/ Demonstration/	Written and Viva	F & S	II	
CO3	Describe Purusha as mentioned in Ayurveda	Cognitive/ Recall	Must know	Knows	Lecture	Written and Viva	F & S	II	
CO3	Differentiate Ativahikapurusha/ Sukshmasharira/ Rashipurusha/ Chikitsapurusha/ Karmapurusha/ Shaddhatvatmaka-purusha.	Cognitive/ Comprehension	Must know	Knows how	Lecture / Group discussions	Written and Viva	F & S	II	
CO3	Recognize and state significance of Atmavijnanam	Affective	Desirable to know	Knows	Group Discussions/ Problem Based Learning	viva	F	II	
CO3	Define term Manas, Enlist synonyms, Explain it's Guna. Karma, Vishay. Explain dual nature of mind. (<i>ubhayaatmakatvam</i>),	Cognitive/ Recall and Comprehension	Must know	Knows	Lecture / Activity Based Learning/Debate	Written and Viva. Puzzle	F & S	II	
CO3	Explain influence of Panchabhoutika aahara and aushadha (penta-elemental diet) on manas	Cognitive/ Recall	Must know	Knows how	Lecture/ discussions/ PBL	Written and Viva. Open Book Test	F & S	II	

CO3	Recognizes the utility of Knowledge of Mana	Affective	Must Know	Knows	Case Based learning	viva	F & S	II	
CO3, CO1	Explain Concept of mind in other sciences.	Cognitive/ Recall	Nice to know	Knows	Discussions/ Videos	Written and Viva	F	II	
CO1	Explain Role of Panchamahabhuta and Triguna in Dehaprakriti and Manasaprakriti respectively.	Cognitive/ Comprehension	Must know	Knows how	Lecture / discussions/ C B L	Written and Viva	F & S	II	
CO3	Discuss the role of Tamas as the tenth Dravya	Cognitive/Comprehension	Desirable to know	Know	Lecture Edutainment Role Play	Written and Viva	F & S	II	
CO3	Realize Practical application of study of dravya in Ayurveda	Affective	Desirable to know	Know	Group Discussions/ Case Base Learning/ Demonstration.	Written and Viva, quiz	F & S	II	
CO3	Recite Dravya Granth of Tarka Sangrah& defn from Charak	Cognitive Recall	Desirable to know	knows	Audio clips/ classroom recitation	Viva, Recitation Competetion	F&S		
CO3. CO2	Discuss principles and examples in contemporary sciences which will enhance understanding the concept of Karana dravya. For ex- Quantum Physics	Cognitive/Comprehension	Nice to know	Know	Lecture/ Discussions/ Self-learning activity	Open book testh	F	II	
Topic -4 Guna vijñaneeyam Time (Lecture:-4 hours Non lecture 6 hours)									
CO3	Define Guna and classify Guna according to various Darshanas and Charaka Samhita	Cognitive Recall	Must know	knows how	Lecture /Demonstration	Written and Viva	F&S	II	

CO3	Explain the Lakshana of indriyartha Gunas with examples.	Cognitive Comprehension	Must know	Knows how	Lecture / Group Discussion	Written and Viva	F&S	II	
CO3	Discuss the Lakshana of Gurvadi Guna with examples.	Cognitive Comprehension	Must know	Knows how	Lecture /Seminar/ Group Discussion	Written and Viva, puzzle	F&S	II	
CO3	Explain the Lakshana of Paradi Guna with examples.	Cognitive Comprehension	Must know	Knows how	Lecture /Seminar/ Group Discussion	Written and Viva, Puzzle	F&S	II	
CO3	Describe the Lakshana of Adhyatma Guna with examples.	Cognitive Comprehension	Must know	Knows how	Lecture /Seminar/ Group Discussion	Written And Viva	F&S	II	
CO3	Appreciate the importance of Guna (Gunapradhanyata)	Affective	Must know	Knows	Discussion	Written Discussion viva	F&S	II	
CO3	Describe the practical application of Indriyartha Gunas in diagnosis of disease and Treatment	Cognitive Comprehension	Must know	Knows how	Lecture / Demonstration/ Case based learning	Written And Viva	F&S	II	
CO3	Describe the practical application of Gurvadi Guna in diagnosis of disease and Treatment	Cognitive Comprehension	Must know	Knows how	Lecture / Demonstration/ Case based learning	Written And Viva	F&S	II	
CO3	Describe the practical application of Paraadi Gunas.	Cognitive Comprehension	Must know	Knows how	Lecture / Demonstration/ Activity based learning	Written And Viva	F&S	II	

CO3	Describe the practical application of Adhyatma Guna .	Cognitive Comprehension	Must know	knows how	Lecture / Demonstration/ Problem Based Learning	Written And Viva	F&S	II	
CO3	Recite the concern verses from TarkaSangrah and Charak Samhita	Cognitive Recall	Desirable to know	knows	Audio clip/ classroom recitation	viva	F&S Recitation competition	II	
CO1 CO2	Discuss Principles and examples in contemporary sciences which will enhance understanding the concept of Guna.	Cognitive Comprehension	Nice to know	Knows	Lecture/ Discussions/ Self-learning activity	-	F	II	
Topic - 5. Karma vijñaneeyam Time (Lecture:- __2__ hours Non lecture _4__hours)									
CO3	Define <i>Karma</i> acco. to various <i>Darshana</i> and <i>Ayurveda</i> .	Cognitive Recall	Must know	Knows	Lecture	Written And Viva	F&S	II	
CO3	Compare the <i>Karma Lakshana</i> (characteristics) from <i>Charaka Samhita</i> and <i>Darshana</i>	Cognitive Comprehension	Must know	Knows	Lecture/ Group discussion/ Flipped Classroom	Written And Viva	F&S	II	
CO3	Explain the types of <i>Karma</i>	Cognitive Comprehension	Must know	Knows	Lecture and discussion, demonstration	Written And Viva	F&S	II	
CO3	Describe the process of production and destruction of <i>Laukika Karma</i> with one	Cognitive Comprehension	Desirable to know	Knows how	Lecture and demonstration	Written And Viva	F&S	II	

	example.								
CO3	Describe the <i>Adhyaatmika</i> karma and its causal relationship with health and disease.	Cognitive Comprehension	Must know	Knows how	Lecture and discussion	Written And Viva	F&S	II	
CO3	Enlist the other types of processes or pharmacological actions which came under the title of <i>Karma</i> in <i>Ayurveda</i> . Viz: <i>Panchakarma</i> , <i>Shastrakarma</i> , <i>Lekhana</i> , <i>Bruhana</i> etc.	Cognitive Recall	Must know	Knows how	Lecture and discussion/ Self Directed Learning	Written And Viva	S	II	
CO3	Recite the concern verses from TarkaSangrah and Charak Samhita	Cognitive Recall	Desirable to know	knows	Audio clip/ classroom recitation/ Edutainment	viva	F&S Recitation competition	II	
CO1 CO2	Discuss principles and examples in contemporary sciences which will enhance understanding the concept of Karma.	Cognitive Recall	Nice to know	Knows	Lecture/ Discussions/ Self-learning	-	F	II	
Topic - 6 . Samanya vijnaneeyam									
Time (Lecture:- <u>3</u> hours Non lecture <u>6</u> hours)									
CO3	Explain the Samanya(According to <i>Ayurveda & Darshana</i>)	Cognitive Comprehension	Must know	Knows	Lecture	Written And Viva	F&S	III	
CO3	Distinguish the <i>Samanya</i> concept of <i>Ayurveda</i> from	Cognitive Comprehension	Must know	Knows	Lecture and discussion	Written And Viva	F&S	III	

	<i>Darshana.</i>								
CO3	Describe the <i>Anuvrutti Buddhi</i>	Cognitive Recall	Desirable to know	knows	Lecture and discussion	Written	F & S	III	
CO3	Explain the types of <i>Samanya</i> (Acc. To <i>Ayurveda</i> and <i>Darshana</i>)	Cognitive Recall	Must know	Knows	Lecture and discussion/ Flipped Classroom	Written And Viva	F & S	III	
CO3	Explain the importance of <i>samanya</i> in diagnosis and treatment	Cognitive Comprehension	Must know	Knows	Lecture and discussion/Case Based Learning	Written And Viva ,Quiz	S	III	
CO3	Identify the examples of <i>Dravya-guna-karma Samanya</i> with each <i>DOSHA-DHATU-MALA</i>	Cognitive Comprehension	Must know	Knows how	Lecture and Demonstration/ Group Discussion	Written And Viva , Open Book Test	S	III	
CO3	Recite the concern verses from <i>TarkaSangrah</i> and <i>Charak Samhita</i>	Cognitive Recall	Desirable to know	knows	Audio clip/ classroom recitation	viva	F&S Recitation competition		
CO1	Discuss principle and examples in contemporary sciences which will enhance understanding the concept of <i>Samanya</i> . For ex-system biology	Cognitive Comprehension	Nice to know	knows	Self -Directed learning	-	F	III	
Topic - 7 . Vishesh vijñaneeyam									
Time (Lecture:- __3__ hours Non lecture __6__ hours)									
CO3	Explain <i>Vishesha</i> According to <i>Ayurveda</i> & <i>Darshana</i>	Cognitive Comprehension	Must know	Knows	Lecture and Group Discussion	Written And Viva	F&S	III	

CO3	Distinguish <i>Vishesha</i> concept of <i>Ayurveda</i> from <i>Darshana</i> .	Cognitive Comprehension	Must know	Knows	Lecture and Group Discussion	Written and Viva	F&S	III	
CO3	Describe the <i>Vyavrutti Buddhi</i>	Cognitive Recall	Desirable to know	knows	Lecture and discussion	Written	F & S	III	
CO3	Explain <i>Vishesha</i> in the context of <i>Mahabhoota Paramanu</i>	Cognitive Recall	Nice to know	knows	Lecture	Written	F & S	III	
CO3	Discuss the <i>Viruddha Vishesha</i> and <i>Aviruddha Vishesha</i> and other types of <i>Vishesha</i>	Cognitive Comprehension	Must know	Knows how	Lecture and discussion, demonstration	Written And Viva	F&S	III	
CO3	Explain the statement “ <i>Pravruttirubhayasyatu</i> ”	Cognitive Comprehension	Must know	Knows how	Lecture, Problem Based Learning	Written Viva	F&S	III	
CO3	Provide different classifications of <i>vishesha</i> and their utility in Diagnosis and Treatment.	Cognitive recall	Must know	Knows how	Lecture/ Activity Based Learning	Written, Viva, Open Book Test	F&S	III	
CO3	Identify the examples of <i>Dravya-guna-karma Vishesha</i> with each <i>DOSHA-DHATU-MALA</i>	Cognitive Comprehension	Must know	Knows how	Lecture and demonstration/ Game Based Learning	Written And Viva Quiz	S	III	
CO1, CO2	Describe principles and examples in contemporary sciences which will enhance understanding the concept of <i>Vishesha</i> For ex- System Biology	Cognitive Comprehension	Nice to know	knows	Lecture/ Discussions/ Self-learning activity	viva-	F	III	

CO3	Recite the concern verses from TarkaSangrah and Charak Samhita	Cognitive Recall	Desirable to know	knows	Audio clip/ classroom recitation	viva	F&S Recitation on competition	III	
Topic - 8. Samavay vijnaneeyam									
Time (Lecture:- <u> 2 </u> hours Non lecture <u> 4 </u> hours)									
CO3	Explain Samavaya (Acc. To <i>Ayurveda</i> and <i>Darshana</i>)	Cognitive Recall	Must know	Knows	Lecture	Written And Viva	F&S	III	
CO3	Describe the eternal relation between ayutasiddhavritti	Cognitive Comprehension	Must know	Knows how	Lecture and demonstration	Written And Viva	F&S	III	
CO1 CO2	Discuss principles and examples in contemporary sciences which will enhance understanding the concept of Samavaya	Cognitive Recall	Nice to know	knows	Lecture/ Discussions/ Self-learning activity	-	F	III	
CO3	Recite the concern verses from TarkaSangrah and Charak Samhita	Cognitive Recall	Desirable to know	knows	Audio clip/ classroom recitation	Viva, Recitation competition	F&S		
Topic - 9. Abhav vijnaneeyam									
Time (Lecture:- <u> 2 </u> hours Non lecture <u> 4 </u> hours)									
CO3	Define <i>Abhava</i>	Cognitive Recall	Must know	Knows	Lecture and discussion	Written And Viva	F&S	III	
CO3	Discuss the supportive and contradictory views for the acceptance of <i>Abhava</i> as a <i>Padartha</i>	Cognitive comprehension	Must know	Knows How	Lecture Group Discussion/ debate	Written And Viva	F&S	III	
CO3	Explain the view of <i>Ayurveda</i> about <i>Abhava</i>	Cognitive Recall	Must know	Knows	Lecture demonstration	Written And Viva	F&S	III	

CO3	Explain the four types of <i>Abhava</i>	Cognitive Recall	Must know	Knows	Lecture ,Activity Based Learning	Written And Viva , Puzzle	F&S	III	
CO3	Demonstrate the utility of the knowledge of <i>Abhava</i> in Ayurveda	Cognitive Comprehension	Must know	Knows how	Lecture, Group discussions Problem Based Learning	Written And Viva	F&S	III	
CO1 CO2	Discuss principles and examples in contemporary sciences which will enhance understanding the concept of <i>Abhava</i>	Cognitive Recall	Nice to know	knows	Lecture/ Discussions/ Self-learning activity	-	F	III	
CO3	Recite the concern verses from TarkaSangrah and Charak Samhita	Cognitive Recall	Desirable to know	knows	Audio clip/ classroom recitation	viva	F&S Recitation competition		
Paper II									
Topic 1- (Pariksha) Time (Lecture:- 6 hours Non lecture 12 hours)									
CO4	Describe Pariksha	Cognitive/ Recall	Must know	Knows	Lecture/Group Discussion	Written And Viva	F&S	I	
CO4	Explain the necessity & significance of pariksha	Cognitive Comprehension	Must know	Knows how	Lecture/Problem Based Learning/Debate	Written And Viva	F&S	I	
CO4	Describe Buddhi and its classification	Cognitive / Recall	Must know	Knows	Lecture/Activity based learning	Written And Viva	F&S	I	
CO4	Describe Prama, Prameya, Pramata, Pramana and differentiate Prama and Aprama	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva, open book test	F&S	I	

CO4	Describe the Significance of Pramana	Cognitive / comprehension	Must know	Knows how	Problem based learning	Written And Viva	F&S	I	
CO4	Enumerate Pramana according to different schools of philosophy.	Cognitive / Recall	Must know	Knows	Lecture	Written And Viva, puzzle	F&S	I	
CO4	Enumerate Pariksha as per Ayurveda.	Cognitive / Recall	Must know	Knows	Lecture/ Enquiry based learning	Written And Viva	F&S	I	
CO4	Describe the Pramana accepted by different schools of Philosophy with one example each.	Cognitive / Recall	Must know	Knows	Lecture/ group discussion	Written And Viva, quiz	F&S	I	
CO4	Describe 4 Pariksha explained by Ayurveda with one example each	Cognitive / Recall	Must know	Knows	Lecture/ activity based learning	Written And Viva, puzzle	F&S	I	
CO4	Justify the inclusion of Pramanas under three Pariksha	Cognitive / Comprehension	Must know	Knows how	Problem based learning and flipped classroom	Written And Viva	F&S	I	
CO4	Describe the practical application of Pariksha Vidhi in Diagnosis and Treatment.	Cognitive / Recall	Must know	Knows	Case based learning/ Group discussion	Written, open book test And Viva	F&S	I	
CO4	Establish that the Pramanas are tool to gain the knowledge	Affective	Must know	knows	Group discussion	Viva	F&S	I	
CO4	Recite the concern Verses from Tarkasangrah & CharakSamhita	Cognitive Recall	Desirable to know	kmows	Audio clips, classroom Recitation	Viva, Recitation competetion	F&S	I	

7. Topic 2- (Aptopdesha Pariksha/Pramana) Time (Lecture:- __6_ hours Non lecture _10__hours)I									
CO 4	Describe Apta and Aptopadesh	Cognitive / Recall	Must know	Knows	Lecture	Written And Viva	F&S	I	
CO 4	Describe the significance of Aptopadesha in Chikitsa	Cognitive / Recall	Must know	Knows	Case based learning/ Group discussion	Written And Viva	F&S	I	
CO 4	Define the term Shabda	Cognitive / Recall	Must know	Knows	Lecture	Written And Viva	F&S	I	
CO 4	Describe types of Shabda	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva	F&S	I	
CO 4	Define the term Shaba artha bodhaka Vrutti	Cognitive / Recall	Must know	Knows	Lecture/ group discussion	Written And Viva	F&S	I	
CO 4	Enumerate Shabaartha bodhaka vrutti	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva, quiz	F&S	I	
CO 4	Define Abhidha Vrutti with illustration	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva	F&S	I	
CO 4	Define Lakshana Vrutti with examples	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva	F&S	I	
CO 4	Enumerate the types of Lakshanavrutti and define each of them with example	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva	F&S	I	
CO 4	Define Vyanjana vrutti with example	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva	F&S	I	
CO 4	Define Tatparyakhya vrutti with	Cognitive / Recall	Must know	Knows	Lecture/ Activity based	Written And Viva	F&S	I	

	example				learning				
CO 4	Define the term Pada with specification to Shakti and enumerate the types of Pada	Cognitive / Recall	Must know	Knows	enquiry based learning	Written And Viva	F&S	I	
CO 4	Enumerate Shaktigraha hetu	Cognitive / Recall	Must know	Knows	Lecture/ group discussion/ Problem based learning	Written And Viva, puzzle	F&S	I	
CO 4	Describe Shakti graha hetu	Cognitive / Recall	Must know	Knows	Lecture/ Tutorial/ Problem based learning	Written And Viva	F&S	I	
CO 4	Enumerate Vaakyarthajhana hetu	Cognitive / Recall	Must know	Knows	Lecture/ group discussion/ Problem based learning	Written And Viva, quiz	F&S	I	
CO 4	Define Akanksha with example	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning/ Problem based learning	Written And Viva	F&S	I	
CO 4	Define Yogyata with example	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning/ Problem based learning	Written And Viva	F&S	I	
CO 4	Define Sannidhi with example	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning/ Problem based learning	Written And Viva	F&S	I	

CO 4	Describe importance of Aptopadesha in maintaining Health, Prevention of diseases, diagnostics, therapeutics and research.	Cognitive/ Comprehension	Must know	knows	Lecture/ Activity based learning/ Problem based learning	Written And Viva, open book test	F&S	I	
CO4	Recite the concern Verses from Tarkasangrah & CharakSamhita	Cognitive Recall	Desirable to know	knows	Audio clips, classroom Recitation	Viva, Recitation competetion	F&S	I	

Topic 3- Pratyaksha Pariksha/Pramana Time (Lecture:- __8_ hours Non lecture _14__hours)

CO4	Define Pratyaksha	Cognitive / Recall	Must know	Knows	Lecture/ Tutorial/Activity based learning	Written And Viva	F&S	II	
CO4	Enumerate the types of Pratyaksha	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva	F&S	II	
CO4	Describe types of Pratyaksha	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning/ Problem based learning	Written And Viva, quiz	F&S	II	
CO4	Describe Indriya Prapyakaritva Mechanism of sensory perception)	Cognitive / comprehension	Must know	Knows	Lecture/ Flip classroom/ Problem based learning	Written And Viva,	F&S	II	
CO4	Define Sannikarsha	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva	F&S	II	

CO4	Describe the types of Sannikarsha	Cognitive / comprehension	Must know	Knows how	Lecture/ Problem based learning	Written And Viva, puzzle	F&S	II	
CO4	Define Indriya	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva	F&S	II	
CO4	Enumerate the types of Indriya	Cognitive / Recall	Must know	Knows	Lecture/ role play	Written And Viva	F&S	II	
CO4	Define Jnanendriya	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva	F&S	II	
CO4	Enlist the functions of Karmendriya	Cognitive / Recall	Must know	Knows	Problem based learning	Written And Viva	F&S	II	
CO4	Describe the function of Manas in relation to Jnanotpatti	Cognitive / Recall	Must know	Knows	Lecture/ Problem based learning	Written And Viva	F&S	II	
CO4	Justify the role of Manas as ubhayendriya in relation with Jnanotpatti and Karma.	Cognitive / Comprehension	Must know	Knows how	Problem based learning / Group discussion/Debate	Written And Viva, open book test	F&S	II	
CO4	Enumerate Panchapanchaka and describe its significance with respect to Pratyaksha Jnana	Cognitive / Recall	Must know	Knows	Lecture/ Problem based learning / Group discussion	Written And Viva, quiz	F&S	II	
CO4	Enumerate and describe briefly the various theories of Darshana and Ayurveda, which highlight the relationship of Indriya	Cognitive / Comprehension	Must know	Knows	Group discussion/ role play/debate	Written And Viva, open book test	F&S	II	

	and Panchamahabhuta.								
CO4	Justify the specificity of Indriya for perceiving specific Artha	Cognitive / Comprehension	Must know	Knows how	Activity based learning/ Problem based learning / Group discussion	Written And Viva	F&S	II	
CO4	Enumerate Trayodasha Karana	Cognitive / Recall	Must know	Knows	Lecture/Tutorial / Activity based learning	Written And Viva, puzzle	F&S	II	
CO4	Enumerate Antahkarana	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva	F&S	II	
CO4	Enumerate the functions of Antahkarana	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva	F&S	II	
CO4	Illustrate the role Antahkarana in Jnanotpatti with example to highlight the significance	Cognitive / Comprehension	Must know	Knows how	Lecture/ Problem based learning / Group discussion	Written And Viva, open book test	F&S	II	
CO4	Describe the factors which create hindrance for perception with an illustration (pratyaksha-anupalabdhi-karana)	Cognitive / Comprehension	Must know	Knows	Activity based learning/ Problem based learning / Group discussion	Written And Viva, puzzle	F&S	II	
CO4	Enumerate a few equipments or aids which help in enhancing the direct perception	Cognitive / Recall	Must know	Knows	demonstrations/ Problem based learning / Group discussion	Written And Viva, quiz	F&S	II	
CO4	Justify the necessity of other pramana with textual references and	Cognitive / Application	Must know	Knows how	Lecture/ Activity based learning/	Written And Viva, open book	F&S	II	

	illustrations				Problem based learning / Group discussion	test			
CO4	Describe the practical application of Pratyaksha in Sharir, Nidan, Chikitsa and Anusandhan (research).	Cognitive / comprehension	Must know	Knows	Lecture/ case-based learning / Group discussion	Written And Viva	F&S	II	
CO4	Justify the role Pratyaksha (Observation and interpretation skills for generalization of results) in research	Cognitive / Application	Must know	Knows how	Lecture/ Activity based learning/ Problem based learning / Group discussion	Written And Viva	F&S	II	
CO4	Realizes importance as well as limitation of Pratyaksha	Affective	Must know	Knows	Group discussion	Viva	F&S	II	
CO4	Recite the concern Verses from Tarkasangrah & CharakSamhita	Cognitive Recall	Desirable to know	knows	Audio clips, classroom Recitation	Viva, Recitation competetion	F&S	II	

Topic 4 - Anumana pariksha/Pramana Time (Lecture:- _10_ hours Non lecture _15_ hours)

CO4	Describe Anumana	Cognitive / Recall	Must know	Knows	Lecture	Written And Viva	F&S	II	
CO4	Define the terms with an example (Anumiti, Paramarsha, Vyapti, Hetu, Sadhya, Paksha, Drishtanta)	Cognitive / Recall	Must know	Knows	Lecture/ enquiry based learning	Written And Viva, quiz	F&S	II	
CO4	Describe the types of anumana	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning/ group discussion	Written And Viva,	F&S	II	

CO4	Describe Pancha Avayava Vakya	Cognitive / Recall	Must know	Knows	Lecture/ gamification/ Problem based learning / Group discussion	Written And Viva	F&S	II	
CO4, CO2	Associate Contemporary method of carrying out research with Pancha Avayava Vakya	Cognitive / Comprehension	Desirable to know	Knows how	Self directed learning, / Problem based learning / Group discussion	Written And Viva, open book test	F&S	II	
CO4	Define vyapti	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva	F&S	II	
CO4	Describe the types of vyapti	Cognitive / Recall	Must know	Knows	Lecture/ Problem based learning	Written And Viva	F&S	II	
CO4	Define hetu	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva	F&S	II	
CO4	Describe the types of hetu	Cognitive / Recall	Must know	Knows	group discussion	Written And Viva	F&S	II	
CO4	Enlist Sad-hetu Lakshana	Cognitive / Recall	Must know	Knows	Lecture/ Problem based learning	Written And Viva, quiz	F&S	II	
CO4	Define Hetwabhasa	Cognitive / Recall	Must know	Knows	Lecture/ Problem based learning	Written And Viva	F&S	II	
CO4	Explain the types of Hetwabhasa	Cognitive / Comprehension	Must know	Knows	Lecture/Tutorial group discussion	Written And Viva, puzzle, quiz	F&S	II	
CO4	Describe Ahetu	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning	Written And Viva	F&S	II	

CO4	Describe Tarkaas per Nyaya Sutra and Tarka Sangraha	Cognitive / Recall	Must know	Knows	Lecture Tutorial/ Problem based learning	Written And Viva, quiz	F&S	II	
CO4	Distinguish between Tarka as Aprama and tool in Anumana	Cognitive / Comprehension	Must know	Knows how	Enquiry based learning/ group discussion/debate	Written And Viva	F&S	II	
CO4	Justify the role of Tarka in Anumana	Cognitive / Comprehension	Must know	Knows how	Activity based learning/ Problem based learning / Group discussion	Written And Viva, open book test	F&S	II	
CO4	Demonstrate the practical applications of Anumana Pariksha (with few examples) in Sharir, Nidan, Chikitsa and Anusandhan (research).	Cognitive / Application	Must know	Knows how	Role play/ Game based learning / Group discussion	Written And Viva, open book test	F&S	II	
CO4	Recite the concern Verses from Tarkasangrah & CharakSamhita	Cognitive Recall	Desirable to know	knows	Audio clips, classroom Recitation	Viva, Recitation competetion	F&S	I	
Topic 5 - Yukti pariksha/Pramana Time (Lecture:- _2_ hours Non lecture _2_ hours)									
CO4	Describe Yukti	Cognitive / Recall	Must know	Knows	Lecture/ Activity based learning/ Group discussion	Written And Viva	F&S	III	
CO4	Compare Yukti as an independent Pariksha and as a part of Anumana	Cognitive / Comprehension	Must know	Knows how	Lecture/ Activity based learning/ Problem based	Written And Viva, open book test	F&S	III	

					learning / Group discussion				
CO4	Describe the Importance of Yukti in Ayurveda	Cognitive / Recall	Must know	Knows how	Lecture / Activity based learning / Problem based learning / Group discussion	Written And Viva	F&S	III	
CO4	Describe the practical application of Yukti in Sharir, Nidan, Chikitsa and Anusandhan (research).	Cognitive Recall	Must know	Knows how	Lecture / Activity based learning / Problem based learning / Group discussion	Written And Viva	F&S	III	
CO4	Recite the concern Verses from CharakSamhita	Cognitive Recall	Desirable to know	knows	Audio clips, classroom Recitation	Viva, Recitation competition	F&S	III	
8. Topic 6 – Upamana Pramana Time (Lecture:- __2_ hours Non lecture _4_ hours)									
CO4	Define Upamana..Enlist the types of Upaman	Cognitive / Recall	Must know	Knows	Lecture / Activity based learning	Written And Viva	F&S	III	
CO4	Describe the Importance of Upamana in Ayurveda	Cognitive / Recall	Must know	Knows	Lecture / Problem based learning / Group discussion	Written And Viva	F&S	III	
CO4	Describe the practical applications of Upamana in Sharir, Nidan, Chikitsa and Anusandhan.	Cognitive / Comprehension	Must know	Knows	Lecture / Game based learning / Problem based learning / Group discussion	Written And Viva, quiz	F&S	III	
CO4	Recite the concern Verses from Tarkasangrah & Charak	Cognitive Recall	Desirable to know	knows	Audio clips, classroom Recitation	Viva, Recitation competition	F&S	III	

Topic 7 - Karya- Karana Siddhanta Time (Lecture:- _11_ hours Non lecture _13_ hours)									
CO5 CO2	Define Karya and Karana. List types of Karana. Charakokta Dashvidha Parikshya Bhava.	Cognitive/ Recall	Must know	Knows	Lecture Tutorial	Written and Viva	F & S	III	
CO5	Explain Charakokta Dashvidha Parikshya Bhava.	Cognitive/Co mprehension	Must know	Knows	Lecture/Problem Based learning	Written and Viva	F & S	III	
CO5 CO2	Describe the significance of Karya and Kaarana in Ayurveda	Cognitive/ Comprehension	Must know	Knows how	Lecture/problem based activity	Written and Viva	F & S	III	
CO5 CO2	Realises the utility of Charakokta Dashvidha Parikshya Bhav in understanding situations and taking decisions	Affective	Must know	Knows	Group discussion/ Role play/ Debate		F	III	
CO5 CO2	Distinguish different opinions regarding the manifestation of Karya from Karana	Cognitive / Application	Must know	Knows how	Edutainment Role play/ Debate group discussion/debate	Written and Viva, quiz	F & S	III	
CO5 CO2	Analyse Satkaryavada and relate it with Ayurveda Siddhanta	Cognitive / Application	Must know	Knows how	Lecture & Group Discussion/debate	Written and Viva	F & S	III	
CO5 CO2	Analyse Asatkaryavada & relate it with Ayurveda Siddhanta	Cognitive / Application	Must know	Knows how	Lecture & Group Discussion/debate	Written and Viva	F & S	III	

CO5 CO2	Analyse Parinamavada & relate it with Ayurveda Siddhanta	Cognitive / Application	Must know	Knows how	Lecture & Group Discussion	Written and Viva	F & S	III	
CO5 CO2	Analyse Arambhavada & relate it with Ayurveda Siddhanta	Cognitive / Application	Must know	Knows how	Lecture & Group Discussion	Written and Viva	F & S	III	
CO5 CO2	Analyse Paramanuvada and relate it with Ayurveda Siddhanta	Cognitive / Application	Must know	Knows how	Lecture & Group Discussion	Written and Viva	F & S	III	
CO5 CO2	Explain Vivartavada and relate it with Ayurveda Siddhanta	Cognitive/ Comprehension	Must know	Knows how	Lecture & Group Discussion	Written and Viva	F & S	III	
CO5 CO2	Explain Kshanabhangurvada and relate it with Ayurveda Siddhanta	Cognitive/ Comprehension	Must know	Knows how	Lecture & Group Discussion	Written and Viva	F & S	III	
CO5 CO2	Explain Swabhavavada and relate it with Ayurveda Siddhanta	Cognitive/ Comprehension	Must know	Knows how	Lecture & Group Discussion	Written and Viva	F & S	III	
CO5 CO2	Explain Peelupakavada and relate it with Ayurveda Siddhanta	Cognitive/ Comprehension	Must know	Knows how	Lecture & Group Discussion/debate	Written and Viva	F & S	III	
CO5	Explain Pitharapakavada and relate it with Ayurveda Siddhanta	Cognitive/ Comprehension	Must know	Knows how	Lecture & Group Discussion/debate	Written and Viva	F & S	III	
CO5	Explain Anekantavada and relate it with Ayurveda Siddhanta	Cognitive/ Comprehension	Must know	Knows how	Lecture & Group Discussion	Written and Viva	F & S	III	
CO5 CO2	Explain Swabhavoparamavada.	Cognitive/ Comprehension	Must know	Knows how	Lecture & Group Discussion	Written and Viva	F & S	III	

CO5 CO2	Recite the concern Verses from Tarkasangrah & CharakSamhita	Cognitive Recall	Desirable to know	knows	Audio clips, classroom Recitation	Viva, Recitation competition	F&S	III	
CO5, CO2	Value cause and effect theory	Affective	Must know	Knows	Debate/Group Discussion	Viva	F	III	
CO 5, CO2	Analyse cause effect relationship, causality, causation in contemporary sciences	Cognitive / Comprehensi on	Nice to know	Knows	Self directed learning , Flipped classroom, Group Discussions.	-	-	III	

List of Practicals

Course AyUG-PV : Practical List

Marks: 100

Hours:- 45 (included in non Lecture hours)

SN	Name of Topic/ Name of Practical	Term	Activity / Practical
P1	Ayurved Nirupan	I	Ayurved Perception identification: Ask the meaning of Ayurveda to your parents, friends and family members (min 10) and write it, give your opinion on it. Introduction to communication skills. Conduct of survey.
P2	Darshana and Padartha	I	<ul style="list-style-type: none">• Darshan concept development: Find and write names of different philosophies?• Discussions: meanings of philosophy, darshana, spirituality, religion. Are they same or different? Write in Activity Book.
P3	Hitayu/ Sukhayu lakshanas	I	<ul style="list-style-type: none">• Identification of characters of Hitayu, & Sukhayu in Healthy individuals.
P4	Dravya	I	<ol style="list-style-type: none">1. Identification of Guna and Karma. Make a list of 10 dravyas surrounding you and identify Guna and Karma in it.2. Panchbhautik nature identification: Demonstrate the Panchamahabhuta in any five ahara dravya and five sharira dravya/ avayava with a neat labeled diagramme. (ex-cell, blood, vata, pitta, kapha etc).3. Determination of Directions: Identify the directions in and enlist the content in each direction in your campus.4. Conceptualize Time : Discussion and understanding of Kala as per Ayurved and contemporary sciences.5. Categorization of Aushadhi dravya by dominance of Mahabhoot e.g. Parthiv / Jaleeya/ Agney/ Vayaveey/ Akasheey dravya with reasons.6. Early Clinical Exposure(ECE): Visit the OPD, find the diseases common for different age groups (balyavastha/ tarunyavastha/ vrudhastha)

P5	Guna	II	<p>Identification:</p> <p>Sartha Guna : Identify concept of Shabda, Sparsha, Rupa, Rasa, Gandha in Dravya.</p> <p>Application and demonstration find the different therapies based on 5 Sartha Gunas. e.g. Gandha. Shabda, Sparsha.</p> <p>Observe /Experience/ Study / Read book or article present on (any one)</p> <p>Aromatherapy- Gandha Chikitsa. Music therapy/ Mamtra Chikitsa -Shabda guna.</p> <p>Sparsha- Touch therapy.</p> <p>Gurvadi Guna: Identify guna in any five ahara dravya : different vargas.</p> <p>in Sharir dravya: dosha, dhatu mala.</p> <p>Comparison Gurvadi gunas and correlate with concepts learned in Physics, Chemistry and Biology.</p> <p>Observation(survey) of the effects of Seasons on Gurvadi gunas in body, nature etc.</p> <p>Paradi Guna and their application in five examples.</p> <p>Atma Guna identification: Making or Framing their real life situations related to Atma Guna(sukha, dukkha etc)</p>
P6	Karma	II	<p>Conceptualization Karma, its application in branch of Ashtanga Ayurveda.(panchakarma/ Shastrakarma etc</p> <p>Illustration: Make a collage of pictures/ photos depicting five types of karma and their similarity with concepts learned in Physics, Chemistry etc.</p>
P7	Pratyaksha Praman	II	<p>Observation: Note down the factors from Prakruti analysis which you can</p>

			<p>understand through pratyaksh (like- colour, dry skin)</p> <p>Identification: Find few identification marks for identification of herbs/ minerals which need Pratyaksha.</p> <p>ECE: Pramans in examination of patient and Diagnosis of disease.</p> <p>Identifies the gunas which can be perceived by one sense (ekendriya) organ and more than one sense organ (Dwiendriya etc).</p> <p>Demonstrate with examples of Shabda,(snigdha/ ruksha etc) Sparsha (snigdha/ ruksha etc), Rupa, Rasa(taste threshold video), Gandha. (5 examples)</p>
P8	Pratyaksha Praman Limitations	II	<p>Observation: Find out how one can overcome limitations of Pratyaksha by advances in equipment. (microscope, telescope etc)</p> <p>Justification of use of various equipment in examination of patient and Diagnosis of disease. (X ray, USG etc)</p>
P9	Anuman Praman	II	<p>Application in Real life situation</p> <p>Write 3 examples of Vyapti (associations)in real life.</p> <p>Find and explain 5 examples of Anumana pramana as per types.</p> <p>Write 3 examples of panchavayava vakya. Correlate it with practicals that you have conducted.</p> <p>Examples of Hetvabhas.(Any three)</p> <p>Study use of inference in various sciences.</p>
P10	Samanya Vishesh Siddhant	III	<p>Identification: Visit vanaushadhi udyan of your college. Find samanyatva and visheshatva among plants.</p> <p>Illustration : Make a chart of food articles and activities to illustrate the relationship of samanya/vishesha with dosha-dhatu-malas.</p> <p>Application: Make a list/ collection of seasonal vegetables and fruits which are</p>

			Samanya/Vishesha with the dosha.(five examples)
P11	Samvay	III	Conceptualization Mention five real life examples of Nitya and anitya sambandha.
P12	Abhav	III	Application: Write five real life experiences of pragabhava, pradhwamsabhava, atyantabhava and anyonyabhav.
P13	Upman Praman	III	Illustration : Upamana in practical life or with your prior learning. (Examples of upamana from Ashtang Hridaya and Charak samhita)and prior learning (Examples in Physics, chemistry etc)
P14	Yukti Praman	III	Conceptualization: How various factors influence the process of the decision making? Application : Write 5 examples of Yukti in practical life or with your prior learning. ECE: Role of Yukti in Sharir, Nidan, Chikitsa and Anusandhan.
P15	Satkaryavad and other vadas	III	Justification : Parinama vada: Describe 3 real life or with your prior learning examples (Physics, Chemistry etc). Justification of Satkarya vada.: Describe 3 real life or with your prior learning examples. Swabhavoparama vada : Describe 3 real life or with your prior learning examples. Pakajotpatti siddhanta.: Write 3 examples of real life or with your prior learning. Justification of Arambhavada Describe 3 real life or with your prior learning examples
P16	Cause and effect theory	III	Illustration: Karya Karan Bhav: Write Samavayi, asamavayi and Nimitta Karana of a karya in real life examples (5 examples). Examples learned in Physics, Chemistry, Biology. Search Find out use of cause effect theory in other sciences. Schematic representation of cause effect in any examples.

			<p>Application: Assess the 10 factors of Charakokta Karyakarana bhava regarding any task consider the task as karya Remember and write theories of evolution you learned within and other than syllabus.</p>
A1	Other Activities in Journal.	I, II, III.	<ol style="list-style-type: none"> 1. Oral presentation: on allotted topic, PPT slides be made and Copy of slides be pasted in activity book 2. Quiz: Participation of all students in Quiz on some topic of Padartha vijnana. 3. Recitation: Important shloka of padartha vijnana recitation everyday or alternate days by students and written in diary. 4. Each student will do Pick and speak on topics of Padartha Vijnana. 5. e charts / animations etc.

Table 4: Learning objectives (Practical) of AyUG-PV

Practical									
A4 Course outcome	B4 Learning Objective (At the end of the session, the Students should be able to)	C4 Domain/ sub	D4 Must to know/ desirable to know/ Nice to know	E4 Level Does/ Shows how/ Knows how/ Know	F4 T-L method	G4 Assessment	H4 Formative /summative	I4 Term	J4 Integration
Practical1-Ayurved Nirupan Time (practical- 2 hours)									
CO1	Define Ayurved	Cognitive Recall	MK	knows	discussion	Viva	F & S	I	
CO1	Conduct the survey to identify the perception about Ayurved in the society	Psychomotor	MK	Shows	Demonstration/ discussion	Viva	F&S	I	
Practical2-Darshan and Padarth (Practical- 1hour)									
CO2	Discuss and compare the meanings of philosophy, darshana, spirituality, religion.	Cognitive / Recall	MK	Knows how	Demonstration/ discussion/ brainstorming	Viva	F &S	I	
CO2	Find and write names of different philosophies?	Cognitive e/Recall	MK	Knows how	Demonstration/ discussion/ brainstorming	Viva	F&S	I	
Practical - 3(hitayu/Sukhayu) Time (Practical/ Clinical 2 hours) :									

CO 1	Discuss characters of hitayu, & Sukhayu	Cognitive /Recall	MK	Knows how	Demonstration/ discussion/ brainstorming	Viva	F&S	I	
CO 1	Identifies characters of hitayu, & Sukhayu in healthy individuals	Cognitive / Comprehension	MK	Knows How	Demo/Practical	Viva	F& S	I	
Practical 4- Dravya Time (Practical/ Clinical 6 hours)									
CO1,3	Define dravya, discuss nature of dravya	Cognitive Recall	MK	Knows how	Demonstration/ discussion/ brainstorming	Viva	F&S	I	
CO1,3	Identify pentaelemental nature of Ahar Dravya Aushadh Dravya in given examples	Cognitive/ Comprehension	MK	Shows	Practical/Demonstration	Viva/ Practicals	F& S	I	
CO1,3	Identify the Guna and Karma in the given dravya	Cognitive/ Comprehension	MK	Knows how	Practical/Demonstration	Viva/ Practicals	F&S	I	
CO1,3	Categorize the Aushadhi dravya by dominance of Mahabhoot e.g. Parthiv /Jaleeya/ Agney/ Vayaveey/ Akasheey dravya with reasons	Cognitive/ Comprehension	MK	Knows how	Practical/Demonstration	Viva/ Practicals	F&S	I	
CO1,3	Identify the directions in and enlist the content in each direction in your campus.	Cognitive/ Comprehension	MK	Knows how	Practical/Demonstration	Viva/ Practicals	F&S	I	
CO1,3	Discus the concept of Kala as per Ayurved and	Cognitive/ Recall	MK	Knows	Demonstration/ discussion/	Viva	F&S	I	

	contemporary sciences.				brainstorming				
CO1,3	find the diseases common for different age groups (balyavastha/ tarunyavastha/ vrudh'avastha)	Cognitive/ Comprehe nsion	MK	Knows how	Early Clinical Exposure.	Viva/ Practicals	F&S	I	
Practical - 5(Guna) Time (Practical/ Clinical 5 hours)									
CO 3	Discuss Guna,	Cognitive/ Recall	MK	Knows how	Demonstration/ discussion/ brainstorming	Viva	F&S	II	
CO 3	Identify Gunas in given Ahar dravya.	Cognitive/ Comprehe nsion	MK	Knows How	Demo/Practical	Viva/ Practicals	F&S	II	
CO 3	Identify Gunas in given Sharir dravya.	Cognitive/ Comprehe nsion	MK	Knows how	Practical/Demon stration	Viva/ Practicals	F&S	II	
CO 3	Identify the specification of Shabda, Sparsha, Rupa, Rasa, Gandha in Dravy	Cognitive/ Comprehe nsion	MK	Knows how	Demonstration of Dravyas like- kutki, gojihva, guduchi, yashtimadhu, sariva etc.	Viva/ Practicals	F&S	II	
CO 3	find the different therapies based on 5 Sartha Gunas. e.g.Gandha. Shabda, Sparsha.	Cognitive/ Comprehe nsion	DK	knows	Demonstration/ discussion/ brainstorming	Viva/ Practicals	F&S	II	

CO 3	Observe and record the effects of Seasons on Gurvadi gunas in body and nature	Cognitive/analysis	MK	Knows how	Practical/Demonstration	Viva/Practicals	F&S	II	
CO 3	Correlate Gurvadi gunas with concepts learned in Physics, Chemistry and Biology.	Cognitive/comprehension	MK	Knows how	Demonstration/discussion/brainstorming	Viva/Practicals	F&S	II	
CO 3	Identify the paratva-apatva in five examples	Cognitive/Comprehension	MK	Knows how	Practical/Demonstration	Viva/Practicals	F&S	II	
CO 3	Perform the Sanskar (toyasannikarsha/vasan/Bhavana)	Psychomotor	MK	Shows	Practical/Demonstration	Viva/Practicals	F&S	II	
CO 3	Frame the real life situations related to Atma Guna(sukha, dukkha etc)	Cognitive/Comprehension	MK	Knows how	Demonstration/discussion/brainstorming	Viva/Practicals	F&S	II	
Practical -6 Karma Time (Practical/ Clinical 3 hours)									
CO 3	Discuss Karma	Cognitive/Recall	MK	Knows how	Demonstration/discussion/brainstorming	Viva	F&S	II	
CO 3	Classify Karma in given	Cognitive/Comprehe	MK	Knows how	Demonstration/Practical	Viva/Practicals	F&S	II	

	examples (panchakarma/Shastrakarma)	nsion							
CO 3	Illustrate five types of Karma in collage of pictures/ photos	Cognitive/ Comprehe nsion	MK	Knows how	Practical/Demon stration	Viva/ Practicals	F&S	II	
CO 3	compare Karma with concepts learned in Physics, Chemistry etc.	Cognitive/ Comprehen sion	MK	Knows	Practical/Demon stration	Viva/ Practicals	F&S	II	
Practical – 7 Pratyaksha Praman Time (Practical/ Clinical 5 hours)									
CO4	Discuss Pratyaksha Praman	Cognitive/ Recall	MK	Knows how	Demonstration/ discussion/ brainstorming	Viva	F&S	II	
CO4	Find identification marks for identification of herbs/ minerals which need Pratyaksha.	Cognitive/ Comprehe nsion	MK	Knows how	Demonstration/ Practical	Viva/ Practicals	F&S	II	
CO4	Note down the factors from Prakruti analysis which need pratyaksh (like- colour, dry skin)	Cognitive/ Comprehe nsion	MK	Knows how	Practical/Demon stration	Viva/ Practicals	F&S	II	
CO4	Discuss the use of pratyaksha in examination of patient and Diagnosis of disease.	Cognitive/ Comprehe nsion	MK	Knows how	ECE/ discussion	Viva/ Practicals	F&S	II	
CO4	identifies with examples of Shabda,(snigdha/ ruksha etc) Sparsha (snigdha/ ruksha etc),	Cognitive/ Comprehe nsion	MK	Knows how	Practical/Demon stration/ Shabd from recordings, (snigdha/	Viva/ Practicals	F&S	II	

	Rupa, Rasa(taste threshold video), Gandha.				ruksha etc) Sparsha by touching or instruments. (snigdha/ruksha etc), Rupa, Rasa(taste threshold video), Gandha.(intensity of Smell)				
CO4	Identifies the gunas which can be perceived by one sense (ekendriya) organ and more than one sense organ (Dwiendriya etc).	Cognitive/Comprehension	MK	Knows how	Demonstration/discussion/brainstorming	Viva/Practicals	F&S	II	
Practical -8 Pratyaksha Badhakar Bhav Time (Practical/ Clinical 2 hours)									
CO4	Discuss Pratyaksha Badhakar Bhav (limitations of pratyaksha.)	Cognitive/recall	MK	Knows	Lecture	Viva	F&S	II	
CO4	Identify and classifies Pratyaksha badhakar Bhav in given examples.	Cognitive/Comprehension	MK	Knows how	Demonstration/Practical. Ask examples or encourage to identify examples.	Viva/Practicals	F&S	II	

CO4	Justify the use of various equipment in examination of patient and Diagnosis of disease.	Cognitive/Comprehension	MK	Knows how	Demonstration/discussion/brainstorming/Video Clips	Viva/Practicals	F&S	II	
Practical -9 Anuman praman Time (Practical/ Clinical 5 hours)									
CO4	Discuss Anuman praman	Cognitive/Recall	MK	Knows	Demonstration/discussion/brainstorming	Viva	F&S	II	
CO4	Identify and classify Anuman praman with type in given examples.	Cognitive/Comprehension	MK	knows	Demonstration/Practical, Ask examples or encourage to identify examples.	Practical/Demonstration	F&S	II	
CO4	Find and discuss examples of Vyapti (associations)in real life.	Cognitive/Comprehension	MK	Knows how	Practical/Demonstration. Ask examples or encourage to identify examples.	Practical/Demonstration	F&S	II	
CO4	Apply panchavayava vakya for drawing inference in practicals conducted	Cognitive/Comprehension	MK	Knows how	Practical/Demonstration	Practical/Demonstration	F&S	II	
CO4	Identify and discuss Hetvabhas in given examples	Cognitive/Comprehension	MK	Knows how	Practical/Demonstration. Ask examples or encourage to identify	Practical/Demonstration	F&S	II	

					examples.				
CO4	Draw inference in various sciences on the basis of Vyapti.	Cognitive/ recall	MK	knows	Demonstration/ discussion/ brainstorming	Practical/De monstration	F&S	II	
Practical -10 Samanya Vishesh Siddhant Time (Practical/ Clinical 5 hours)									
CO 3	Discuss Samanya vishesh Siddhant	Cognitive/ Rcall	MK	Knows	Demonstration/ discussion/ brainstorming	Viva	F&S	III	
CO 3	Identify and classifies Samanya vishesh Siddhant with type in given examples.	Cognitive/ Comprehe nsion	MK	Knows how	Demonstration/ Practical/ Ask examples or encourage to identify examples.	Viva/ Practical	F&S	III	
CO 3	Identify samanyatva and visheshatva among plants in Vanaushadhi udyan	Cognitive/ Comprehe nsion	MK	Knows how	Practical/Demon stration.	Viva/ Practicals	F&S	III	
CO 3	Make a chart/ eChart of food articles and activities to illustrate the relationship of samanya/vishesha with dosha-dhatu-malas.	Cognitive/ Comprehe nsion	MK	Knows how	Practical/Demon stration	Presentation/ Viva/ Practicals	F&S	III	
CO 3	Make a poster seasonal vegetables and fruits which are Samanya/Vishesha with the dosha.	Cognitive/ Comprehe nsion	MK	Knows how	Practical	Presentation /Viva/ Practicals	F&S	III	
Practical -11 Samavay Time (Practical/ Clinical 1 hour)									

CO 3	Discuss Samavay	Cognitive/ Recall	MK	Knows	Demonstration/ discussion/ brainstorming	Viva	F&S	III	
CO 3	Mention five real life examples of Nitya and anitya sambandha.	Cognitive/ Comprehe nsion	MK	Knows how	Demonstration/ Practical/ Ask examples or encourage to identify examples.	Viva/ Practical	F&S	III	
Practical -12 Abhav Time (Practical/ Clinical 1)									
CO 3	Discuss Abhav	Cognitive/ Recall	MK	Knows how	Demonstration/ discussion/ brainstorming	Viva	F&S	III	
CO 3	Write real life experiences of pragabhava, pradhwamsabhava, atyantabhava and anyonyabhav.	Cognitive/ Comprehe nsion	MK	Shows	Demonstration/ Practical/ Ask examples or encourage to identify examples.	Viva	F&S	III	
Practical - 13 Upman Praman Time (Practical/ (Practical/ Clinical 1 hour)									
CO4	Discuss Upaman Praman	Cognitive/ Recall	MK	Knows how	Demonstration/ discussion/ brainstorming	Viva/ Practical	F&S	III	
CO4	Illustrate Upamana in practical examples and real life situation.	Cognitive/ Comprehe nsion	MK	Knows how	Demonstration/ Practical/ Ask examples or encourage to identify examples.	Viva/ Practicals	F&S	III	
CO4	Identify Examples of upamana from Ashtang	Cognitive/ Comprehe	MK	Knows how	Demonstration/ discussion/	Viva/ Practicals	F&S	III	

	Hridaya and Charak Samhita	nsion			brainstorming.				
CO4	Identify examples in Physics, chemistry biology where Upaman is used	Cognitive/ Comprehension	MK	Knows how	Demonstration/ discussion/ brainstorming/ Ask examples or encourage to identify examples.	Viva/ Practicals	F&S	III	
Practical -14 Yukti Praman Time (Practical/ Clinical 1 hour									
CO4	Discuss Yukti Praman	Cognitive/ Recall	MK	Knows	Demonstration/ discussion/ brainstorming	Viva	F&S	III	
CO4	Illustrate examples of Yukti in practical life or with your prior learning.	Cognitive/ Comprehension	MK	Knows how	Demonstration/ Practical/ Ask examples or encourage to identify examples.	Viva/ Practicals Quiz	F&S	III	
CO4	Identify Role of Yukti in Nidan, Chikitsa and Anusandhan (research).	Cognitive/ Comprehension	MK	Knows how	ECE/ Demonstration/	Viva/ Practicals/ PBL	F&S	III	
Practical -15 Various Vadas Time (Practical/ Clinical 3 hour)									
CO5 CO2	Discuss Satkaryavad	Cognitive/ Recall	MK	Knows how	Demonstration/ discussion/ brainstorming	Viva	F&S	III	
CO5 CO2	Justify Satkaryavad through real life	Cognitive/ comprehension	MK	Knows how	Demonstration/ Practical/ /Ask examples or	Viva/ Practicals/ PBL	F&S	III	

	examples/ examples from prior learning				encourage to identify examples.				
CO5 CO2	Justify Parinamvad through real life examples/ examples from prior learning	Cognitive/ comprehension	MK	Knows how	Practical/Demonstration/ /Ask examples or encourage to identify examples.	Viva/ Practicals	F&S	III	
CO5 CO2	Justify Pakajotpatti through real life examples/ examples from prior learning	Cognitive/ comprehension	MK	Knows how	Practical/Demonstration/ /Ask examples or encourage to identify examples.	Viva/ Practicals	F&S	III	
CO5 CO2	Justify Swabhavoparamvad through real life examples/ examples from prior learning	Cognitive/ comprehension	MK	Knows how	Demonstration/ discussion/ brainstorming/ /Ask examples or encourage to identify examples.	Viva/ Practicals	F&S	III	
CO5 CO2	Justify Arambhavad through real life examples/ examples from prior learning	Cognitive/ comprehension	MK	Knows how	Demonstration/ Practical//Ask examples or encourage to identify examples.	Viva/ Practicals	F&S	III	
Practical -16 Cause and Effect theory Time (Practical/ Clinical 2 hours)									
CO5, CO2	Discuss Cause and effect theory	Cognitive/ comprehension	MK	Knows	Demonstration/ discussion/ brainstorming	Viva/ Quiz	F&S	III	
CO5 CO2	Identify Samavayi, Asamavayi and Nimitta	Cognitive/ Comprehe	MK	Knows How	Demonstration/ Practical/Ask	Viva/ Practicals	F&S	III	

	karan of a Karya in real life examples/ examples with prior learning	nsion			examples or encourage to identify examples.				
CO5	Find out use of cause effect theory in other sciences.	Cognitive/ comprehension	MK	Knows how	Practical/Demonstration	Viva/ Practicals/ Debate	F&S	III	
CO5	Represent cause and effect schematically in any examples	Cognitive/ comprehension	MK	Knows how	Practical/Demonstration	Viva/ Practicals	F&S	III	
CO5	Assess the 10 factors of Charakokta Karyakarana bhava regarding any task consider the task as karya	Cognitive/ analysis	MK	Knows how	Practical/Demonstration	Viva/ Practicals	F&S	III	
CO5	Write theories of evolution you learned within and other than syllabus.	Cognitive/ comprehension	MK	Knows how	Practical/Demonstration	Viva/ Practicals	F&S	III	

Table 5: Non Lecture Activities Course AyUG-PV**Table 5- Course AyUG-PV Non Lecture Activities- 140**

	List non lecture Teaching-Learning methods *	No of Activities
1	GROUP DISCUSSION	20
2	PRACTICALS AND DEMONSTRATIONS	45
3	ACTIVITY BASED LEARNING	10
4	PROBLEM BASED LEARNING	10
5	ENQUIRY BASED LEARNING	8
6	CASE BASED LEARNING	6
7	GAME BASED LEARNING	8
8	FLIPPED CLASSROOMS	6
9	DEBATE	8
10	SEMINARS	6
11	TUTORIALS	5
12	ROLE PLAY	5
13	SELF DIRECTED LEARNING	3
		140

Table 6: Assessment Summary AyUG-PV**6 A - Number of Papers and Marks Distribution**

S.No.	Subject Code	Papers	Theory	Practical/Clinical Assessment					Grand Total
				Practical/ Clinical	Viva	Electives	IA	Sub Total	
1.	AyUG-PV	2	200	100	60	10 (Set-FB)	30	200	400

6 B - Scheme of Assessment (formative and Summative)

SR.NO.	PROFESSIONAL COURSE	DURATION OF PROFESSIONAL COURSE		
		First Term (1-6 Months)	Second Term (7-12 Months)	Third Term (13-18 Months)
1	First	3 PA & First TT	3 PA & Second TT	3 PA & UE

PA: Periodical Assessment; TT: Term Test; UE: University Examinations

6 C - Calculation Method for Internal assessment Marks (30 Marks)

TERM	PERIODICAL ASSESSMENT*					TERM TEST**	TERM ASSESSMENT	
	A	B	C	D	E	F	G	H
	1 (15 Marks)	2 (15 Marks)	3 (15 Marks)	Average (A+B+C/3)	Converted to 30 Marks (D/15)*30)	Term Test (Marks converted to 30)	Sub Total _/60 Marks	Term Assessment (.../30)
FIRST							E+F	(E+F)/2
SECOND							E+F	(E+F)/2
THIRD						NIL		E
Final IA	Average of Three Term Assessment Marks as Shown in 'H' Column.							
	Maximum Marks in Parentheses *Select an Evaluation Method which is appropriate for the objectives of Topics from the Table 6 D for Periodic assessment. Conduct 15 marks assessment and enter marks in A, B, and C. ** Conduct Theory (100 Marks)(MCQ(20*1 Marks), SAQ(8*5), LAQ(4*10)) and Practical (100 Marks) Then convert to 30 marks.							

6 D -Evaluation Methods for Periodical Assessment

S. No.	Evaluation Methods
1.	Activities Indicated in Table 3 - Column G3 as per Indicated I, II or III term in column I3.
2.	Practical / Clinical Performance
3.	Viva Voce, MCQs, MEQ (Modified Essay Questions/Structured Questions)
4.	Open Book Test (Problem Based)
5.	Summary Writing (Research Papers/ Samhitas)
6.	Class Presentations; Work Book Maintenance
7.	Problem Based Assignment
8.	Objective Structured Clinical Examination (OSCE), Objective Structured Practical Examination (OPSE), Mini Clinical Evaluation Exercise (Mini-CEX), Direct Observation of Procedures (DOP), Case Based Discussion (CBD)
9.	Extra-curricular Activities, (Social Work, Public Awareness, Surveillance Activities, Sports or Other Activities which may be decided by the department).
10.	Small Project
11.	AyUG-PV Specific Test on Topics in list of practicals.

6 E- Paper Layout

I PROFESSIONAL BAMS EXAMINATIONS

AyUG-PV

Paper-I

Time: 3 Hours Maximum Marks: 100

INSTRUCTIONS: All questions compulsory

TOTAL MARKS 100

		Number of Questions	Marks per question	Total Marks
Q 1	Multiple Choice Questions (MCQ)	20	1	20
Q 2	Short answer questions (SAQ)	8	5	40
Q 3	Long answer questions (LAQ)	4	10	40
				100

I PROFESSIONAL BAMS EXAMINATIONS

AyUG PV

Paper-II

Time: 3 Hours Maximum Marks: 100

INSTRUCTIONS: All questions compulsory

TOTAL MARKS 100

		Number of Questions	Marks per question	Total Marks
Q 1	Multiple Choice Questions (MCQ)	20	1	20
Q 2	Short answer questions (SAQ)	8	5	40
Q 3	Long answer questions (LAQ)	4	10	40
				100

6 F- Disribution of Theory Exam

Paper I				D Type of Questions "Yes" can be asked. "No" should not be asked.		
A List of topics	B Term	C Marks	MCQ (1 mark)	SAQ (5 marks)	LAQ (10 marks)	
1	Ayurveda nirupana	I	25	Yes	Yes	Yes
2	Padartha and darshana nirupana	I		Yes	Yes	Yes
3.	Dravya vijnaneeyam	II	48	Yes	Yes	Yes
4.	Guna vijnaneeyam	II		Yes	Yes	Yes
5.	Karma vijnaneeyam	II		Yes	Yes	Yes
6.	Samanya vijnaneeyam	III	27	Yes	Yes	Yes
7.	Vishesha vijnaneeyam	III		Yes	Yes	Yes
8.	Samavaya vijnaneeyam	III		Yes	Yes	No
9	Abhava vijnaneeyam	III		Yes	Yes	No

Paper II				D Type of Questions "Yes" can be asked. "No" should not be asked.		
A List of Topics	B Term	C Marks	MCQ (1 Mark)	SAQ (5 Marks)	LAQ (10 Marks)	
1	Pariksha	I	26	YES	YES	YES
2	Aptopdesha Pariksha/Pramana	I		YES	YES	YES
3.	Pratyaksha Pariksha/Pramana	II	42	YES	YES	YES
4.	Anumanapariksha/Pramana	II		YES	YES	YES
5.	Yuktipariksha/Pramana	III	32	YES	YES	NO
6.	UpamanaPramana	III		YES	YES	NO
7.	Karya- Karana Siddhanta	III		YES	YES	YES

6 G- Question paper blue print

Paper I –

A Question Sr. No	B Type of Question	C Question Paper Format
.Q1	<p>Multiple choice Questions (MCQ)</p> <p>20 Questions</p> <p>1 mark each</p> <p>All compulsory</p> <p>(Must Know 15 MCQ Desirable to know 3 MCQ Nice to know 2 MCQ)</p>	<ol style="list-style-type: none"> 1. Topic number 1 2. Topic number 2 3. Topic number 3 4. Topic number 4 5. Topic number 5 6. Topic number 6 7. Topic number 7 8. Topic number 8 9. Topic number 9 10. Topic number 2 11. Topic number 3 12. Topic number 4 13. Topic number 5 14. Topic number 6 15. Topic number 7 16. Topic number 9 17. Topic number 1 18. Topic number 2 19. Topic number 3 20. Topic number 4
Q2	<p>Short answer Questions (SAQ)</p> <p>Eight Questions</p> <p>5 Marks Each</p> <p>All compulsory</p> <p>(Must know 7 . Desirable to know 1 No Questions on Nice to know.)</p>	<ol style="list-style-type: none"> 1. Topic no.1 2. Topic no.2 3. Topic no.3 4. Topic no.4 5. Topic no.5 6. Topic no.6/ Topic no.7 7. Topic no.8/ Topic no.9 8. Topic no.3/ Topic no.4
Q3	<p>Long answer Questions (LAQ)</p> <p>Four Questions</p> <p>10 marks each</p> <p>All compulsory</p> <p>(All questions on Must to know. No Questions on Nice to know and Desirable to know.)</p>	<ol style="list-style-type: none"> 1. Topic no.1/ Topic no.2 2. Topic no.3 3. Topic no.4/Topic no.5 4. Topic no.6/ Topic no.7

Paper II

A Question Sr. No	B Type of Question	C Question Paper Format
Q1	<p>Multiple choice Questions (MCQ)</p> <p>20 Questions</p> <p>1 mark each</p> <p>All compulsory</p> <p>(Must know 15 MCQ Desirable to know 3 MCQ Nice to know 2 MCQ)</p>	<ol style="list-style-type: none"> 1. Topic number 1 2. Topic number 2 3. Topic number 3 4. Topic number 4 5. Topic number 5 6. Topic number 6 7. Topic number 7 8. Topic number 1 9. Topic number 2 10. Topic number 3 11. Topic number 4 12. Topic number 5 13. Topic number 6 14. Topic number 7 15. Topic number 1 16. Topic number 2 17. Topic number 3 18. Topic number 4 19. Topic number 7 20. Topic number 4
Q2	<p>Short answer Questions (SAQ)</p> <p>Eight Questions</p> <p>5 Marks Each</p> <p>All compulsory</p> <p>(Must know 7 . Desirable to know 1 No Questions on Nice to know.)</p>	<ol style="list-style-type: none"> 1. Topic no.1 2. Topic no.2 3. Topic no.3 4. Topic no.4 5. Topic no.5 6. Topic no.6 7. Topic no.7 8. Topic no.3/ Topic no.4
Q3	<p>Long answer Questions (LAQ)</p> <p>Four Questions</p> <p>10 marks each</p> <p>All compulsory</p> <p>(All questions on must know No Questions on Nice to know and Desirable to know)</p>	<ol style="list-style-type: none"> 1. Topic no.1/ Topic no.2 2. Topic no.3 3. Topic no.4 4. Topic no.7

6 H Distribution of Practical Exam

Practical – (Practical 100 +Viva 60+Elective 10+ IA 30) =(Total 200 Marks)

SN	Heads	Marks
1	Practical (Total Marks 100)	100
a.	Spotting (4 Spots) Problem based on Principles in PV. Topics 1. Pratyaksha praman/Pratyaksha Badhakar Bhav 2. Vada (Any one) 3. Abhav/Samavay 4. Upaman/Yukti	20
b.	Journal of Activity book/ Projects. (Viva on journal and communication skill)	20
c.	Practical I (10 Marks Each) 1. Identify panchamahabhoot dominance in the given dravya 2. Identify Samanya- Vishesh in the given dravyas 3. Identify the Gunas in the given dravyas (Use different dravys for different students.)	30
d.	Practical II (Problem based questiones/ Situations)(10 Marks Each)(Any three) 1. Identify and explain the Karya Karan with types in given problem 2. Frame and Write Panchavayav vakya for the given anumana. 3. Identify Vyapti, Paksh, Sadhya, Hetu, Pakshadharmata, Sapaksha, Vipaksha in the give example. 4. Identify and explain Hetvabhas in given example. 5. Identify the vada applicable in given example.(any one vada.) 6. Identify Upama, Sajna- sajni sambhandha in given example.	30
2	Viva Voce	60
	Recitation of Shloka: 10 marks (sutras in Tarka sangraha, Samhitas, other)	
	Questions on Darshan 10 marks	
	Question on Dravya/ Guna/ Karma. 10 marks	
	Question on Samany/vishesh/samavaya/ Abhav 10 Marks	
	Question on one Praman 10 Marks	

	Question on Karya karan bhav 10 Marks.	
3	Internal Assessment	30
4	Electives	10
		200

7. References /Resources

Reference Books

PadarthaVignana books

	Authorus
1. Padarthavigyan	Acharya Ramraksha Pathak
2. AyurvediyaPadarthaVigyana	Vaidya Ranjit Rai Desai
3. Ayurved Darshana	Acharya Rajkumar Jain
4. PadarthaVigyana	Kashikar
5. PadarthaVigyana	Balwant Shastri
6. SankhyatantwaKaumadi	GajananShastri
7. Psycho Pathology in Indian Medicine	Dr. S.P. Gupta
8. CharakEvumSushrutkeDarshanik Vishay	Prof.Jyotirmitra Acharya
9. AyurvediyaPadarthaVigyana	Dr. Ayodhya Prasad Achal
10. PadarthaVigyana	Dr. Vidyadhar Shukla
11. Post graduate text book of Samhitha&Sidhanta	Dr P.P.Kirathamoorthy and Dr Anoop AK
12. Padartha Vigyana	Dr. Ravidutta Tripathi
13. AyurvediyaPadarthaVigyana	Vaidya Ramkrishna Sharma Dhand
14. AyurvediyaPadartha Vignan Parichaya	Vaidya Banwarilal Gaur
15. AyurvediyaPadartha Darshan	Pandit Shivhare
16. Scientific Exposition of Ayurveda	Dr. Sudhir Kumar
17. Padarthavignana and Ayurveda itihasa	Dr C R Agnives
18. Essentials of padarthavignana	Dr Vinodkumar MV
19. Padarthavignanevam Ayurveda Itihas	Dr RamnihorTapsi Jaiswal
20. AyurvediyaPadarthavignana	Dr C R Agnives
21. AyurvediyaMoulikaSiddhanta	Dr V J Thakkar

Pharmacy Council of India
New Delhi

Rules & Syllabus for the Bachelor
of Pharmacy (B. Pharm) Course

[Framed under Regulation 6, 7 & 8 of the Bachelor of
Pharmacy (B. Pharm) course regulations 2014]

CHAPTER- I: REGULATIONS

1. Short Title and Commencement

These regulations shall be called as “The Revised Regulations for the B. Pharm. Degree Program (CBCS)of the Pharmacy Council of India, New Delhi”. They shall come into effect from the Academic Year 2016-17. The regulations framed are subject to modifications from time to time by Pharmacy Council of India.

2. Minimum qualification for admission

2.1 First year B. Pharm:

Candidate shall have passed 10+2 examination conducted by the respective state/central government authorities recognized as equivalent to 10+2 examination by the Association of Indian Universities (AIU) with English as one of the subjects and Physics, Chemistry, Mathematics (P.C.M) and or Biology (P.C.B / P.C.M.B.) as optional subjects individually. Any other qualification approved by the Pharmacy Council of India as equivalent to any of the above examinations.

2.2. B. Pharm lateral entry (to third semester):

A pass in D. Pharm. course from an institution approved by the Pharmacy Council of India under section 12 of the Pharmacy Act.

3. Duration of the program

The course of study for B.Pharm shall extend over a period of eight semesters (four academic years) and six semesters (three academic years) for lateral entry students. The curricula and syllabi for the program shall be prescribed from time to time by Pharmacy Council of India, New Delhi.

4. Medium of instruction and examinations

Medium of instruction and examination shall be in English.

5. Working days in each semester

Each semestershall consist of not less than 100 working days. The odd semesters shall be conducted from the month of June/July to November/December and the even semesters shall be conducted from December/January to May/June in every calendar year.

6. Attendance and progress

A candidate is required to put in at least 80% attendance in individual courses considering theory and practical separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.

7. Program/Course credit structure

As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, tutorial hours, practical classes, etc. are measured in terms of credits. On satisfactory completion of the courses, a candidate earns credits. The amount of credit associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly, the credit associated with any of the other academic, co/extra-curricular activities is dependent upon the quantum of work expected to be put in for each of these activities per week.

7.1. Credit assignment

7.1.1. Theory and Laboratory courses

Courses are broadly classified as Theory and Practical. Theory courses consist of lecture (L) and /or tutorial (T) hours, and Practical (P) courses consist of hours spent in the laboratory. Credits (C) for a course is dependent on the number of hours of instruction per week in that course, and is obtained by using a multiplier of one (1) for lecture and tutorial hours, and a multiplier of half (1/2) for practical (laboratory) hours. Thus, for example, a theory course having three lectures and one tutorial per week throughout the semester carries a credit of 4. Similarly, a practical having four laboratory hours per week throughout semester carries a credit of 2.

7.2. Minimum credit requirements

The minimum credit points required for award of a B. Pharm. degree is 208. These credits are divided into Theory courses, Tutorials, Practical, Practice School and Project over the duration of eight semesters. The credits are distributed semester-wise as shown in Table IX. Courses generally progress in sequences, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester-wise schedule of courses given in the syllabus.

The lateral entry students shall get 52 credit points transferred from their D. Pharm program. Such students shall take up additional remedial courses of 'Communication Skills' (Theory and Practical) and 'Computer Applications in Pharmacy' (Theory and Practical) equivalent to 3 and 4 credit points respectively, a total of 7 credit points to attain 59 credit points, the maximum of I and II semesters.

8. Academic work

A regular record of attendance both in Theory and Practical shall be maintained by the teaching staff of respective courses.

9. Course of study

The course of study for B. Pharm shall include Semester Wise Theory & Practical as given in Table – I to VIII. The number of hours to be devoted to each theory, tutorial and practical course in any semester shall not be less than that shown in Table – I to VIII.

Table-I: Course of study for semester I

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP101T	Human Anatomy and Physiology I– Theory	3	1	4
BP102T	Pharmaceutical Analysis I – Theory	3	1	4
BP103T	Pharmaceutics I – Theory	3	1	4
BP104T	Pharmaceutical Inorganic Chemistry – Theory	3	1	4
BP105T	Communication skills – Theory *	2	-	2
BP106RBT BP106RMT	Remedial Biology/ Remedial Mathematics – Theory*	2	-	2
BP107P	Human Anatomy and Physiology – Practical	4	-	2
BP108P	Pharmaceutical Analysis I – Practical	4	-	2
BP109P	Pharmaceutics I – Practical	4	-	2
BP110P	Pharmaceutical Inorganic Chemistry – Practical	4	-	2
BP111P	Communication skills – Practical*	2	-	1
BP112RBP	Remedial Biology – Practical*	2	-	1
Total		32/34[§]/36[#]	4	27/29[§]/30[#]

[#]Applicable ONLY for the students who have studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology (RB)course.

[§]Applicable ONLY for the students who have studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics (RM)course.

* Non University Examination (NUE)

Table-II: Course of study for semester II

Course Code	Name of the course	No. of hours	Tutorial	Credit points
BP201T	Human Anatomy and Physiology II – Theory	3	1	4
BP202T	Pharmaceutical Organic Chemistry I – Theory	3	1	4
BP203T	Biochemistry – Theory	3	1	4
BP204T	Pathophysiology – Theory	3	1	4
BP205T	Computer Applications in Pharmacy – Theory *	3	-	3
BP206T	Environmental sciences – Theory *	3	-	3
BP207P	Human Anatomy and Physiology II –Practical	4	-	2
BP208P	Pharmaceutical Organic Chemistry I– Practical	4	-	2
BP209P	Biochemistry – Practical	4	-	2
BP210P	Computer Applications in Pharmacy – Practical*	2	-	1
Total		32	4	29

*Non University Examination (NUE)

Table-III: Course of study for semester III

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP301T	Pharmaceutical Organic Chemistry II – Theory	3	1	4
BP302T	Physical Pharmaceutics I – Theory	3	1	4
BP303T	Pharmaceutical Microbiology – Theory	3	1	4
BP304T	Pharmaceutical Engineering – Theory	3	1	4
BP305P	Pharmaceutical Organic Chemistry II – Practical	4	-	2
BP306P	Physical Pharmaceutics I – Practical	4	-	2
BP307P	Pharmaceutical Microbiology – Practical	4	-	2
BP 308P	Pharmaceutical Engineering –Practical	4	-	2
Total		28	4	24

Table-IV: Course of study for semester IV

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP401T	Pharmaceutical Organic Chemistry III– Theory	3	1	4
BP402T	Medicinal Chemistry I – Theory	3	1	4
BP403T	Physical Pharmaceutics II – Theory	3	1	4
BP404T	Pharmacology I – Theory	3	1	4
BP405T	Pharmacognosy and Phytochemistry I– Theory	3	1	4
BP406P	Medicinal Chemistry I – Practical	4	-	2
BP407P	Physical Pharmaceutics II – Practical	4		2
BP408P	Pharmacology I – Practical	4	-	2
BP409P	Pharmacognosy and Phytochemistry I – Practical	4	-	2
	Total	31	5	28

Table-V: Course of study for semester V

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP501T	Medicinal Chemistry II – Theory	3	1	4
BP502T	Industrial PharmacyI– Theory	3	1	4
BP503T	Pharmacology II – Theory	3	1	4
BP504T	Pharmacognosy and Phytochemistry II– Theory	3	1	4
BP505T	Pharmaceutical Jurisprudence – Theory	3	1	4
BP506P	Industrial PharmacyI – Practical	4	-	2
BP507P	Pharmacology II – Practical	4	-	2
BP508P	Pharmacognosy and Phytochemistry II – Practical	4	-	2
	Total	27	5	26

Table-VI: Course of study for semester VI

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP601T	Medicinal Chemistry III – Theory	3	1	4
BP602T	Pharmacology III – Theory	3	1	4
BP603T	Herbal Drug Technology – Theory	3	1	4
BP604T	Biopharmaceutics and Pharmacokinetics – Theory	3	1	4
BP605T	Pharmaceutical Biotechnology – Theory	3	1	4
BP606T	Quality Assurance –Theory	3	1	4
BP607P	Medicinal chemistry III – Practical	4	-	2
BP608P	Pharmacology III – Practical	4	-	2
BP609P	Herbal Drug Technology – Practical	4	-	2
Total		30	6	30

Table-VII: Course of study for semester VII

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP701T	Instrumental Methods of Analysis – Theory	3	1	4
BP702T	Industrial PharmacyII – Theory	3	1	4
BP703T	Pharmacy Practice – Theory	3	1	4
BP704T	Novel Drug Delivery System – Theory	3	1	4
BP705P	Instrumental Methods of Analysis – Practical	4	-	2
BP706PS	Practice School*	12	-	6
Total		28	5	24

* Non University Examination (NUE)

Table-VIII: Course of study for semester VIII

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP801T	Biostatistics and Research Methodology	3	1	4
BP802T	Social and Preventive Pharmacy	3	1	4
BP803ET	Pharma Marketing Management	3 + 3 = 6	1 + 1 = 2	4 + 4 = 8
BP804ET	Pharmaceutical Regulatory Science			
BP805ET	Pharmacovigilance			
BP806ET	Quality Control and Standardization of Herbals			
BP807ET	Computer Aided Drug Design			
BP808ET	Cell and Molecular Biology			
BP809ET	Cosmetic Science			
BP810ET	Experimental Pharmacology			
BP811ET	Advanced Instrumentation Techniques			
BP812ET	Dietary Supplements and Nutraceuticals			
BP813PW	Project Work	12	-	6
Total		24	4	22

Table-IX: Semester wise credits distribution

Semester	Credit Points
I	27/29 [§] /30 [#]
II	29
III	26
IV	28
V	26
VI	26
VII	24
VIII	22
Extracurricular/ Co curricular activities	01*
Total credit points for the program	209/211[§]/212[#]

* The credit points assigned for extracurricular and or co-curricular activities shall be given by the Principals of the colleges and the same shall be submitted to the University. The criteria to acquire this credit point shall be defined by the colleges from time to time.

[§]Applicable ONLY for the students studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics course.

[#]Applicable ONLY for the students studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology course.

10. Program Committee

1. The B. Pharm. program shall have a Program Committee constituted by the Head of the institution in consultation with all the Heads of the departments.

2. The composition of the Program Committee shall be as follows:

A senior teacher shall be the Chairperson; One Teacher from each department handling B.Pharm courses; and four student representatives of the program (one from each academic year), nominated by the Head of the institution.

3. Duties of the Program Committee:

- i. Periodically reviewing the progress of the classes.
- ii. Discussing the problems concerning curriculum, syllabus and the conduct of classes.
- iii. Discussing with the course teachers on the nature and scope of assessment for the course and the same shall be announced to the students at the beginning of respective semesters.
- iv. Communicating its recommendation to the Head of the institution on academic matters.
- v. The Program Committee shall meet at least thrice in a semester preferably at the end of each Sessionalexam (Internal Assessment) and before the end semester exam.

11. Examinations/Assessments

The scheme for internal assessment and end semester examinations is given in Table – X.

11.1. End semester examinations

The End Semester Examinations for each theory and practical coursethrough semesters I to VIII shall be conducted by the university except for the subjects with asterix symbol (*) in table I and II for which examinations shall be conducted by the subject experts at college level and the marks/grades shall be submitted to the university.

Tables-X: Schemes for internal assessments and end semester examinations semester wise

Semester I

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP101T	Human Anatomy and Physiology I– Theory	10	15	1 Hr	25	75	3 Hrs	100
BP102T	Pharmaceutical Analysis I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP103T	Pharmaceutics I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP104T	Pharmaceutical Inorganic Chemistry – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP105T	Communication skills – Theory *	5	10	1 Hr	15	35	1.5 Hrs	50
BP106RBT BP106RMT	Remedial Biology/ Mathematics – Theory*	5	10	1 Hr	15	35	1.5 Hrs	50
BP107P	Human Anatomy and Physiology – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP108P	Pharmaceutical Analysis I – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP109P	Pharmaceutics I – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP110P	Pharmaceutical Inorganic Chemistry – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP111P	Communication skills – Practical*	5	5	2 Hrs	10	15	2 Hrs	25
BP112RBP	Remedial Biology – Practical*	5	5	2 Hrs	10	15	2 Hrs	25
Total		70/75[§]/80[#]	115/125[§]/130[#]	23/24[§]/26[#] Hrs	185/200[§]/210[#]	490/525[§]/ 540[#]	31.5/33[§]/ 35[#] Hrs	675/725[§]/ 750[#]

[#]Applicable ONLY for the students studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology (RB)course.

[§]Applicable ONLY for the students studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics (RM)course.

* Non University Examination (NUE)

Semester II

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP201T	Human Anatomy and Physiology II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP202T	Pharmaceutical Organic Chemistry I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP203T	Biochemistry – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP204T	Pathophysiology – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP205T	Computer Applications in Pharmacy – Theory*	10	15	1 Hr	25	50	2 Hrs	75
BP206T	Environmental sciences – Theory*	10	15	1 Hr	25	50	2 Hrs	75
BP207P	Human Anatomy and Physiology II – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP208P	Pharmaceutical Organic Chemistry I– Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP209P	Biochemistry – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP210P	Computer Applications in Pharmacy – Practical*	5	5	2 Hrs	10	15	2 Hrs	25
Total		80	125	20 Hrs	205	520	30 Hrs	725

* The subject experts at college level shall conduct examinations

Semester III

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP301T	Pharmaceutical Organic Chemistry II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP302T	PhysicalPharmaceuticsI –Theory	10	15	1 Hr	25	75	3 Hrs	100
BP303T	Pharmaceutical Microbiology – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP304T	Pharmaceutical Engineering – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP305P	Pharmaceutical Organic Chemistry II – Practical	5	10	4 Hr	15	35	4 Hrs	50
BP306P	Physical Pharmaceutics I – Practical	5	10	4 Hr	15	35	4 Hrs	50
BP307P	Pharmaceutical Microbiology – Practical	5	10	4 Hr	15	35	4 Hrs	50
BP308P	Pharmaceutical Engineering – Practical	5	10	4 Hr	15	35	4 Hrs	50
Total		60	100	20	160	440	28Hrs	600

Semester IV

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP401T	Pharmaceutical Organic Chemistry III- Theory	10	15	1 Hr	25	75	3 Hrs	100
BP402T	Medicinal Chemistry I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP403T	Physical Pharmaceutics II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP404T	Pharmacology I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP405T	Pharmacognosy I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP406P	Medicinal Chemistry I – Practical	5	10	4 Hr	15	35	4 Hrs	50
BP407P	Physical Pharmaceutics II – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP408P	Pharmacology I – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP409P	Pharmacognosy I – Practical	5	10	4 Hrs	15	35	4 Hrs	50
Total		70	115	21 Hrs	185	515	31 Hrs	700

Semester V

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP501T	Medicinal Chemistry II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP502T	Industrial PharmacyI– Theory	10	15	1 Hr	25	75	3 Hrs	100
BP503T	Pharmacology II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP504T	Pharmacognosy II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP505T	Pharmaceutical Jurisprudence – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP506P	Industrial PharmacyI– Practical	5	10	4 Hr	15	35	4 Hrs	50
BP507P	Pharmacology II – Practical	5	10	4 Hr	15	35	4 Hrs	50
BP508P	Pharmacognosy II – Practical	5	10	4 Hr	15	35	4 Hrs	50
Total		65	105	17 Hr	170	480	27 Hrs	650

Semester VI

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP601T	Medicinal Chemistry III – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP602T	Pharmacology III – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP603T	Herbal Drug Technology – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP604T	Biopharmaceutics and Pharmacokinetics – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP605T	Pharmaceutical Biotechnology– Theory	10	15	1 Hr	25	75	3 Hrs	100
BP606T	Quality Assurance– Theory	10	15	1 Hr	25	75	3 Hrs	100
BP607P	Medicinal chemistry III – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP608P	Pharmacology III – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP609P	Herbal Drug Technology – Practical	5	10	4 Hrs	15	35	4 Hrs	50
Total		75	120	18 Hrs	195	555	30 Hrs	750

Semester VII

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP701T	Instrumental Methods of Analysis – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP702T	Industrial Pharmacy – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP703T	Pharmacy Practice – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP704T	Novel Drug Delivery System – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP705 P	Instrumental Methods of Analysis – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP706 PS	Practice School*	25	-	-	25	125	5 Hrs	150
Total		70	70	8Hrs	140	460	21 Hrs	600

* The subject experts at college level shall conduct examinations

Semester VIII

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP801T	Biostatistics and Research Methodology – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP802T	Social and Preventive Pharmacy – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP803ET	Pharmaceutical Marketing – Theory	10 + 10 = 20	15 + 15 = 30	1 + 1 = 2 Hrs	25 + 25 = 50	75 + 75 = 150	3 + 3 = 6 Hrs	100 + 100 = 200
BP804ET	Pharmaceutical Regulatory Science – Theory							
BP805ET	Pharmacovigilance – Theory							
BP806ET	Quality Control and Standardization of Herbals – Theory							
BP807ET	Computer Aided Drug Design – Theory							
BP808ET	Cell and Molecular Biology – Theory							
BP809ET	Cosmetic Science – Theory							
BP810ET	Experimental Pharmacology – Theory							
BP811ET	Advanced Instrumentation Techniques – Theory							
BP812PW	Project Work	-	-	-	-	150	4 Hrs	150

Total	40	60	4 Hrs	100	450	16 Hrs	550
--------------	-----------	-----------	--------------	------------	------------	---------------	------------

11.2. Internal assessment: Continuous mode

The marks allocated for Continuous mode of Internal Assessment shall be awarded as per the scheme given below.

Table-XI: Scheme for awarding internal assessment: Continuous mode

Theory		
Criteria	Maximum Marks	
Attendance (Refer Table – XII)	4	2
Academic activities (Average of any 3 activities e.g. quiz, assignment, open book test, field work, group discussion and seminar)	3	1.5
Student – Teacher interaction	3	1.5
Total	10	5
Practical		
Attendance (Refer Table – XII)	2	
Based on Practical Records, Regular viva voce, etc.	3	
Total	5	

Table- XII: Guidelines for the allotment of marks for attendance

Percentage of Attendance	Theory	Practical
95 – 100	4	2
90 – 94	3	1.5
85 – 89	2	1
80 – 84	1	0.5
Less than 80	0	0

11.2.1. Sessional Exams

Two Sessional exams shall be conducted for each theory / practical course as per the schedule fixed by the college(s). The scheme of question paper for theory and practical Sessional examinations is given below. The average marks of two Sessional exams shall be computed for internal assessment as per the requirements given in tables – X.

Sessional exam shall be conducted for 30 marks for theory and shall be computed for 15 marks. Similarly Sessional exam for practical shall be conducted for 40 marks and shall be computed for 10 marks.

Question paper pattern for theory Sessional examinations

For subjects having University examination

I. Multiple Choice Questions (MCQs)	=	10 x 1 = 10
OR		OR
Objective Type Questions (5 x 2) (Answer all the questions)	=	05 x 2 = 10
I. Long Answers (Answer 1 out of 2)	=	1 x 10 = 10
II. Short Answers (Answer 2 out of 3)	=	2 x 5 = 10

Total	=	30 marks

For subjects having Non University Examination

I. Long Answers (Answer 1 out of 2)	=	1 x 10 = 10
II. Short Answers (Answer 4 out of 6)	=	4 x 5 = 20

Total	=	30 marks

Question paper pattern for practical sessional examinations

I. Synopsis	=	10
II. Experiments	=	25
III. Viva voce	=	05

Total	=	40 marks

12. Promotion and award of grades

A student shall be declared PASS and eligible for getting grade in a course of B.Pharm. program if he/she secures at least 50% marks in that particular course including internal assessment. For example, to be declared as PASS and to get grade, the student has to secure a minimum of 50 marks for the total of 100 including continuous mode of assessment and end semester theory examination and has to secure a minimum of 25 marks for the total 50 including internal assessment and end semester practical examination.

13. Carry forward of marks

In case a student fails to secure the minimum 50% in any Theory or Practical course as specified in 12, then he/she shall reappear for the end semester examination of that course. However his/her marks of the Internal Assessments shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.

14. Improvement of internal assessment

A student shall have the opportunity to improve his/her performance only once in the Sessional exam component of the internal assessment. The re-conduct of the Sessional exam shall be completed before the commencement of next end semester theory examinations.

15. Re-examination of end semester examinations

Reexamination of end semester examinations shall be conducted as per the schedule given in table XIII. The exact dates of examinations shall be notified from time to time.

Table-XIII: Tentative schedule of end semester examinations

Semester	For Regular Candidates	For Failed Candidates
I, III, V and VII	November / December	May / June
II, IV, VI and VIII	May / June	November / December

Question paper pattern for end semester theory examinations

For 75 marks paper

- I. Multiple Choice Questions(MCQs) = 20 x 1 = 20
OR
Objective Type Questions (10 x 2) = 10 x 2 = 20
(Answer all the questions)
- II. Long Answers (Answer 2 out of 3) = 2 x 10 = 20
III. Short Answers (Answer 7 out of 9) = 7 x 5 = 35

Total = 75 marks

For 50 marks paper

- I. Long Answers (Answer 2 out of 3) = 2 x 10 = 20
II. Short Answers (Answer 6 out of 8) = 6 x 5 = 30

Total = 50 marks

For 35 marks paper

- I. Long Answers (Answer 1 out of 2) = 1 x 10 = 10
II. Short Answers (Answer 5 out of 7) = 5 x 5 = 25

Total = 35 marks

Question paper pattern for end semester practical examinations

- I. Synopsis = 5
II. Experiments = 25
III. Viva voce = 5

Total = 35 marks

16. Academic Progression:

No student shall be admitted to any examination unless he/she fulfills the norms given in 6. Academic progression rules are applicable as follows:

A student shall be eligible to carry forward all the courses of I, II and III semesters till the IV semester examinations. However, he/she shall not be eligible to attend the courses of V semester until all the courses of I and II semesters are successfully completed.

A student shall be eligible to carry forward all the courses of III, IV and V semesters till the VI semester examinations. However, he/she shall not be eligible to attend the courses of VII semester until all the courses of I, II, III and IV semesters are successfully completed.

A student shall be eligible to carry forward all the courses of V, VI and VII semesters till the VIII semester examinations. However, he/she shall not be eligible to get the course completion certificate until all the courses of I, II, III, IV, V and VI semesters are successfully completed.

A student shall be eligible to get his/her CGPA upon successful completion of the courses of I to VIII semesters within the stipulated time period as per the norms specified in 26.

A lateral entry student shall be eligible to carry forward all the courses of III, IV and V semesters till the VI semester examinations. However, he/she shall not be eligible to attend the courses of VII semester until all the courses of III and IV semesters are successfully completed.

A lateral entry student shall be eligible to carry forward all the courses of V, VI and VII semesters till the VIII semester examinations. However, he/she shall not be eligible to get the course completion certificate until all the courses of III, IV, V and VI semesters are successfully completed.

A lateral entry student shall be eligible to get his/her CGPA upon successful completion of the courses of III to VIII semesters within the stipulated time period as per the norms specified in 26.

Any student who has given more than 4 chances for successful completion of I / III semester courses and more than 3 chances for successful completion of II / IV semester courses shall be permitted to attend V / VII semester classes ONLY during the subsequent academic year as the case may be. In simpler terms there shall NOT be any ODD BATCH for any semester.

Note: Grade AB should be considered as failed and treated as one head for deciding academic progression. Such rules are also applicable for those students who fail to register for examination(s) of any course in any semester.

17. Grading of performances

17.1. Letter grades and grade points allocations:

Based on the performances, each student shall be awarded a final letter grade at the end of the semester for each course. The letter grades and their corresponding grade points are given in Table – XII.

Table – XII: Letter grades and grade points equivalent to Percentage of marks and performances

Percentage of Marks Obtained	Letter Grade	Grade Point	Performance
90.00 – 100	O	10	Outstanding
80.00 – 89.99	A	9	Excellent
70.00 – 79.99	B	8	Good
60.00 – 69.99	C	7	Fair
50.00 – 59.99	D	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

A learner who remains absent for any end semester examination shall be assigned a letter grade of AB and a corresponding grade point of zero. He/she should reappear for the said evaluation/examination in due course.

18. The Semester grade point average (SGPA)

The performance of a student in a semester is indicated by a number called ‘Semester Grade Point Average’ (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester. For example, if a student takes five courses (Theory/Practical) in a semester with credits C₁, C₂, C₃, C₄ and C₅ and the student’s grade points in these courses are G₁, G₂, G₃, G₄ and G₅, respectively, and then students’ SGPA is equal to:

$$\text{SGPA} = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4G_4 + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F and AB grade awarded in that semester. For example if a learner has a F or AB grade in course 4, the SGPA shall then be computed as:

$$C_1G_1 + C_2G_2 + C_3G_3 + C_4* \text{ZERO} + C_5G_5$$

$$\text{SGPA} = \frac{\text{-----}}{C_1 + C_2 + C_3 + C_4 + C_5}$$

19. Cumulative Grade Point Average (CGPA)

The CGPA is calculated with the SGPA of all the VIII semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all VIII semesters and their courses. The CGPA shall reflect the failed status in case of F grade(s), till the course(s) is/are passed. When the course(s) is/are passed by obtaining a pass grade on subsequent examination(s) the CGPA shall only reflect the new grade and not the fail grades earned earlier. The CGPA is calculated as:

$$\text{CGPA} = \frac{C_1S_1 + C_2S_2 + C_3S_3 + C_4S_4 + C_5S_5 + C_6S_6 + C_7S_7 + C_8S_8}{\text{-----}}$$

$$C_1 + C_2 + C_3 + C_4 + C_5 + C_6 + C_7 + C_8$$

where C₁, C₂, C₃,... is the total number of credits for semester I,II,III,... and S₁,S₂, S₃,... is the SGPA of semester I,II,III,....

20. Declaration of class

The class shall be awarded on the basis of CGPA as follows:

- First Class with Distinction = CGPA of 7.50 and above
- First Class = CGPA of 6.00 to 7.49
- Second Class = CGPA of 5.00 to 5.99

21. Project work

All the students shall undertake a project under the supervision of a teacher and submit a report. The area of the project shall directly relate any one of the elective subject opted by the student in semester VIII. The project shall be carried out in group not exceeding 5 in number. The project report shall be submitted in triplicate (typed & bound copy not less than 25 pages).

The internal and external examiner appointed by the University shall evaluate the project at the time of the Practical examinations of other semester(s). Students shall be evaluated in groups for four hours (i.e., about half an hour for a group of five students). The projects shall be evaluated as per the criteria given below.

Evaluation of Dissertation Book:

Objective(s) of the work done	15 Marks
Methodology adopted	20 Marks
Results and Discussions	20 Marks
Conclusions and Outcomes	20 Marks

Total	75 Marks
--------------	-----------------

Evaluation of Presentation:

Presentation of work	25 Marks
Communication skills	20 Marks
Question and answer skills	30 Marks

Total	75 Marks
--------------	-----------------

Explanation: The 75 marks assigned to the dissertation book shall be same for all the students in a group. However, the 75 marks assigned for presentation shall be awarded based on the performance of individual students in the given criteria.

22. Industrial training (Desirable)

Every candidate shall be required to work for at least 150 hours spread over four weeks in a Pharmaceutical Industry/Hospital. It includes Production unit, Quality Control department, Quality Assurance department, Analytical laboratory, Chemical manufacturing unit, Pharmaceutical R&D, Hospital (Clinical Pharmacy), Clinical Research Organization, Community Pharmacy, etc. After the Semester – VI and before the commencement of Semester – VII, and shall submit satisfactory report of such work and certificate duly signed by the authority of training organization to the head of the institute.

23. Practice School

In the VII semester, every candidate shall undergo practice school for a period of 150 hours evenly distributed throughout the semester. The student shall opt any one of the domains for practice school declared by the program committee from time to time.

At the end of the practice school, every student shall submit a printed report (in triplicate) on the practice school he/she attended (not more than 25 pages). Along with the exams of semester VII, the report submitted by the student, knowledge and skills acquired by the student through practice school shall be evaluated by the subject experts at college level and grade point shall be awarded.

24. Award of Ranks

Ranks and Medals shall be awarded on the basis of final CGPA. However, candidates who fail in one or more courses during the B.Pharm program shall not be eligible for award of ranks. Moreover, the candidates should have completed the B. Pharm program in minimum prescribed number of years, (four years) for the award of Ranks.

25. Award of degree

Candidates who fulfill the requirements mentioned above shall be eligible for award of degree during the ensuing convocation.

26. Duration for completion of the program of study

The duration for the completion of the program shall be fixed as double the actual duration of the program and the students have to pass within the said period, otherwise they have to get fresh Registration.

27. Re-admission after break of study

Candidate who seeks re-admission to the program after break of study has to get the approval from the university by paying a condonation fee.

No condonation is allowed for the candidate who has more than 2 years of break up period and he/she has to rejoin the program by paying the required fees.

CHAPTER - II: SYLLABUS

Semester I

BP101T. HUMAN ANATOMY AND PHYSIOLOGY-I (Theory)

45 Hours

Scope: This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

Objectives: Upon completion of this course the student should be able to

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform the various experiments related to special senses and nervous system.
5. Appreciate coordinated working pattern of different organs of each system

Course Content:

Unit I

10 hours

- **Introduction to human body**

Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology.

- **Cellular level of organization**

Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine

- **Tissue level of organization**

Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.

Unit II

10 hours

- **Integumentary system**

Structure and functions of skin

- **Skeletal system**

Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system

Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction

- **Joints**
Structural and functional classification, types of joints movements and its articulation

Unit III

10 hours

- **Body fluids and blood**
- Body fluids, composition and functions of blood, hemopoiesis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.
- **Lymphatic system**
Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system

Unit IV

08 hours

Peripheral nervous system:

Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system.

Origin and functions of spinal and cranial nerves.

- **Special senses**
Structure and functions of eye, ear, nose and tongue and their disorders.

Unit V

07 hours

- **Cardiovascular system**
Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.

BP107P. HUMAN ANATOMY AND PHYSIOLOGY (Practical)

4 Hours/week

Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject.

1. Study of compound microscope.
2. Microscopic study of epithelial and connective tissue
3. Microscopic study of muscular and nervous tissue
4. Identification of axial bones
5. Identification of appendicular bones

6. Introduction to hemocytometry.
7. Enumeration of white blood cell (WBC) count
8. Enumeration of total red blood corpuscles (RBC) count
9. Determination of bleeding time
10. Determination of clotting time
11. Estimation of hemoglobin content
12. Determination of blood group.
13. Determination of erythrocyte sedimentation rate (ESR).
14. Determination of heart rate and pulse rate.
15. Recording of blood pressure.

Recommended Books (Latest Editions)

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
4. Text book of Medical Physiology- Arthur C, Guyton and John.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.

6. Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

Reference Books (Latest Editions)

1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje ,Academic Publishers Kolkata

BP102T. PHARMACEUTICAL ANALYSIS (Theory)

45 Hours

Scope: This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs

Objectives: Upon completion of the course student shall be able to

- understand the principles of volumetric and electro chemical analysis
- carryout various volumetric and electrochemical titrations
- develop analytical skills

Course Content:

UNIT-I

10 Hours

(a) **Pharmaceutical analysis-** Definition and scope

- i) Different techniques of analysis
- ii) Methods of expressing concentration
- iii) Primary and secondary standards.
- iv) Preparation and standardization of various molar and normal solutions- Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate

(b)**Errors:** Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures

(c)Pharmacopoeia, Sources of impurities in medicinal agents,limit tests.

UNIT-II

10 Hours

- **Acid base titration:** Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves
- **Non aqueous titration:** Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl

UNIT-III

10 Hours

- **Precipitation titrations:** Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride.
- **Complexometric titration:** Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate.
- **Gravimetry:** Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate.
- Basic Principles,methods and application of diazotisation titration.

UNIT-IV

08 Hours

Redox titrations

(a) Concepts of oxidation and reduction

(b) Types of redox titrations (Principles and applications)

Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate

UNIT-V

07 Hours

- **Electrochemical methods of analysis**
 - **Conductometry**- Introduction, Conductivity cell, Conductometric titrations, applications.
 - **Potentiometry** - Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration and applications.
 - **Polarography** - Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications

BP108P. PHARMACEUTICAL ANALYSIS (Practical)

4 Hours / Week

I Limit Test of the following

- (1) Chloride
- (2) Sulphate
- (3) Iron
- (4) Arsenic

II Preparation and standardization of

- (1) Sodium hydroxide
- (2) Sulphuric acid
- (3) Sodium thiosulfate
- (4) Potassium permanganate
- (5) Ceric ammonium sulphate

III Assay of the following compounds along with Standardization of Titrant

- (1) Ammonium chloride by acid base titration
- (2) Ferrous sulphate by Cerimetry
- (3) Copper sulphate by Iodometry
- (4) Calcium gluconate by complexometry
- (5) Hydrogen peroxide by Permanganometry
- (6) Sodium benzoate by non-aqueous titration
- (7) Sodium Chloride by precipitation titration

IV Determination of Normality by electro-analytical methods

- (1) Conductometric titration of strong acid against strong base
- (2) Conductometric titration of strong acid and weak acid against strong base
- (3) Potentiometric titration of strong acid against strong base

Recommended Books: (Latest Editions)

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry
4. Bentley and Driver's Textbook of Pharmaceutical Chemistry
5. John H. Kennedy, Analytical chemistry principles
6. Indian Pharmacopoeia.

BP103T. PHARMACEUTICS- I (Theory)

45 Hours

Scope: This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

Objectives: Upon completion of this course the student should be able to:

- Know the history of profession of pharmacy
- Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
- Understand the professional way of handling the prescription
- Preparation of various conventional dosage forms

Course Content:

UNIT – I

10 Hours

- **Historical background and development of profession of pharmacy:** History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia.
- **Dosage forms:** Introduction to dosage forms, classification and definitions
- **Prescription:** Definition, Parts of prescription, handling of Prescription and Errors in prescription.
- **Posology:** Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area.

UNIT – II

10 Hours

- **Pharmaceutical calculations:** Weights and measures – Imperial & Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight.
- **Powders:** Definition, classification, advantages and disadvantages, Simple & compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions.
- **Liquid dosage forms:** Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques

UNIT – III**08 Hours**

- **Monophasic liquids:** Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions.
- **Biphasic liquids:**
- **Suspensions:** Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome.
- **Emulsions:** Definition, classification, emulsifying agent, test for the identification of type of Emulsion, Methods of preparation & stability problems and methods to overcome.

UNIT – IV**08 Hours**

- **Suppositories:** Definition, types, advantages and disadvantages, types of bases, methods of preparations. Displacement value & its calculations, evaluation of suppositories.
- **Pharmaceutical incompatibilities:** Definition, classification, physical, chemical and therapeutic incompatibilities with examples.

UNIT – V**07 Hours**

- **Semisolid dosage forms:** Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosage forms

BP109P. PHARMACEUTICALS (Practical)

3 Hours / week

1. Syrups

- a) Syrup IP'66
- b) Compound syrup of Ferrous Phosphate BPC'68

2. Elixirs

- a) Piperazine citrate elixir
- b) Paracetamol pediatric elixir

3. Linctus

- a) Terpin Hydrate Linctus IP'66
- b) Iodine Throat Paint (Mandles Paint)

4. Solutions

- a) Strong solution of ammonium acetate
- b) Cresol with soap solution
- c) Lugol's solution

5. Suspensions

- a) Calamine lotion
- b) Magnesium Hydroxide mixture
- c) Aluminium Hydroxide gel

6. Emulsions

- a) Turpentine Liniment
- b) Liquid paraffin emulsion

7. Powders and Granules

- a) ORS powder (WHO)
- b) Effervescent granules
- c) Dusting powder
- d) Divided powders

8. Suppositories

- a) Glycero gelatin suppository
- b) Cocoa butter suppository
- c) Zinc Oxide suppository

8. Semisolids

- a) Sulphur ointment
- b) Non staining-iodine ointment with methyl salicylate
- c) Carbopal gel

9. Gargles and Mouthwashes

- a) Iodine gargle
- b) Chlorhexidine mouthwash

Recommended Books: (Latest Editions)

1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
3. M.E. Aulton, Pharmaceutics, The Science & Dosage Form Design, Churchill Livingstone, Edinburgh.
4. Indian pharmacopoeia.
5. British pharmacopoeia.
6. Lachmann. Theory and Practice of Industrial Pharmacy, Lea & Febiger Publisher, The University of Michigan.
7. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.
8. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi.
9. E.A. Rawlins, Bentley's Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA.
10. Isaac Ghebre Sellassie: Pharmaceutical Pelletization Technology, Marcel Dekker, INC, New York.
11. Dilip M. Parikh: Handbook of Pharmaceutical Granulation Technology, Marcel Dekker, INC, New York.
12. Françoise Nieloud and Gilberte Marti-Mestres: Pharmaceutical Emulsions and Suspensions, Marcel Dekker, INC, New York.

BP104T. PHARMACEUTICAL INORGANIC CHEMISTRY (Theory)

45 Hours

Scope: This subject deals with the monographs of inorganic drugs and pharmaceuticals.

Objectives: Upon completion of course student shall be able to

- know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
- understand the medicinal and pharmaceutical importance of inorganic compounds

Course Content:

UNIT I

10 Hours

- **Impurities in pharmaceutical substances:** History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate

General methods of preparation, assay for the compounds superscripted with **asterisk (*)**, properties and medicinal uses of inorganic compounds belonging to the following classes

UNIT II

10 Hours

- **Acids, Bases and Buffers:** Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity.
- **Major extra and intracellular electrolytes:** Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate* and Oral Rehydration Salt (ORS), Physiological acid base balance.
- **Dental products:** Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.

UNIT III

10 Hours

- **Gastrointestinal agents**

Acidifiers: Ammonium chloride* and Dil. HCl

Antacid: Ideal properties of antacids, combinations of antacids, Sodium

Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture

Cathartics: Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite

Antimicrobials: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations

UNIT IV

08 Hours

- **Miscellaneous compounds**

Expectorants: Potassium iodide, Ammonium chloride*.

Emetics: Copper sulphate*, Sodium potassium tartarate

Haematinics: Ferrous sulphate*, Ferrous gluconate

Poison and Antidote: Sodium thiosulphate*, Activated charcoal, Sodium nitrite³³³

Astringents: Zinc Sulphate, Potash Alum

UNIT V

07 Hours

- **Radiopharmaceuticals:** Radio activity, Measurement of radioactivity, Properties of α , β , radiations, Half life, radio isotopes and study of radio isotopes - Sodium iodide I^{131} , Storage conditions, precautions & pharmaceutical application of radioactive substances.

BP110P. PHARMACEUTICAL INORGANIC CHEMISTRY (Practical)

4 Hours / Week

I Limit tests for following ions

Limit test for Chlorides and Sulphates
Modified limit test for Chlorides and Sulphates
Limit test for Iron
Limit test for Heavy metals
Limit test for Lead
Limit test for Arsenic

II Identification test

Magnesium hydroxide
Ferrous sulphate
Sodium bicarbonate
Calcium gluconate
Copper sulphate

III Test for purity

Swelling power of Bentonite
Neutralizing capacity of aluminum hydroxide gel
Determination of potassium iodate and iodine in potassium Iodide

IV Preparation of inorganic pharmaceuticals

Boric acid
Potash alum
Ferrous sulphate

Recommended Books (Latest Editions)

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4th edition.
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition
4. M.L Schroff, Inorganic Pharmaceutical Chemistry
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7. Indian Pharmacopoeia

BP105T.COMMUNICATION SKILLS (Theory)

30 Hours

Scope: This course will prepare the young pharmacy student to interact effectively with doctors, nurses, dentists, physiotherapists and other health workers. At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business.

Objectives:

Upon completion of the course the student shall be able to

1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
2. Communicate effectively (Verbal and Non Verbal)
3. Effectively manage the team as a team player
4. Develop interview skills
5. Develop Leadership qualities and essentials

Course content:

UNIT – I

07 Hours

- **Communication Skills:** Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context
- **Barriers to communication:** Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers
- **Perspectives in Communication:** Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment

UNIT – II

07 Hours

- **Elements of Communication:** Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication
- **Communication Styles:** Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style

UNIT – III

07 Hours

- **Basic Listening Skills:** Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations
- **Effective Written Communication:** Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication
- **Writing Effectively:** Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message

UNIT – IV

05 Hours

- **Interview Skills:** Purpose of an interview, Do's and Dont's of an interview
- **Giving Presentations:** Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery

UNIT – V

04 Hours

- **Group Discussion:** Introduction, Communication skills in group discussion, Do's and Dont's of group discussion

BP111P.COMMUNICATION SKILLS (Practical)

2 Hours / week

The following learning modules are to be conducted using wordsworth[®] English language lab software

Basic communication covering the following topics

Meeting People

Asking Questions

Making Friends

What did you do?

Do's and Dont's

Pronunciations covering the following topics

Pronunciation (Consonant Sounds)

Pronunciation and Nouns

Pronunciation (Vowel Sounds)

Advanced Learning

Listening Comprehension / Direct and Indirect Speech

Figures of Speech

Effective Communication

Writing Skills

Effective Writing

Interview Handling Skills

E-Mail etiquette

Presentation Skills

Recommended Books: (Latest Edition)

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2ndEdition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1stEdition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1stEdition, Mc Graw Hill Education, 2011
11. Effective communication, John Adair, 4thEdition, Pan Mac Millan,2009
12. Bringing out the best in people, Aubrey Daniels, 2ndEdition, Mc Graw Hill, 1999

BP 106RBT.REMEDIAL BIOLOGY (Theory)

30 Hours

Scope: To learn and understand the components of living world, structure and functional system of plant and animal kingdom.

Objectives: Upon completion of the course, the student shall be able to

- know the classification and salient features of five kingdoms of life
- understand the basic components of anatomy & physiology of plant
- know understand the basic components of anatomy & physiology animal with special reference to human

UNIT I

07 Hours

Living world:

- Definition and characters of living organisms
- Diversity in the living world
- Binomial nomenclature
- Five kingdoms of life and basis of classification. Salient features of Monera, Protista, Fungi, Animalia and Plantae, Virus,

Morphology of Flowering plants

- Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed.
- General Anatomy of Root, stem, leaf of monocotyledons & Dicotyledones.

UNIT II

07 Hours

Body fluids and circulation

- Composition of blood, blood groups, coagulation of blood
- Composition and functions of lymph
- Human circulatory system
- Structure of human heart and blood vessels
- Cardiac cycle, cardiac output and ECG

Digestion and Absorption

- Human alimentary canal and digestive glands
- Role of digestive enzymes
- Digestion, absorption and assimilation of digested food

Breathing and respiration

- Human respiratory system
- Mechanism of breathing and its regulation
- Exchange of gases, transport of gases and regulation of respiration
- Respiratory volumes

UNIT III

07 Hours

Excretory products and their elimination

- Modes of excretion
- Human excretory system- structure and function
- Urine formation
- Rennin angiotensin system

Neural control and coordination

- Definition and classification of nervous system
- Structure of a neuron
- Generation and conduction of nerve impulse
- Structure of brain and spinal cord
- Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata

Chemical coordination and regulation

- Endocrine glands and their secretions
- Functions of hormones secreted by endocrine glands

Human reproduction

- Parts of female reproductive system
- Parts of male reproductive system
- Spermatogenesis and Oogenesis
- Menstrual cycle

UNIT IV

05 Hours

Plants and mineral nutrition:

- Essential mineral, macro and micronutrients
- Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation

Photosynthesis

- Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factors affecting photosynthesis.

UNIT V

04 Hours

Plant respiration:Respiration, glycolysis, fermentation (anaerobic).

Plant growth and development

- Phases and rate of plant growth, Condition of growth,Introduction to plant growth regulators

Cell - The unit of life

- Structure and functions of cell and cell organelles.Cell division

Tissues

- Definition, types of tissues, location and functions.

Text Books

- a. Text book of Biology by S. B. Gokhale
- b. A Text book of Biology by Dr. Thulajappa and Dr. Seetaram.

Reference Books

- a. A Text book of Biology by B.V. Sreenivasa Naidu
- b. A Text book of Biology by Naidu and Murthy
- c. Botany for Degree students By A.C.Dutta.
- d.Outlines of Zoology by M. Ekambaranatha ayyer and T. N. Ananthkrishnan.
- e. A manual for pharmaceutical biology practical by S.B. Gokhale and C. K. Kokate

BP112RBP.REMEDIAL BIOLOGY (Practical)

30 Hours

1. Introduction to experiments in biology
 - a) Study of Microscope
 - b) Section cutting techniques
 - c) Mounting and staining
 - d) Permanent slide preparation
2. Study of cell and its inclusions
3. Study of Stem, Root, Leaf, seed, fruit, flower and their modifications
4. Detailed study of frog by using computer models
5. Microscopic study and identification of tissues pertinent to Stem, Root
Leaf, seed, fruit and flower
6. Identification of bones
7. Determination of blood group
8. Determination of blood pressure
9. Determination of tidal volume

Reference Books

1. Practical human anatomy and physiology. by S.R.Kale and R.R.Kale.
2. A Manual of pharmaceutical biology practical by S.B.Gokhale, C.K.Kokate and S.P.Shriwastava.
3. Biology practical manual according to National core curriculum .Biology forum of Karnataka. Prof .M.J.H.Shafi

BP 106RMT.REMEDIAL MATHEMATICS (Theory)

30 Hours

Scope: This is an introductory course in mathematics. This subject deals with the introduction to Partial fraction, Logarithm, matrices and Determinant, Analytical geometry, Calculus, differential equation and Laplace transform.

Objectives: Upon completion of the course the student shall be able to:-

1. Know the theory and their application in Pharmacy
2. Solve the different types of problems by applying theory
3. Appreciate the important application of mathematics in Pharmacy

Course Content:

UNIT – I

06 Hours

- **Partial fraction**

Introduction, Polynomial, Rational fractions, Proper and Improper fractions, Partial fraction, Resolving into Partial fraction, Application of Partial Fraction in Chemical Kinetics and Pharmacokinetics

- **Logarithms**

Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems.

- **Function:**

Real Valued function, Classification of real valued functions,

- **Limits and continuity :**

Introduction, Limit of a function, Definition of limit of a function ($\epsilon - \delta$

definition), $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = na^{n-1}$, $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$,

UNIT –II

06 Hours

- **Matrices and Determinant:**

Introduction matrices, Types of matrices, Operation on matrices, Transpose of a matrix, Matrix Multiplication, Determinants, Properties of determinants, Product of determinants, Minors and co-Factors, Adjoint or adjugate of a square matrix, Singular and non-singular matrices, Inverse of a matrix, Solution of system of linear of equations using matrix method, Cramer's rule, Characteristic equation and roots of a square matrix, Cayley-Hamilton theorem, Application of Matrices in solving Pharmacokinetic equations

UNIT – III

06 Hours

- **Calculus**

Differentiation : Introductions, Derivative of a function, Derivative of a constant, Derivative of a product of a constant and a function, Derivative of the sum or difference of two functions, Derivative of the product of two functions (product formula), Derivative of the quotient of two functions (Quotient formula) – **Without Proof**, Derivative of x^n w.r.t x , where n is any rational number, Derivative of e^x , Derivative of $\log_e x$, Derivative of a^x , Derivative of trigonometric functions from first principles (**without Proof**), Successive Differentiation, Conditions for a function to be a maximum or a minimum at a point. Application

UNIT – IV

06 Hours

- **Analytical Geometry**

Introduction: Signs of the Coordinates, Distance formula,

Straight Line : Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slope – intercept form of a straight line

Integration:

Introduction, Definition, Standard formulae, Rules of integration, Method of substitution, Method of Partial fractions, Integration by parts, definite integrals, application

UNIT-V

06 Hours

- **Differential Equations** : Some basic definitions, Order and degree, Equations in separable form, Homogeneous equations, Linear Differential equations, Exact equations, **Application in solving Pharmacokinetic equations**
- **Laplace Transform** : Introduction, Definition, Properties of Laplace transform, Laplace Transforms of elementary functions, Inverse Laplace transforms, Laplace transform of derivatives, Application to solve Linear differential equations, **Application in solving Chemical kinetics and Pharmacokinetics equations**

Recommended Books (Latest Edition)

1. Differential Calculus by Shanthinarayan
2. Pharmaceutical Mathematics with application to Pharmacy by Panchaksharappa Gowda D.H.
3. Integral Calculus by Shanthinarayan
4. Higher Engineering Mathematics by Dr.B.S.Grewal

Semester II

BP 201T. HUMAN ANATOMY AND PHYSIOLOGY-II (Theory)

45 Hours

Scope: This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

Objectives: Upon completion of this course the student should be able to:

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.
5. Appreciate coordinated working pattern of different organs of each system
6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.

Course Content:

Unit I

10 hours

- **Nervous system**

Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters.

Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)

Unit II

06 hours

- **Digestive system**

Anatomy of GI Tract with special reference to anatomy and functions of stomach, (Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine

and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT.

- **Energetics**

Formation and role of ATP, Creatinine Phosphate and BMR.

Unit III

- **Respiratory system** **10 hours**

Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration

Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods.

- **Urinary system**

Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.

Unit IV

10 hours

- **Endocrine system**

Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders.

Unit V

09 hours

- **Reproductive system**

Anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition

- **Introduction to genetics**

Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance

BP 207 P. HUMAN ANATOMY AND PHYSIOLOGY (Practical)

4 Hours/week

Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject.

1. To study the integumentary and special senses using specimen, models, etc.,
2. To study the nervous system using specimen, models, etc.,
3. To study the endocrine system using specimen, models, etc
4. To demonstrate the general neurological examination
5. To demonstrate the function of olfactory nerve
6. To examine the different types of taste.
7. To demonstrate the visual acuity
8. To demonstrate the reflex activity
9. Recording of body temperature
10. To demonstrate positive and negative feedback mechanism.

11. Determination of tidal volume and vital capacity.
12. Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.
13. Recording of basal mass index .
14. Study of family planning devices and pregnancy diagnosis test.
15. Demonstration of total blood count by cell analyser
16. Permanent slides of vital organs and gonads.

Recommended Books (Latest Editions)

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA

4. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

Reference Books:

1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterje ,Academic Publishers Kolkata

BP202T. PHARMACEUTICAL ORGANIC CHEMISTRY –I (Theory)

45 Hours

Scope: This subject deals with classification and nomenclature of simple organic compounds, structural isomerism, intermediates forming in reactions, important physical properties, reactions and methods of preparation of these compounds. The syllabus also emphasizes on mechanisms and orientation of reactions.

Objectives: Upon completion of the course the student shall be able to

1. write the structure, name and the type of isomerism of the organic compound
2. write the reaction, name the reaction and orientation of reactions
3. account for reactivity/stability of compounds,
4. identify/confirm the identification of organic compound

Course Content:

General methods of preparation and reactions of compounds superscripted with asterisk (*) to be explained

To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences

UNIT-I

07 Hours

- **Classification, nomenclature and isomerism**

Classification of Organic Compounds

Common and IUPAC systems of nomenclature of organic compounds

(up to 10 Carbons open chain and carbocyclic compounds)

Structural isomerisms in organic compounds

UNIT-II 10 Hours

- **Alkanes*, Alkenes* and Conjugated dienes***

SP³ hybridization in alkanes, Halogenation of alkanes, uses of paraffins.

Stabilities of alkenes, SP² hybridization in alkenes

E₁ and E₂ reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidences. E₁ versus E₂ reactions, Factors affecting E₁ and E₂ reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation.

Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement

UNIT-III 10 Hours

- **Alkyl halides***

SN₁ and SN₂ reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations.

SN₁ versus SN₂ reactions, Factors affecting SN₁ and SN₂ reactions

Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform.

- **Alcohols***- Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol

UNIT-IV 10 Hours

- **Carbonyl compounds* (Aldehydes and ketones)**

Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation, qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde.

UNIT-V

08 Hours

- **Carboxylic acids***

Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids, amide and ester

Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid. Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid

- **Aliphatic amines*** - Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine

BP208P. PHARMACEUTICAL ORGANIC CHEMISTRY -I (Practical)

4 Hours / week

1. Systematic qualitative analysis of unknown organic compounds like
 1. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc.
 2. Detection of elements like Nitrogen, Sulphur and Halogen by Lassaigne's test
 3. Solubility test
 4. Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides.
 5. Melting point/Boiling point of organic compounds
 6. Identification of the unknown compound from the literature using melting point/ boiling point.
 7. Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.
 8. Minimum 5 unknown organic compounds to be analysed systematically.
2. Preparation of suitable solid derivatives from organic compounds
3. Construction of molecular models

Recommended Books (Latest Editions)

1. Organic Chemistry by Morrison and Boyd
2. Organic Chemistry by I.L. Finar , Volume-I
3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
4. Organic Chemistry by P.L.Soni
5. Practical Organic Chemistry by Mann and Saunders.
6. Vogel's text book of Practical Organic Chemistry
7. Advanced Practical organic chemistry by N.K.Vishnoi.
8. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.
9. Reaction and reaction mechanism by Ahluwalia/Chatwal.

BP203 T. BIOCHEMISTRY (Theory)

45 Hours

Scope: Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.

Objectives: Upon completion of course student shall be able to

1. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
2. Understand the metabolism of nutrient molecules in physiological and pathological conditions.
3. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.

Course Content:

UNIT I

08 Hours

- **Biomolecules**

Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins.

- **Bioenergetics**

Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential.

Energy rich compounds; classification; biological significances of ATP and cyclic AMP

UNIT II

10 Hours

- **Carbohydrate metabolism**

Glycolysis – Pathway, energetics and significance

Citric acid cycle- Pathway, energetics and significance

HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency

Glycogen metabolism Pathways and glycogen storage diseases (GSD)

Gluconeogenesis- Pathway and its significance

Hormonal regulation of blood glucose level and Diabetes mellitus

- **Biological oxidation**

Electron transport chain (ETC) and its mechanism.

Oxidative phosphorylation & its mechanism and substrate level phosphorylation

Inhibitors ETC and oxidative phosphorylation/Uncouplers

UNIT III

10 Hours

- **Lipid metabolism**

- Oxidation of saturated fatty acid (Palmitic acid)

Formation and utilization of ketone bodies; ketoacidosis

De novo synthesis of fatty acids (Palmitic acid)

Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D

Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity.

- **Amino acid metabolism**

General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders

Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenylketonuria, Albinism, alpeptonuria, tyrosinemia)

Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline

Catabolism of heme; hyperbilirubinemia and jaundice

UNIT IV

10 Hours

- **Nucleic acid metabolism and genetic information transfer**

Biosynthesis of purine and pyrimidine nucleotides

Catabolism of purine nucleotides and Hyperuricemia and Gout disease

Organization of mammalian genome

Structure of DNA and RNA and their functions

DNA replication (semi conservative model)

Transcription or RNA synthesis

Genetic code, Translation or Protein synthesis and inhibitors

UNIT V

07 Hours

- **Enzymes**

Introduction, properties, nomenclature and IUB classification of enzymes

Enzyme kinetics (Michaelis plot, Line Weaver Burke plot)

Enzyme inhibitors with examples

Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation

Therapeutic and diagnostic applications of enzymes and isoenzymes

Coenzymes –Structure and biochemical functions

BP 209 P. BIOCHEMISTRY (Practical)

4 Hours / Week

1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch)
2. Identification tests for Proteins (albumin and Casein)
3. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method)
4. Qualitative analysis of urine for abnormal constituents
5. Determination of blood creatinine
6. Determination of blood sugar
7. Determination of serum total cholesterol
8. Preparation of buffer solution and measurement of pH
9. Study of enzymatic hydrolysis of starch
10. Determination of Salivary amylase activity
11. Study the effect of Temperature on Salivary amylase activity.
12. Study the effect of substrate concentration on salivary amylase activity.

Recommended Books (Latest Editions)

1. Principles of Biochemistry by Lehninger.
2. Harper's Biochemistry by Robert K. Murray, Daryl K. Granner and Victor W. Rodwell.
3. Biochemistry by Stryer.
4. Biochemistry by D. Satyanarayan and U.Chakrapani
5. Textbook of Biochemistry by Rama Rao.
6. Textbook of Biochemistry by Deb.
7. Outlines of Biochemistry by Conn and Stumpf
8. Practical Biochemistry by R.C. Gupta and S. Bhargavan.
9. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition)
10. Practical Biochemistry for Medical students by Rajagopal and Ramakrishna.
11. Practical Biochemistry by Harold Varley.

BP 204T.PATHOPHYSIOLOGY (THEORY)

45Hours

Scope: Pathophysiology is the study of causes of diseases and reactions of the body to such disease producing causes. This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge required to practice medicine safely, confidently, rationally and effectively.

Objectives: Upon completion of the subject student shall be able to –

1. Describe the etiology and pathogenesis of the selected disease states;
2. Name the signs and symptoms of the diseases; and
3. Mention the complications of the diseases.

Course content:

Unit I

10Hours

- **Basic principles of Cell injury and Adaptation:**
Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury, Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage), Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia), Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis & Alkalosis, Electrolyte imbalance

- **Basic mechanism involved in the process of inflammation and repair:**
Introduction, Clinical signs of inflammation, Different types of Inflammation, Mechanism of Inflammation – Alteration in vascular permeability and blood flow, migration of WBC's, Mediators of inflammation, Basic principles of wound healing in the skin, Pathophysiology of Atherosclerosis

Unit II

10Hours

- **Cardiovascular System:**
Hypertension, congestive heart failure, ischemic heart disease (angina, myocardial infarction, atherosclerosis and arteriosclerosis)
- **Respiratory system:** Asthma, Chronic obstructive airways diseases.
- **Renal system:** Acute and chronic renal failure .

Unit II

10Hours

- **Haematological Diseases:**
Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalasemia, hereditary acquired anemia, hemophilia
- **Endocrine system:** Diabetes, thyroid diseases, disorders of sex hormones
- **Nervous system:** Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease.
- **Gastrointestinal system:** Peptic Ulcer
-

Unit IV

8 Hours

- Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease.
- **Disease of bones and joints:** Rheumatoid arthritis, osteoporosis and gout
- **Principles of cancer:** classification, etiology and pathogenesis of cancer
- **Diseases of bones and joints:** Rheumatoid Arthritis, Osteoporosis, Gout
- **Principles of Cancer:** Classification, etiology and pathogenesis of Cancer

Unit V

7 Hours

- **Infectious diseases:** Meningitis, Typhoid, Leprosy, Tuberculosis

Urinary tract infections

- **Sexually transmitted diseases:** AIDS, Syphilis, Gonorrhoea

Recommended Books (Latest Editions)

1. Vinay Kumar, Abul K. Abas, Jon C. Aster; Robbins & Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014.
2. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010.
3. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011.
4. Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B (John Burnard); Best and Taylor's Physiological basis of medical practice; 12th ed; united states;
5. William and Wilkins, Baltimore; 1991 [1990 printing].
6. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston; Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS/Churchill Livingstone; 2010.
7. Guyton A, John .E Hall; Textbook of Medical Physiology; 12th edition; WB Saunders Company; 2010.
8. Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey; Pharmacotherapy: A Pathophysiological Approach; 9th edition; London; McGraw-Hill Medical; 2014.
9. V. Kumar, R. S. Cotran and S. L. Robbins; Basic Pathology; 6th edition; Philadelphia; WB Saunders Company; 1997.
10. Roger Walker, Clive Edwards; Clinical Pharmacy and Therapeutics; 3rd edition; London; Churchill Livingstone publication; 2003.

Recommended Journals

1. The Journal of Pathology. ISSN: 1096-9896 (Online)
2. The American Journal of Pathology. ISSN: 0002-9440
3. Pathology. 1465-3931 (Online)
4. International Journal of Physiology, Pathophysiology and Pharmacology. ISSN: 1944-8171 (Online)
5. Indian Journal of Pathology and Microbiology. ISSN-0377-4929.

BP205 T. COMPUTER APPLICATIONS IN PHARMACY (Theory)

30 Hrs (2 Hrs/Week)

Scope: This subject deals with the introduction Database, Database Management system, computer application in clinical studies and use of databases.

Objectives: Upon completion of the course the student shall be able to

1. know the various types of application of computers in pharmacy
2. know the various types of databases
3. know the various applications of databases in pharmacy

Course content:

UNIT – I

06 hours

Number system: Binary number system, Decimal number system, Octal number system, Hexadecimal number systems, conversion decimal to binary, binary to decimal, octal to binary etc, binary addition, binary subtraction – One's complement, Two's complement method, binary multiplication, binary division

Concept of Information Systems and Software : Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project

UNIT –II

06 hours

Web technologies: Introduction to HTML, XML, CSS and Programming languages, introduction to web servers and Server Products

Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database

UNIT – III

06 hours

Application of computers in Pharmacy – Drug information storage and retrieval, Pharmacokinetics, Mathematical model in Drug design, Hospital and Clinical Pharmacy, Electronic Prescribing and discharge (EP) systems, barcode medicine identification and automated dispensing of drugs, mobile technology and adherence monitoring

Diagnostic System, Lab-diagnostic System, Patient Monitoring System, Pharma Information System

UNIT – IV

06 hours

Bioinformatics: Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery

UNIT-V

06 hours

Computers as data analysis in Preclinical development:

Chromatographic data analysis(CDS), Laboratory Information management System (LIMS) and Text Information Management System(TIMMS)

BP210P. COMPUTER APPLICATIONS IN PHARMACY (Practical)

1. Design a questionnaire using a word processing package to gather information about a particular disease.
2. Create a HTML web page to show personal information.
3. Retrieve the information of a drug and its adverse effects using online tools
4. Creating mailing labels Using Label Wizard , generating label in MS WORD
5. Create a database in MS Access to store the patient information with the required fields Using access
6. Design a form in MS Access to view, add, delete and modify the patient record in the database
7. Generating report and printing the report from patient database
8. Creating invoice table using – MS Access
9. Drug information storage and retrieval using MS Access
10. Creating and working with queries in MS Access
11. Exporting Tables, Queries, Forms and Reports to web pages
12. Exporting Tables, Queries, Forms and Reports to XML pages

Recommended books (Latest edition):

1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
2. Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
3. Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
4. Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi - 110002

BP 206 T. ENVIRONMENTAL SCIENCES (Theory)

30 hours

Scope:Environmental Sciences is the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment.

Objectives: Upon completion of the course the student shall be able to:

1. Create the awareness about environmental problems among learners.
2. Impart basic knowledge about the environment and its allied problems.
3. Develop an attitude of concern for the environment.
4. Motivate learner to participate in environment protection and environment improvement.
5. Acquire skills to help the concerned individuals in identifying and solving environmental problems.
6. Strive to attain harmony with Nature.

Course content:

Unit-I

10hours

The Multidisciplinary nature of environmental studies

Natural Resources

Renewable and non-renewable resources:

Natural resources and associated problems

a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.

Unit-II

10hours

Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit- III

10hours

Environmental Pollution: Air pollution; Water pollution; Soil pollution

Recommended Books (Latest edition):

1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India,
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
5. Clark R.S., Marine Pollution, Clarendon Press Oxford
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
8. Down of Earth, Centre for Science and Environment

SEMESTER III

BP301T. PHARMACEUTICAL ORGANIC CHEMISTRY –II (Theory)

45 Hours

Scope: This subject deals with general methods of preparation and reactions of some organic compounds. Reactivity of organic compounds are also studied here. The syllabus emphasizes on mechanisms and orientation of reactions. Chemistry of fats and oils are also included in the syllabus.

Objectives: Upon completion of the course the student shall be able to

1. write the structure, name and the type of isomerism of the organic compound
2. write the reaction, name the reaction and orientation of reactions
3. account for reactivity/stability of compounds,
4. prepare organic compounds

Course Content:

General methods of preparation and reactions of compounds superscripted with asterisk (*) to be explained

To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences

UNIT I

10 Hours

- **Benzene and its derivatives**

- A. Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule
- B. Reactions of benzene - nitration, sulphonation, halogenation- reactivity, Friedelcrafts alkylation- reactivity, limitations, Friedelcrafts acylation.
- C. Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction
- D. Structure and uses of DDT, Saccharin, BHC and Chloramine

UNIT II

10 Hours

- **Phenols*** - Acidity of phenols, effect of substituents on acidity, qualitative tests, Structure and uses of phenol, cresols, resorcinol, naphthols
- **Aromatic Amines*** - Basicity of amines, effect of substituents on basicity, and synthetic uses of aryl diazonium salts
- **Aromatic Acids*** -Acidity, effect of substituents on acidity and important reactions of benzoic acid.

UNIT III

10 Hours

- **Fats and Oils**
 - a. Fatty acids – reactions.

- b. Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils.
- c. Analytical constants – Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value – significance and principle involved in their determination.

UNIT IV

08 Hours

- **Polynuclear hydrocarbons:**

- a. Synthesis, reactions
- b. Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene, Diphenylmethane, Triphenylmethane and their derivatives

UNIT V

07 Hours

- **Cyclo alkanes***

Stabilities – Baeyer's strain theory, limitation of Baeyer's strain theory, Coulson and Moffitt's modification, Sachse Mohr's theory (Theory of strainless rings), reactions of cyclopropane and cyclobutane only

BP305P. PHARMACEUTICAL ORGANIC CHEMISTRY -II (Practical)

4 Hrs/week

- I Experiments involving laboratory techniques
- Recrystallization
 - Steam distillation
- II Determination of following oil values (including standardization of reagents)
- Acid value
 - Saponification value
 - Iodine value
- III Preparation of compounds
- Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction.
 - 2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/
 - Acetanilide by halogenation (Bromination) reaction.
 - 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction.
 - Benzoic acid from Benzyl chloride by oxidation reaction.
 - Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction.
 - 1-Phenyl azo-2-naphthol from Aniline by diazotization and coupling reactions.
 - Benzil from Benzoin by oxidation reaction.
 - Dibenzal acetone from Benzaldehyde by Claisen Schmidt reaction
 - Cinnamic acid from Benzaldehyde by Perkin reaction
 - *P*-Iodo benzoic acid from *P*-amino benzoic acid

Recommended Books (Latest Editions)

1. Organic Chemistry by Morrison and Boyd
2. Organic Chemistry by I.L. Finar , Volume-I
3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
4. Organic Chemistry by P.L.Soni
5. Practical Organic Chemistry by Mann and Saunders.
6. Vogel's text book of Practical Organic Chemistry
7. Advanced Practical organic chemistry by N.K.Vishnoi.

8. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

BP302T. PHYSICAL PHARMACEUTICS-I (Theory)

45Hours

Scope: The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

Objectives: Upon the completion of the course student shall be able to

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms
2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Course Content:

UNIT-I

10 Hours

Solubility of drugs: Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications

UNIT-II

10Hours

States of Matter and properties of matter: State of matter, changes in the state of matter, latent heats, vapour pressure, sublimation critical point, eutectic mixtures, gases, aerosols – inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid-crystalline, amorphous & polymorphism.

Physicochemical properties of drug molecules: Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications

UNIT-III

08 Hours

Surface and interfacial phenomenon: Liquid interface, surface & interfacial tensions,

surface free energy, measurement of surface & interfacial tensions, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB Scale, solubilisation, detergency, adsorption at solid interface.

UNIT-IV**08Hours**

Complexation and protein binding: Introduction, Classification of Complexation, Applications, methods of analysis, protein binding, Complexation and drug action, crystalline structures of complexes and thermodynamic treatment of stability constants.

UNIT-V**07 Hours**

pH, buffers and Isotonic solutions: Sorensen's pH scale, pH determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions.

BP306P. PHYSICAL PHARMACEUTICS – I (Practical)

4 Hrs/week

1. Determination the solubility of drug at room temperature
2. Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.
3. Determination of Partition co- efficient of benzoic acid in benzene and water
4. Determination of Partition co- efficient of Iodine in CCl₄ and water
5. Determination of % composition of NaCl in a solution using phenol-water system by CST method
6. Determination of surface tension of given liquids by drop count and drop weight method
7. Determination of HLB number of a surfactant by saponification method
8. Determination of Freundlich and Langmuir constants using activated char coal
9. Determination of critical micellar concentration of surfactants
10. Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method
11. Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method

Recommended Books: (Latest Editions)

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.
3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C and ManavalanR.
8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanyam, J. Thimma settee
9. Physical Pharmaceutics by C.V.S. Subramanyam
10. Test book of Physical Phramacy, by Gaurav Jain & Roop K. Khar

BP 303 T. PHARMACEUTICAL MICROBIOLOGY (Theory)

45Hours

Scope:

- Study of all categories of microorganisms especially for the production of alcohol antibiotics, vaccines, vitamins enzymes etc..

Objectives: Upon completion of the subject student shall be able to;

1. Understand methods of identification, cultivation and preservation of various microorganisms
2. To understand the importance and implementation of sterilization in pharmaceutical processing and industry
3. Learn sterility testing of pharmaceutical products.
4. Carried out microbiological standardization of Pharmaceuticals.
5. Understand the cell culture technology and its applications in pharmaceutical industries.

Course content:

Unit I

10 Hours

Introduction, history of microbiology, its branches, scope and its importance.

Introduction to Prokaryotes and Eukaryotes

Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count).

Study of different types of phase contrast microscopy, dark field microscopy and electron microscopy.

Unit II

10 Hours

Identification of bacteria using staining techniques (simple, Gram's & Acid fast staining) and biochemical tests (IMViC).

Study of principle, procedure, merits, demerits and applications of physical, chemical gaseous, radiation and mechanical method of sterilization.

Evaluation of the efficiency of sterilization methods.

Equipments employed in large scale sterilization.

Sterility indicators.

Unit III

10 Hours

Study of morphology, classification, reproduction/replication and cultivation of Fungi and Viruses.

Classification and mode of action of disinfectants

Factors influencing disinfection, antiseptics and their evaluation. For bacteriostatic and bactericidal actions

Evaluation of bactericidal & Bacteriostatic.

Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.

Unit IV

08 Hours

Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification.

Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids.

Assessment of a new antibiotic.

Unit V

07Hours

Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage.

Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations.

Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures.

Application of cell cultures in pharmaceutical industry and research.

BP 307P.PHARMACEUTICAL MICROBIOLOGY (Practical)

4 Hrs/week

1. Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology.
2. Sterilization of glassware, preparation and sterilization of media.
3. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.
4. Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical).
5. Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.
6. Microbiological assay of antibiotics by cup plate method and other methods
7. Motility determination by Hanging drop method.
8. Sterility testing of pharmaceuticals.
9. Bacteriological analysis of water
10. Biochemical test.

Recommended Books (Latest edition)

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Pepler: Microbial Technology.
9. I.P., B.P., U.S.P.- latest editions.
10. Ananthnarayan : Text Book of Microbiology, Orient-Longman, Chennai
11. Edward: Fundamentals of Microbiology.
12. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
13. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company

BP 304 T. PHARMACEUTICAL ENGINEERING (Theory)

45 Hours

Scope: This course is designed to impart a fundamental knowledge on the art and science of various unit operations used in pharmaceutical industry.

Objectives: Upon completion of the course student shall be able:

1. To know various unit operations used in Pharmaceutical industries.
2. To understand the material handling techniques.
3. To perform various processes involved in pharmaceutical manufacturing process.
4. To carry out various test to prevent environmental pollution.
5. To appreciate and comprehend significance of plant lay out design for optimum use of resources.
6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.

Course content:

UNIT-I

10 Hours

- **Flow of fluids:** Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer.
- **Size Reduction:** Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill.
- **Size Separation:** Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank.

UNIT-II

10 Hours

- **Heat Transfer:** Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers.

- **Evaporation:** Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator & Economy of multiple effect evaporator.
- **Distillation:** Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation

UNIT- III

08 Hours

- **Drying:** Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer.
- **Mixing:** Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier,

UNIT-IV

08 Hours

- **Filtration:** Objectives, applications, Theories & Factors influencing filtration, filter aids, filter medias. Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seidtz filter.
- **Centrifugation:** Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge.

UNIT- V

07 Hours

- **Materials of pharmaceutical plant construction, Corrosion and its prevention:** Factors affecting during materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention. Ferrous and nonferrous metals, inorganic and organic non metals, basic of material handling systems.

Recommended Books: (Latest Editions)

1. Introduction to chemical engineering – Walter L Badger & Julius Banchemo, Latest edition.
2. Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson- Latest edition.
3. Unit operation of chemical engineering – McCabe Smith, Latest edition.
4. Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest edition.
5. Remington practice of pharmacy- Martin, Latest edition.
6. Theory and practice of industrial pharmacy by Lachmann., Latest edition.
7. Physical pharmaceuticals- C.V.S Subrahmanyam et al., Latest edition.
8. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.

BP308P - PHARMACEUTICAL ENGINEERING (Practical)

4 Hours/week

- I. Determination of radiation constant of brass, iron, unpainted and painted glass.
- II. Steam distillation – To calculate the efficiency of steam distillation.
- III. To determine the overall heat transfer coefficient by heat exchanger.
- IV. Construction of drying curves (for calcium carbonate and starch).
- V. Determination of moisture content and loss on drying.
- VI. Determination of humidity of air – i) From wet and dry bulb temperatures –use of Dew point method.
- VII. Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier.
- VIII. Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic and logarithmic probability plots.
- IX. Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill.
- X. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment.
- XI. Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity
- XII. To study the effect of time on the Rate of Crystallization.
- XIII. To calculate the uniformity Index for given sample by using Double Cone Blender.

SEMESTER IV

BP401T. PHARMACEUTICAL ORGANIC CHEMISTRY –III (Theory)

45 Hours

Scope: This subject imparts knowledge on stereo-chemical aspects of organic compounds and organic reactions, important named reactions, chemistry of important hetero cyclic compounds. It also emphasizes on medicinal and other uses of organic compounds.

Objectives: At the end of the course, the student shall be able to

1. understand the methods of preparation and properties of organic compounds
2. explain the stereo chemical aspects of organic compounds and stereo chemical reactions
3. know the medicinal uses and other applications of organic compounds

Course Content:

Note: To emphasize on definition, types, mechanisms, examples, uses/applications

UNIT-I

10 Hours

Stereo isomerism

Optical isomerism –

Optical activity, enantiomerism, diastereoisomerism, meso compounds

Elements of symmetry, chiral and achiral molecules

DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers

Reactions of chiral molecules

Racemic modification and resolution of racemic mixture.

Asymmetric synthesis: partial and absolute

UNIT-II

10 Hours

Geometrical isomerism

Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems)

Methods of determination of configuration of geometrical isomers.

Conformational isomerism in Ethane, n-Butane and Cyclohexane.

Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity.

Stereospecific and stereoselective reactions

UNIT-III

10 Hours

Heterocyclic compounds:

Nomenclature and classification

Synthesis, reactions and medicinal uses of following compounds/derivatives

Pyrrole, Furan, and Thiophene

Relative aromaticity and reactivity of Pyrrole, Furan and Thiophene

UNIT-IV**8 Hours**

Synthesis, reactions and medicinal uses of following compounds/derivatives

Pyrazole, Imidazole, Oxazole and Thiazole.

Pyridine, Quinoline, Isoquinoline, Acridine and Indole. Basicity of pyridine

Synthesis and medicinal uses of Pyrimidine, Purine, azepines and their derivatives

UNIT-V**07 Hours****Reactions of synthetic importance**

Metal hydride reduction (NaBH_4 and LiAlH_4), Clemmensen reduction, Birch reduction, Wolff Kishner reduction.

Oppenauer-oxidation and Dakin reaction.

Beckmanns rearrangement and Schmidt rearrangement.

Claisen-Schmidt condensation

Recommended Books (Latest Editions)

1. Organic chemistry by I.L. Finar, Volume-I & II.
2. A text book of organic chemistry – Arun Bahl, B.S. Bahl.
3. Heterocyclic Chemistry by Raj K. Bansal
4. Organic Chemistry by Morrison and Boyd
5. Heterocyclic Chemistry by T.L. Gilchrist

BP402T. MEDICINAL CHEMISTRY – I (Theory)

45 Hours

Scope: This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.

Objectives: Upon completion of the course the student shall be able to

1. understand the chemistry of drugs with respect to their pharmacological activity
2. understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
3. know the Structural Activity Relationship (SAR) of different class of drugs
4. write the chemical synthesis of some drugs

Course Content:

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (*)

UNIT- I

10 Hours

Introduction to Medicinal Chemistry

History and development of medicinal chemistry

Physicochemical properties in relation to biological action

Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism.

Drug metabolism

Drug metabolism principles- Phase I and Phase II.

Factors affecting drug metabolism including stereo chemical aspects.

UNIT- II

10 Hours

Drugs acting on Autonomic Nervous System

Adrenergic Neurotransmitters:

Biosynthesis and catabolism of catecholamine.

Adrenergic receptors (Alpha & Beta) and their distribution.

Sympathomimetic agents: SAR of Sympathomimetic agents

Direct acting: Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine,

Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline.

- Indirect acting agents: Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine.
- Agents with mixed mechanism: Ephedrine, Metaraminol.

Adrenergic Antagonists:

Alpha adrenergic blockers: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide.

Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol.

UNIT-III

10 Hours

Cholinergic neurotransmitters:

Biosynthesis and catabolism of acetylcholine.

Cholinergic receptors (Muscarinic & Nicotinic) and their distribution.

Parasympathomimetic agents: SAR of Parasympathomimetic agents

Direct acting agents: Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine.

Indirect acting/ Cholinesterase inhibitors (Reversible & Irreversible): Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Ambenonium chloride, Isofluorophate, Echothiophate iodide, Parathione, Malathion.

Cholinesterase reactivator: Pralidoxime chloride.

Cholinergic Blocking agents: SAR of cholinolytic agents

Solanaceous alkaloids and analogues: Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*.

Synthetic cholinergic blocking agents: Tropicamide, Cyclopentolate hydrochloride, Clidinium bromide, Dicyclomine hydrochloride*, Glycopyrrolate, Methantheline bromide, Propantheline bromide, Benztropine mesylate, Orphenadrine citrate, Biperidine hydrochloride, Procyclidine hydrochloride*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.

UNIT- IV

08 Hours

Drugs acting on Central Nervous System

A. Sedatives and Hypnotics:

Benzodiazepines: SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem

Barbiturates: SAR of barbiturates, Barbitol*, Phenobarbital, Mephobarbital, Amobarbital, Butobarbital, Pentobarbital, Secobarbital

Miscellaneous:

Amides & imides: Glutethimide.

Alcohol & their carbamate derivatives: Meprobamate, Ethchlorvynol.

Aldehyde & their derivatives: Triclofos sodium, Paraldehyde.

B. Antipsychotics

Phenothiazines: SAR of Phenothiazines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Triflupromazine, Thioridazine hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride.

Ring Analogues of Phenothiazines: Chlorprothixene, Thiothixene, Loxapine succinate, Clozapine.

Fluro buterophenones: Haloperidol, Droperidol, Risperidone.

Beta amino ketones: Molindone hydrochloride.

Benzamides: Sulpieride.

C. Anticonvulsants: SAR of Anticonvulsants, mechanism of anticonvulsant action

Barbiturates: Phenobarbitone, Methobarbital. **Hydantoins:**

Phenytoin*, Mephenytoin, Ethotoin **Oxazolindione diones:**

Trimethadione, Paramethadione **Succinimides:**

Phensuximide, Methsuximide, Ethosuximide* **Urea and**

monoacylureas: Phenacemide, Carbamazepine*

Benzodiazepines: Clonazepam

Miscellaneous: Primidone, Valproic acid, Gabapentin, Felbamate

UNIT – V

07 Hours

Drugs acting on Central Nervous System

General anesthetics:

Inhalation anesthetics: Halothane*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane.

Ultra short acting barbiturates: Methohexital sodium*, Thiopental sodium, Thiopental sodium.

Dissociative anesthetics: Ketamine hydrochloride.*

Narcotic and non-narcotic analgesics

Morphine and related drugs: SAR of Morphine analogues, Morphine sulphate, Codeine, Meperidine hydrochloride, Anilerdine hydrochloride, Diphenoxylate hydrochloride, Loperamide hydrochloride, Fentanyl citrate*, Methadone hydrochloride*, Propoxyphene hydrochloride, Pentazocine, Levorphanol tartarate.

Narcotic antagonists: Nalorphine hydrochloride, Levallorphan tartarate, Naloxone hydrochloride.

Anti-inflammatory agents: Sodium salicylate, Aspirin, Mefenamic acid*, Meclofenamate, Indomethacin, Sulindac, Tolmetin, Zomepiac, Diclofenac, Ketorolac, Ibuprofen*, Naproxen, Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone.

BP406P. MEDICINAL CHEMISTRY – I (Practical)

4 Hours/Week

I Preparation of drugs/ intermediates

- 1 1,3-pyrazole
- 2 1,3-oxazole
- 3 Benzimidazole
- 4 Benztriazole
- 5 2,3- diphenyl quinoxaline
- 6 Benzocaine
- 7 Phenytoin
- 8 Phenothiazine
- 9 Barbiturate

II Assay of drugs

- 1 Chlorpromazine
- 2 Phenobarbitone
- 3 Atropine
- 4 Ibuprofen
- 5 Aspirin
- 6 Furosemide

III Determination of Partition coefficient for any two drugs

Recommended Books (Latest Editions)

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.

7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

BP 403 T. PHYSICAL PHARMACEUTICS-II (Theory)

45Hours

Scope: The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

Objectives: Upon the completion of the course student shall be able to

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms
2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Course Content:

UNIT-I

07 Hours

Colloidal dispersions: Classification of dispersed systems & their general characteristics, size & shapes of colloidal particles, classification of colloids & comparative account of their general properties. Optical, kinetic & electrical properties. Effect of electrolytes, coacervation, peptization & protective action.

UNIT-II

10 Hours

Rheology: Newtonian systems, law of flow, kinematic viscosity, effect of temperature, non-Newtonian systems, pseudoplastic, dilatant, plastic, thixotropy, thixotropy in formulation, determination of viscosity, capillary, falling Sphere, rotational viscometers

Deformation of solids: Plastic and elastic deformation, Heckel equation, Stress, Strain, Elastic Modulus

UNIT-III

10 Hours

Coarse dispersion: Suspension, interfacial properties of suspended particles, settling in suspensions, formulation of flocculated and deflocculated suspensions. Emulsions and theories of emulsification, microemulsion and multiple emulsions; Stability of emulsions, preservation of emulsions, rheological properties of emulsions and emulsion formulation by HLB method.

UNIT-IV**10Hours**

Micromeritics: Particle size and distribution, mean particle size, number and weight distribution, particle number, methods for determining particle size by different methods, counting and separation method, particle shape, specific surface, methods for determining surface area, permeability, adsorption, derived properties of powders, porosity, packing arrangement, densities, bulkiness & flow properties.

UNIT-V**10 Hours**

Drug stability: Reaction kinetics: zero, pseudo-zero, first & second order, units of basic rate constants, determination of reaction order. Physical and chemical factors influencing the chemical degradation of pharmaceutical product: temperature, solvent, ionic strength, dielectric constant, specific & general acid base catalysis, Simple numerical problems. Stabilization of medicinal agents against common reactions like hydrolysis & oxidation. Accelerated stability testing in expiration dating of pharmaceutical dosage forms. Photolytic degradation and its prevention

BP 407P. PHYSICAL PHARMACEUTICS- II (Practical)

3 Hrs/week

1. Determination of particle size, particle size distribution using sieving method
2. Determination of particle size, particle size distribution using Microscopic method
3. Determination of bulk density, true density and porosity
4. Determine the angle of repose and influence of lubricant on angle of repose
5. Determination of viscosity of liquid using Ostwald's viscometer
6. Determination sedimentation volume with effect of different suspending agent
7. Determination sedimentation volume with effect of different concentration of single suspending agent
8. Determination of viscosity of semisolid by using Brookfield viscometer
9. Determination of reaction rate constant first order.
10. Determination of reaction rate constant second order
11. Accelerated stability studies

Recommended Books: (Latest Editions)

1. Physical Pharmacy by Alfred Martin, Sixth edition
2. Experimental pharmaceuticals by Eugene, Parott.
3. Tutorial pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical calculations, Lea & Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, Marcel Dekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C, and Manavalan R.

BP 404 T. PHARMACOLOGY-I (Theory)

45 Hrs

Scope: The main purpose of the subject is to understand what drugs do to the living organisms and how their effects can be applied to therapeutics. The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics) as well as absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.

Objectives: Upon completion of this course the student should be able to

1. Understand the pharmacological actions of different categories of drugs
2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.
3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
4. Observe the effect of drugs on animals by simulated experiments
5. Appreciate correlation of pharmacology with other bio medical sciences

Course Content:

UNIT-I

08 hours

1. General Pharmacology

- a. Introduction to Pharmacology- Definition, historical landmarks and scope of pharmacology, nature and source of drugs, essential drugs concept and routes of drug administration, Agonists, antagonists(competitive and non competitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy.
- b. Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs .Enzyme induction, enzyme inhibition, kinetics of elimination

UNIT-II

12 Hours

General Pharmacology

- a. Pharmacodynamics- Principles and mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms, G-protein–coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor and receptors that regulate transcription factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action.
- b. Adverse drug reactions.
- c. Drug interactions (pharmacokinetic and pharmacodynamic)
- d. Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.

UNIT-III**10 Hours****2. Pharmacology of drugs acting on peripheral nervous system**

- a. Organization and function of ANS.
- b. Neurohumoral transmission, co-transmission and classification of neurotransmitters.
- c. Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics.
- d. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).
- e. Local anesthetic agents.
- f. Drugs used in myasthenia gravis and glaucoma

UNIT-IV**08 Hours****3. Pharmacology of drugs acting on central nervous system**

- a. Neurohumoral transmission in the C.N.S. special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine.
- b. General anesthetics and pre-anesthetics.
- c. Sedatives, hypnotics and centrally acting muscle relaxants.
- d. Anti-epileptics
- e. Alcohols and disulfiram

UNIT-V**07 Hours****3. Pharmacology of drugs acting on central nervous system**

- a. Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens.
- b. Drugs used in Parkinsons disease and Alzheimer's disease.
- c. CNS stimulants and nootropics.
- d. Opioid analgesics and antagonists
- e. Drug addiction, drug abuse, tolerance and dependence.

BP 408 P.PHARMACOLOGY-I (Practical)

4Hrs/Week

1. Introduction to experimental pharmacology.
2. Commonly used instruments in experimental pharmacology.
3. Study of common laboratory animals.
4. Maintenance of laboratory animals as per CPCSEA guidelines.
5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
6. Study of different routes of drugs administration in mice/rats.
7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
8. Effect of drugs on ciliary motility of frog oesophagus
9. Effect of drugs on rabbit eye.
10. Effects of skeletal muscle relaxants using rota-rod apparatus.
11. Effect of drugs on locomotor activity using actophotometer.
12. Anticonvulsant effect of drugs by MES and PTZ method.
13. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
14. Study of anxiolytic activity of drugs using rats/mice.
15. Study of local anesthetics by different methods

Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos

Recommended Books (Latest Editions)

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology

6. K.D.Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
8. Modern Pharmacology with clinical Applications, by Charles R.Craig & Robert,
9. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
10. Kulkarni SK. Handbook of experimental pharmacology. VallabhPrakashan,

BP 405 T.PHARMACOGNOSY AND PHYTOCHEMISTRY I (Theory)

45 Hours

Scope: The subject involves the fundamentals of Pharmacognosy like scope, classification of crude drugs, their identification and evaluation, phytochemicals present in them and their medicinal properties.

Objectives: Upon completion of the course, the student shall be able

1. to know the techniques in the cultivation and production of crude drugs
2. to know the crude drugs, their uses and chemical nature
3. know the evaluation techniques for the herbal drugs
4. to carry out the microscopic and morphological evaluation of crude drugs

Course Content:

UNIT-I

10 Hours

Introduction to Pharmacognosy:

- (a) Definition, history, scope and development of Pharmacognosy
- (b) Sources of Drugs – Plants, Animals, Marine & Tissue culture
- (c) Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilages, oleoresins and oleo- gum -resins).

Classification of drugs:

Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and sero taxonomical classification of drugs

Quality control of Drugs of Natural Origin:

Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties.

Quantitative microscopy of crude drugs including lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida.

UNIT-II

10 Hours

Cultivation, Collection, Processing and storage of drugs of natural origin:

Cultivation and Collection of drugs of natural origin
Factors influencing cultivation of medicinal plants.
Plant hormones and their applications.
Polyploidy, mutation and hybridization with reference to medicinal plants

Conservation of medicinal plants

UNIT-III

07 Hours

Plant tissue culture:

Historical development of plant tissue culture, types of cultures, Nutritional requirements, growth and their maintenance.

Applications of plant tissue culture in pharmacognosy.

Edible vaccines

UNIT IV

10 Hours

Pharmacognosy in various systems of medicine:

Role of Pharmacognosy in allopathy and traditional systems of medicine namely, Ayurveda, Unani, Siddha, Homeopathy and Chinese systems of medicine.

Introduction to secondary metabolites:

Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins

UNIT V

08 Hours

Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs

Plant Products:

Fibers - Cotton, Jute, Hemp

Hallucinogens, Teratogens, Natural allergens

Primary metabolites:

General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites:

Carbohydrates: Acacia, Agar, Tragacanth, Honey

Proteins and Enzymes : Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin).

Lipids(Waxes, fats, fixed oils) : Castor oil, Chaulmoogra oil, Wool Fat, Bees Wax

Marine Drugs:

Novel medicinal agents from marine sources

BP408 P. PHARMACOGNOSY AND PHYTOCHEMISTRY I (Practical)

4 Hours/Week

1. Analysis of crude drugs by chemical tests: (i)Tragacanth (ii) Acacia (iii)Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil
2. Determination of stomatal number and index
3. Determination of vein islet number, vein islet termination and palisade ratio.
4. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer
5. Determination of Fiber length and width
6. Determination of number of starch grains by Lycopodium spore method
7. Determination of Ash value
8. Determination of Extractive values of crude drugs
9. Determination of moisture content of crude drugs
10. Determination of swelling index and foaming

Recommended Books: (Latest Editions)

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Saunders & Co., London, 2009.
2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.
3. Text Book of Pharmacognosy by T.E. Wallis
4. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
5. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
6. Herbal drug industry by R.D. Choudhary (1996), 1st Edn, Eastern Publisher, New Delhi.
7. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007
8. Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhlae
9. Anatomy of Crude Drugs by M.A. Iyengar

SEMESTER V

BP501T. MEDICINAL CHEMISTRY – II (Theory)

45 Hours

Scope: This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.

Objectives: Upon completion of the course the student shall be able to

1. Understand the chemistry of drugs with respect to their pharmacological activity
2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
3. Know the Structural Activity Relationship of different class of drugs
4. Study the chemical synthesis of selected drugs

Course Content:

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (*)

UNIT- I

10 Hours

Antihistaminic agents: Histamine, receptors and their distribution in the humanbody

H₁-antagonists: Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamines succinate, Clemastine fumarate, Diphenylpyraline hydrochloride, Tripelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Buclizine hydrochloride, Chlorpheniramine maleate, Triprolidine hydrochloride*, Phenidamine tartarate, Promethazine hydrochloride*, Trimeprazine tartrate, Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetrazine Cromolyn sodium

H₂-antagonists: Cimetidine*, Famotidine, Ranitidin.

Gastric Proton pump inhibitors: Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole

Anti-neoplastic agents:

Alkylating agents: Meclorethamine*, Cyclophosphamide, Melphalan,

Chlorambucil, Busulfan, Thiotepa

Antimetabolites: Mercaptopurine*, Thioguanine, Fluorouracil, Floxuridine, Cytarabine, Methotrexate*, Azathioprine

Antibiotics: Dactinomycin, Daunorubicin, Doxorubicin, Bleomycin

Plant products: Etoposide, Vinblastin sulphate, Vincristin sulphate

Miscellaneous: Cisplatin, Mitotane.

UNIT – II

10 Hours

Anti-anginal:

Vasodilators: Amyl nitrite, Nitroglycerin*, Pentaerythritol tetranitrate, Isosorbide dinitrite*, Dipyridamole.

Calcium channel blockers: Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine.

Diuretics:

Carbonic anhydrase inhibitors: Acetazolamide*, Methazolamide, Dichlorphenamide.

Thiazides: Chlorthiazide*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide,

Loop diuretics: Furosemide*, Bumetanide, Ethacrynic acid.

Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride.

Osmotic Diuretics: Mannitol

Anti-hypertensive Agents: Timolol, Captopril, Lisinopril, Enalapril, Benazepril hydrochloride, Quinapril hydrochloride, Methyldopate hydrochloride,* Clonidine hydrochloride, Guanethidine monosulphate, Guanabenz acetate, Sodium nitroprusside, Diazoxide, Minoxidil, Reserpine, Hydralazine hydrochloride.

UNIT- III

10 Hours

Anti-arrhythmic Drugs: Quinidine sulphate, Procainamide hydrochloride, Disopyramide phosphate*, Phenytoin sodium, Lidocaine hydrochloride, Tocainide hydrochloride, Mexiletine hydrochloride, Lorcaïnide hydrochloride, Amiodarone, Sotalol.

Anti-hyperlipidemic agents: Clofibrate, Lovastatin, Cholesteramine and Cholestipol

Coagulant & Anticoagulants: Menadione, Acetomenadione, Warfarin*, Anisindione, clopidogrel

Drugs used in Congestive Heart Failure: Digoxin, Digitoxin, Nesiritide, Bosentan, Tezosentan.

UNIT- IV

08 Hours

Drugs acting on Endocrine system

Nomenclature, Stereochemistry and metabolism of steroids

Sex hormones: Testosterone, Nandralone, Progesterones, Oestriol, Oestradiol, Oestrione, Diethyl stilbestrol.

Drugs for erectile dysfunction: Sildenafil, Tadalafil.

Oral contraceptives: Mifepristone, Norgestril, Levonorgestrol

Corticosteroids: Cortisone, Hydrocortisone, Prednisolone, Betamethasone, Dexamethasone

Thyroid and antithyroid drugs: L-Thyroxine, L-Thyronine, Propylthiouracil, Methimazole.

UNIT – V

07 Hours

Antidiabetic agents:

Insulin and its preparations

Sulfonyl ureas: Tolbutamide*, Chlorpropamide, Glipizide, Glimepiride.

Biguanides: Metformin.

Thiazolidinediones: Pioglitazone, Rosiglitazone.

Meglitinides: Repaglinide, Nateglinide.

Glucosidase inhibitors: Acarbose, Voglibose.

Local Anesthetics: SAR of Local anesthetics

Benzoic Acid derivatives; Cocaine, Hexylcaine, Meprylcaine, Cyclomethycaine, Piperocaine.

Amino Benzoic acid derivatives: Benzocaine*, Butamben, Procaine*, Butacaine, Propoxycaine, Tetracaine, Benoxinate.

Lidocaine/Anilide derivatives: Lignocaine, Mepivacaine, Prilocaine, Etidocaine.

Miscellaneous: Phenacaine, Dipiperodon, Dibucaine.*

Recommended Books (Latest Editions)

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1to 5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

BP 502 T. Industrial PharmacyI (Theory)

45 Hours

Scope: Course enables the student to understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.

Objectives: Upon completion of the course the student shall be able to

1. Know the various pharmaceutical dosage forms and their manufacturing techniques.
2. Know various considerations in development of pharmaceutical dosage forms
3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality

Course content:

3 hours/ week

UNIT-I

07 Hours

Preformulation Studies: Introduction to preformulation, goals and objectives, study of physicochemical characteristics of drug substances.

a. Physical properties: Physical form (crystal & amorphous), particle size, shape, flow properties, solubility profile (pKa, pH, partition coefficient), polymorphism

b. Chemical Properties: Hydrolysis, oxidation, reduction, racemisation, polymerization

BCS classification of drugs & its significant

Application of preformulation considerations in the development of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.

UNIT-II

10 Hours

Tablets:

- a. Introduction, ideal characteristics of tablets, classification of tablets. Excipients, Formulation of tablets, granulation methods, compression and processing problems. Equipments and tablet tooling.
- b. Tablet coating: Types of coating, coating materials, formulation of coating composition, methods of coating, equipment employed and defects in coating.
- c. Quality control tests: In process and finished product tests

Liquid orals: Formulation and manufacturing consideration of syrups and elixirs suspensions and emulsions; Filling and packaging; evaluation of liquid orals official in pharmacopoeia

UNIT-III

08 Hours

Capsules:

- a. **Hard gelatin capsules:** Introduction, Production of hard gelatin capsule shells. size of capsules, Filling, finishing and special techniques of formulation of hard gelatin capsules, manufacturing defects. In process and final product quality control tests for capsules.
- b. **Soft gelatin capsules:** Nature of shell and capsule content, size of capsules, importance of base adsorption and minim/gram factors, production, in process and final product quality control tests. Packing, storage and stability testing of soft gelatin capsules and their applications.

Pellets: Introduction, formulation requirements, pelletization process, equipments for manufacture of pellets

UNIT-IV

10 Hours

Parenteral Products:

- a. Definition, types, advantages and limitations. Preformulation factors and essential requirements, vehicles, additives, importance of isotonicity
- b. Production procedure, production facilities and controls, aseptic processing
- c. Formulation of injections, sterile powders, large volume parenterals and lyophilized products.
- d. Containers and closures selection, filling and sealing of ampoules, vials and infusion fluids. Quality control tests of parenteral products.

Ophthalmic Preparations: Introduction, formulation considerations; formulation of eye drops, eye ointments and eye lotions; methods of preparation; labeling, containers; evaluation of ophthalmic preparations

UNIT-V

10 Hours

Cosmetics: Formulation and preparation of the following cosmetic preparations: lipsticks, shampoos, cold cream and vanishing cream, tooth pastes, hair dyes and sunscreens.

Pharmaceutical Aerosols: Definition, propellants, containers, valves, types of aerosol systems; formulation and manufacture of aerosols; Evaluation of aerosols; Quality control and stability studies.

Packaging Materials Science: Materials used for packaging of pharmaceutical products, factors influencing choice of containers, legal and official requirements for containers, stability aspects of packaging materials, quality control tests.

BP 506 P. Industrial PharmacyI (Practical)

4 Hours/week

1. Preformulation studies on paracetamol/asparin/or any other drug
2. Preparation and evaluation of Paracetamol tablets
3. Preparation and evaluation of Aspirin tablets
4. Coating of tablets- film coating of tables/granules
5. Preparation and evaluation of Tetracycline capsules
6. Preparation of Calcium Gluconate injection
7. Preparation of Ascorbic Acid injection
8. Qulaity control test of (as per IP) marketed tablets and capsules
9. Preparation of Eye drops/ and Eye ointments
10. Preparation of Creams (cold / vanishing cream)
11. Evaluation of Glass containers (as per IP)

Recommended Books: (Latest Editions)

1. Pharmaceutical dosage forms - Tablets, volume 1 -3 by H.A. Liberman, Leon Lachman &J.B.Schwartz
2. Pharmaceutical dosage form - Parenteral medication vol- 1&2 by Liberman & Lachman
3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman
4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition
5. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS)
6. Theory and Practice of Industrial Pharmacy by Liberman & Lachman
7. Pharmaceutics- The science of dosage form design by M.E.Aulton, Churchill livingstone, Latest edition
8. Introduction to Pharmaceutical Dosage Forms by H. C.Ansel, Lea &Febiger, Philadelphia, 5thedition, 2005
9. Drug stability - Principles and practice by Cartensen & C.J. Rhodes, 3rd Edition, Marcel Dekker Series, Vol 107.

BP503.T. PHARMACOLOGY-II (Theory)

45 Hours

Scope: This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body and in addition, emphasis on the basic concepts of bioassay.

Objectives: Upon completion of this course the student should be able to

1. Understand the mechanism of drug action and its relevance in the treatment of different diseases
2. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
3. Demonstrate the various receptor actions using isolated tissue preparation
4. Appreciate correlation of pharmacology with related medical sciences

Course Content:

UNIT-I

10hours

1. Pharmacology of drugs acting on cardio vascular system

- a. Introduction to hemodynamic and electrophysiology of heart.
- b. Drugs used in congestive heart failure
- c. Anti-hypertensive drugs.
- d. Anti-anginal drugs.
- e. Anti-arrhythmic drugs.
- f. Anti-hyperlipidemic drugs.

UNIT-II

10hours

1. Pharmacology of drugs acting on cardio vascular system

- a. Drug used in the therapy of shock.
- b. Hematinics, coagulants and anticoagulants.
- c. Fibrinolytics and anti-platelet drugs
- d. Plasma volume expanders

2. Pharmacology of drugs acting on urinary system

- a. Diuretics
- b. Anti-diuretics.

UNIT-III

10hours

3. Autocoids and related drugs

- a. Introduction to autocoids and classification
- b. Histamine, 5-HT and their antagonists.
- c. Prostaglandins, Thromboxanes and Leukotrienes.
- d. Angiotensin, Bradykinin and Substance P.
- e. Non-steroidal anti-inflammatory agents
- f. Anti-gout drugs
- g. Antirheumatic drugs

UNIT-IV**08hours****5. Pharmacology of drugs acting on endocrine system**

- a. Basic concepts in endocrine pharmacology.
- b. Anterior Pituitary hormones- analogues and their inhibitors.
- c. Thyroid hormones- analogues and their inhibitors.
- d. Hormones regulating plasma calcium level- Parathormone, Calcitonin and Vitamin-D.
- d. Insulin, Oral Hypoglycemic agents and glucagon.
- e. ACTH and corticosteroids.

UNIT-V**07hours****5. Pharmacology of drugs acting on endocrine system**

- a. Androgens and Anabolic steroids.
- b. Estrogens, progesterone and oral contraceptives.
- c. Drugs acting on the uterus.

6. Bioassay

- a. Principles and applications of bioassay.
- b. Types of bioassay
- c. Bioassay of insulin, oxytocin, vasopressin, ACTH, d-tubocurarine, digitalis, histamine and 5-HT

BP 507 P. PHARMACOLOGY-II (Practical)

4Hrs/Week

1. Introduction to *in-vitro* pharmacology and physiological salt solutions.
2. Effect of drugs on isolated frog heart.
3. Effect of drugs on blood pressure and heart rate of dog.
4. Study of diuretic activity of drugs using rats/mice.
5. DRC of acetylcholine using frog rectus abdominis muscle.
6. Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively.
7. Bioassay of histamine using guinea pig ileum by matching method.
8. Bioassay of oxytocin using rat uterine horn by interpolation method.
9. Bioassay of serotonin using rat fundus strip by three point bioassay.
10. Bioassay of acetylcholine using rat ileum/colon by four point bioassay.
11. Determination of PA₂ value of prazosin using rat anococcygeus muscle (by Schild's plot method).
12. Determination of PD₂ value using guinea pig ileum.
13. Effect of spasmogens and spasmolytics using rabbit jejunum.
14. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model.
15. Analgesic activity of drug using central and peripheral methods

Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos

Recommended Books (Latest Editions)

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins.
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology.
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
8. Modern Pharmacology with clinical Applications, by Charles R.Craig & Robert.
9. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
10. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan.

BP504 T. PHARMACOGNOSY AND PHYTOCHEMISTRY II (Theory)

45Hours

Scope: The main purpose of subject is to impart the students the knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially. Also this subject involves the study of producing the plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine

Objectives: Upon completion of the course, the student shall be able

1. to know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents
2. to understand the preparation and development of herbal formulation.
3. to understand the herbal drug interactions
4. to carryout isolation and identification of phytoconstituents

Course Content:

UNIT-I

7 Hours

Metabolic pathways in higher plants and their determination

- a) Brief study of basic metabolic pathways and formation of different secondary metabolites through these pathways- Shikimic acid pathway, Acetate pathways and Amino acid pathway.
- b) Study of utilization of radioactive isotopes in the investigation of Biogenetic studies.

UNIT-II

14 Hours

General introduction, composition, chemistry & chemical classes, biosources, therapeutic uses and commercial applications of following secondary metabolites:

Alkaloids: Vinca, Rauwolfia, Belladonna, Opium,

Phenylpropanoids and Flavonoids: Lignans, Tea, Ruta

Steroids, Cardiac Glycosides & Triterpenoids: Liquorice, Dioscorea, Digitalis

Volatile oils: Mentha, Clove, Cinnamon, Fennel, Coriander,

Tannins: Catechu, Pterocarpus

Resins: Benzoin, Guggul, Ginger, Asafoetida, Myrrh, Colophony

Glycosides: Senna, Aloes, Bitter Almond

Iridoids, Other terpenoids & Naphthaquinones: Gentian, Artemisia, taxus, carotenoids

UNIT-III

06 Hours

Isolation, Identification and Analysis of Phytoconstituents

- a) Terpenoids: Menthol, Citral, Artemisin
- b) Glycosides: Glycyrrhetic acid & Rutin
- c) Alkaloids: Atropine, Quinine, Reserpine, Caffeine
- d) Resins: Podophyllotoxin, Curcumin

UNIT-IV

10 Hours

Industrial production, estimation and utilization of the following phytoconstituents:

Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, Taxol, Vincristine and Vinblastine

UNIT V

8 Hours

Basics of Phytochemistry

Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs.

BP 508 P. PHARMACOGNOSY AND PHYTOCHEMISTRY II (Practical)

4 Hours/Week

1. Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander
2. Exercise involving isolation & detection of active principles
 - a. Caffeine - from tea dust.
 - b. Diosgenin from Dioscorea
 - c. Atropine from Belladonna
 - d. Sennosides from Senna
3. Separation of sugars by Paper chromatography
4. TLC of herbal extract
5. Distillation of volatile oils and detection of phytoconstituents by TLC
6. Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh

Recommended Books: (Latest Editions)

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Saunders & Co., London, 2009.
2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
4. Herbal drug industry by R.D. Choudhary (1996), 1st Edn, Eastern Publisher, New Delhi.
5. Essentials of Pharmacognosy, Dr.SH.Ansari, 1st edition, Birla publications, New Delhi, 2007
6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.
7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.
8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994.
9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.
10. The formulation and preparation of cosmetic, fragrances and flavours.
11. Remington's Pharmaceutical sciences.
12. Text Book of Biotechnology by Vyas and Dixit.
13. Text Book of Biotechnology by R.C. Dubey.

BP 505 T. PHARMACEUTICAL JURISPRUDENCE (Theory)

45 Hours

Scope: This course is designed to impart basic knowledge on important legislations related to the profession of pharmacy in India.

Objectives: Upon completion of the course, the student shall be able to understand:

1. The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
2. Various Indian pharmaceutical Acts and Laws
3. The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
4. The code of ethics during the pharmaceutical practice

Course Content:

UNIT-I

10 Hours

Drugs and Cosmetics Act, 1940 and its rules 1945:

Objectives, Definitions, Legal definitions of schedules to the Act and Rules

Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties.

Manufacture of drugs – Prohibition of manufacture and sale of certain drugs,

Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license.

UNIT-II

10 Hours

Drugs and Cosmetics Act, 1940 and its rules 1945.

Detailed study of Schedule G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F & DMR (OA)

Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties

Labeling & Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics, List of permitted colors. Offences and penalties.

Administration of the Act and Rules – Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors

UNIT-III

10 Hours

- **Pharmacy Act –1948:** Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils; constitution and functions, Registration of Pharmacists, Offences and

Penalties

- **Medicinal and Toilet Preparation Act –1955:** Objectives, Definitions, Licensing, Manufacture In bond and Outside bond, Export of alcoholic preparations, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties.
- **Narcotic Drugs and Psychotropic substances Act-1985 and Rules:** Objectives, Definitions, Authorities and Officers, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw, manufacture, sale and export of opium, Offences and Penalties

UNIT-IV

08 Hours

- **Study of Salient Features of Drugs and Magic Remedies Act and its rules:** Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties
- **Prevention of Cruelty to animals Act-1960:** Objectives, Definitions, Institutional Animal Ethics Committee, CPCSEA guidelines for Breeding and Stocking of Animals, Performance of Experiments, Transfer and acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties
- **National Pharmaceutical Pricing Authority:** Drugs Price Control Order (DPCO)-2013. Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM)

UNIT-V

07 Hours

- **Pharmaceutical Legislations** – A brief review, Introduction, Study of drugs enquiry committee, Health survey and development committee, Hathi committee and Mudaliar committee
- **Code of Pharmaceutical ethics** Definition, Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath
- **Medical Termination of Pregnancy Act**
- **Right to Information Act**
- **Introduction to Intellectual Property Rights (IPR)**

Recommended books: (Latest Edition)

1. Forensic Pharmacy by B. Suresh

2. Text book of Forensic Pharmacy by B.M. Mithal
3. Hand book of drug law-by M.L. Mehra
4. A text book of Forensic Pharmacy by N.K. Jain
5. Drugs and Cosmetics Act/Rules by Govt. of India publications.
6. Medicinal and Toilet preparations act 1955 by Govt. of India publications.
7. Narcotic drugs and psychotropic substances act by Govt. of India publications
8. Drugs and Magic Remedies act by Govt. of India publication
9. Bare Acts of the said laws published by Government. Reference books (Theory)

SEMESTER VI

BP601T. MEDICINAL CHEMISTRY – III (Theory)

45 Hours

Scope: This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasis on modern techniques of rational drug design like quantitative structure activity relationship (QSAR), Prodrug concept, combinatorial chemistry and Computer aided drug design (CADD). The subject also emphasizes on the chemistry, mechanism of action, metabolism, adverse effects, Structure Activity Relationships (SAR), therapeutic uses and synthesis of important drugs.

Objectives: Upon completion of the course student shall be able to

1. Understand the importance of drug design and different techniques of drug design.
2. Understand the chemistry of drugs with respect to their biological activity.
3. Know the metabolism, adverse effects and therapeutic value of drugs.
4. Know the importance of SAR of drugs.

Course Content:

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted by (*)

UNIT – I

10 Hours

Antibiotics

Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes.

-Lactam antibiotics: Penicillin, Cephalosporins, - Lactamase inhibitors, Monobactams

Aminoglycosides: Streptomycin, Neomycin, Kanamycin

Tetracyclines: Tetracycline, Oxytetracycline, Chlortetracycline, Minocycline, Doxycycline

UNIT – II

10 Hours

Antibiotics

Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes.

Macrolide: Erythromycin Clarithromycin, Azithromycin.

Miscellaneous: Chloramphenicol*, Clindamycin.

Prodrugs: Basic concepts and application of prodrugs design.

Antimalarials: Etiology of malaria.

Quinolines: SAR, Quinine sulphate, Chloroquine*, Amodiaquine, Primaquine phosphate, Pamaquine*, Quinacrine hydrochloride, Mefloquine.

Biguanides and dihydro triazines: Cycloguanil pamoate, Proguanil.

Miscellaneous: Pyrimethamine, Artesunate, Artemether, Atovaquone.

UNIT – III

10 Hours

Anti-tubercular Agents

Synthetic anti tubercular agents: Isoniazid*, Ethionamide, Ethambutol, Pyrazinamide, Para amino salicylic acid.*

Anti tubercular antibiotics: Rifampicin, Rifabutin, Cycloserine Streptomycine, Capreomycin sulphate.

Urinary tract anti-infective agents

Quinolones: SAR of quinolones, Nalidixic Acid, Norfloxacin, Enoxacin, Ciprofloxacin*, Ofloxacin, Lomefloxacin, Sparfloxacin, Gatifloxacin, Moxifloxacin

Miscellaneous: Furazolidine, Nitrofurantoin*, Methanamine.

Antiviral agents:

Amantadine hydrochloride, Rimantadine hydrochloride, Idoxuridine trifluoride, Acyclovir*, Gancyclovir, Zidovudine, Didanosine, Zalcitabine, Lamivudine, Loviride, Delavirding, Ribavirin, Saquinavir, Indinavir, Ritonavir.

UNIT – IV

08 Hours

Antifungal agents:

Antifungal antibiotics: Amphotericin-B, Nystatin, Natamycin, Griseofulvin.

Synthetic Antifungal agents: Clotrimazole, Econazole, Butoconazole, Oxiconazole Tioconazole, Miconazole*, Ketoconazole, Terconazole, Itraconazole, Fluconazole, Naftifine hydrochloride, Tolnaftate*.

Anti-protozoal Agents: Metronidazole*, Tinidazole, Ornidazole, Diloxanide, Iodoquinol, Pentamidine Isethionate, Atovaquone, Eflornithine.

Anthelmintics: Diethylcarbamazine citrate*, Thiabendazole, Mebendazole*, Albendazole, Niclosamide, Oxamniquine, Praziquantal, Ivermectin.

Sulphonamides and Sulfones

Historical development, chemistry, classification and SAR of Sulfonamides: Sulphamethizole, Sulfoxazole, Sulphamethizine, Sulfacetamide*, Sulphapyridine, Sulfamethoxazole*, Sulphadiazine, Mefenide acetate, Sulfasalazine.

Folate reductase inhibitors: Trimethoprim*, Cotrimoxazole.

Sulfones: Dapsone*.

UNIT – V

07 Hours

Introduction to Drug Design

Various approaches used in drug design.

Physicochemical parameters used in quantitative structure activity relationship (QSAR) such as partition coefficient, Hammett's electronic parameter, Taft's steric parameter and Hansch analysis.

Pharmacophore modeling and docking techniques.

Combinatorial Chemistry: Concept and applications of combinatorial chemistry: solid phase and solution phase synthesis.

BP607P. MEDICINAL CHEMISTRY- III (Practical)

4 Hours / week

I Preparation of drugs and intermediates

- 1 Sulphanilamide
- 2 7-Hydroxy, 4-methyl coumarin
- 3 Chlorobutanol
- 4 Triphenyl imidazole
- 5 Tolbutamide
- 6 Hexamine

II Assay of drugs

- 1 Isonicotinic acid hydrazide
- 2 Chloroquine
- 3 Metronidazole
- 4 Dapsone
- 5 Chlorpheniramine maleate
- 6 Benzyl penicillin

III Preparation of medicinally important compounds or intermediates by Microwave irradiation technique

IV Drawing structures and reactions using chem draw®

V Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5)

Recommended Books (Latest Editions)

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.

7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

BP602 T. PHARMACOLOGY-III (Theory)

45 Hours

Scope: This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on respiratory and gastrointestinal system, infectious diseases, immuno-pharmacology and in addition, emphasis on the principles of toxicology and chronopharmacology.

Objectives: Upon completion of this course the student should be able to:

1. understand the mechanism of drug action and its relevance in the treatment of different infectious diseases
2. comprehend the principles of toxicology and treatment of various poisonings and
3. appreciate correlation of pharmacology with related medical sciences.

Course Content:

UNIT-I

10hours

1. Pharmacology of drugs acting on Respiratory system

- a. Anti -asthmatic drugs
- b. Drugs used in the management of COPD
- c. Expectorants and antitussives
- d. Nasal decongestants
- e. Respiratory stimulants

2. Pharmacology of drugs acting on the Gastrointestinal Tract

- a. Antiulcer agents.
- b. Drugs for constipation and diarrhoea.
- c. Appetite stimulants and suppressants.
- d. Digestants and carminatives.
- e. Emetics and anti-emetics.

UNIT-II

10hours

3. Chemotherapy

- a. General principles of chemotherapy.
- b. Sulfonamides and cotrimoxazole.
- c. Antibiotics- Penicillins, cephalosporins, chloramphenicol, macrolides, quinolones and fluoroquinolins, tetracycline and aminoglycosides

UNIT-III

10hours

3. Chemotherapy

- a. Antitubercular agents
- b. Antileprotic agents

- c. Antifungal agents
- d. Antiviral drugs
- e. Anthelmintics
- f. Antimalarial drugs
- g. Antiamoebic agents

UNIT-IV

08hours

3. Chemotherapy

- l. Urinary tract infections and sexually transmitted diseases.
- m. Chemotherapy of malignancy.

4. Immunopharmacology

- a. Immunostimulants
- b. Immunosuppressant

Protein drugs, monoclonal antibodies, target drugs to antigen, biosimilars

UNIT-V

07hours

5. Principles of toxicology

- a. Definition and basic knowledge of acute, subacute and chronic toxicity.
- b. Definition and basic knowledge of genotoxicity, carcinogenicity, teratogenicity and mutagenicity
- c. General principles of treatment of poisoning
- d. Clinical symptoms and management of barbiturates, morphine, organophosphorus compound and lead, mercury and arsenic poisoning.

6. Chronopharmacology

- a. Definition of rhythm and cycles.
- b. Biological clock and their significance leading to chronotherapy.

BP 608 P. PHARMACOLOGY-III (Practical)

4Hrs/Week

1. Dose calculation in pharmacological experiments
2. Antiallergic activity by mast cell stabilization assay
3. Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.
4. Study of effect of drugs on gastrointestinal motility
5. Effect of agonist and antagonists on guinea pig ileum
6. Estimation of serum biochemical parameters by using semi- autoanalyser
7. Effect of saline purgative on frog intestine
8. Insulin hypoglycemic effect in rabbit
9. Test for pyrogens (rabbit method)
10. Determination of acute oral toxicity (LD50) of a drug from a given data
11. Determination of acute skin irritation / corrosion of a test substance
12. Determination of acute eye irritation / corrosion of a test substance
13. Calculation of pharmacokinetic parameters from a given data
14. Biostatistics methods in experimental pharmacology(student's t test, ANOVA)
15. Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon Signed Rank test)

**Experiments are demonstrated by simulated experiments/videos*

Recommended Books (Latest Editions)

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs. The Point Lippincott Williams & Wilkins
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher Modern Pharmacology with clinical Applications, by Charles R.Craig & Robert,
8. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata,
9. Kulkarni SK. Handbook of experimental pharmacology. VallabhPrakashan,
10. N.Udupa and P.D. Gupta, Concepts in Chronopharmacology.

BP 603 T. HERBAL DRUG TECHNOLOGY (Theory)

45 hours

Scope: This subject gives the student the knowledge of basic understanding of herbal drug industry, the quality of raw material, guidelines for quality of herbal drugs, herbal cosmetics, natural sweeteners, nutraceutical etc. The subject also emphasizes on Good Manufacturing Practices (GMP), patenting and regulatory issues of herbal drugs

Objectives: Upon completion of this course the student should be able to:

1. understand raw material as source of herbal drugs from cultivation to herbal drug product
2. know the WHO and ICH guidelines for evaluation of herbal drugs
3. know the herbal cosmetics, natural sweeteners, nutraceuticals
4. appreciate patenting of herbal drugs, GMP .

Course content:

UNIT-I

11 Hours

Herbs as raw materials

Definition of herb, herbal medicine, herbal medicinal product, herbal drug preparation

Source of Herbs

Selection, identification and authentication of herbal materials

Processing of herbal raw material

Biodynamic Agriculture

Good agricultural practices in cultivation of medicinal plants including Organic farming.

Pest and Pest management in medicinal plants: Biopesticides/Bioinsecticides.

Indian Systems of Medicine

a) Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy

b) Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika, Churna, Lehya and Bhasma.

UNIT-II

7 Hours

Nutraceuticals

General aspects, Market, growth, scope and types of products available in the market. Health benefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases, Cancer, Irritable bowel syndrome and various Gastro intestinal diseases.

Study of following herbs as health food: Alfaalfa, Chicory, Ginger, Fenugreek, Garlic, Honey, Amla, Ginseng, Ashwagandha, Spirulina

Herbal-Drug and Herb-Food Interactions: General introduction to interaction and classification. Study of following drugs and their possible side effects and interactions: Hypercium, kava-kava, Ginkobiloba, Ginseng, Garlic, Pepper & Ephedra.

UNIT-III

10 Hours

Herbal Cosmetics

Sources and description of raw materials of herbal origin used via, fixed oils, waxes, gums colours, perfumes, protective agents, bleaching agents, antioxidants in products such as skin care, hair care and oral hygiene products.

Herbal excipients:

Herbal Excipients – Significance of substances of natural origin as excipients – colorants, sweeteners, binders, diluents, viscosity builders, disintegrants, flavors & perfumes.

Herbal formulations :

Conventional herbal formulations like syrups, mixtures and tablets and Novel dosage forms like phytosomes

UNIT- IV

10 Hours

Evaluation of Drugs WHO & ICH guidelines for the assessment of herbal drugs
Stability testing of herbal drugs.

Patenting and Regulatory requirements of natural products:

- a) Definition of the terms: Patent, IPR, Farmers right, Breeder's right, Bioprospecting and Biopiracy
- b) Patenting aspects of Traditional Knowledge and Natural Products. Case study of Curcuma & Neem.

Regulatory Issues - Regulations in India (ASU DTAB, ASU DCC), Regulation of manufacture of ASU drugs - Schedule Z of Drugs & Cosmetics Act for ASU drugs.

UNIT-V

07 Hours

General Introduction to Herbal Industry

Herbal drugs industry: Present scope and future prospects.

A brief account of plant based industries and institutions involved in work on medicinal and aromatic plants in India.

Schedule T – Good Manufacturing Practice of Indian systems of medicine

Components of GMP (Schedule – T) and its objectives

Infrastructural requirements, working space, storage area, machinery and equipments, standard operating procedures, health and hygiene, documentation and records.

BP 609 P. HERBAL DRUG TECHNOLOGY (Practical)

4 hours/ week

1. To perform preliminary phytochemical screening of crude drugs.
2. Determination of the alcohol content of Asava and Arista
3. Evaluation of excipients of natural origin
4. Incorporation of prepared and standardized extract in cosmetic formulations like creams, lotions and shampoos and their evaluation.
5. Incorporation of prepared and standardized extract in formulations like syrups, mixtures and tablets and their evaluation as per Pharmacopoeial requirements.
6. Monograph analysis of herbal drugs from recent Pharmacopoeias
7. Determination of Aldehyde content
8. Determination of Phenol content
9. Determination of total alkaloids

Recommended Books: (Latest Editions)

1. Textbook of Pharmacognosy by Trease & Evans.
2. Textbook of Pharmacognosy by Tyler, Brady & Robber.
3. Pharmacognosy by Kokate, Purohit and Gokhale
4. Essential of Pharmacognosy by Dr.S.H.Ansari
5. Pharmacognosy & Phytochemistry by V.D.Rangari
6. Pharmacopoeal standards for Ayurvedic Formulation (Council of Research in Indian Medicine & Homeopathy)
7. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.

BP 604 T. BIOPHARMACEUTICS AND PHARMACOKINETICS (Theory)

45 Hours

Scope: This subject is designed to impart knowledge and skills of Biopharmaceutics and pharmacokinetics and their applications in pharmaceutical development, design of dose and dosage regimen and in solving the problems arising therein.

Objectives: Upon completion of the course student shall be able to:

1. Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.
2. Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
3. To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
4. Understand various pharmacokinetic parameters, their significance & applications.

Course Content:

UNIT-I Hours

10

Introduction to Biopharmaceutics

Absorption: Mechanisms of drug absorption through GIT, factors influencing drug absorption through GIT, absorption of drug from Non per oral extra-vascular routes, **Distribution** Tissue permeability of drugs, binding of drugs, apparent, volume of drug distribution, plasma and tissue protein binding of drugs, factors affecting protein-drug binding. Kinetics of protein binding, Clinical significance of protein binding of drugs

UNIT- II Hours

10

Elimination: Drug metabolism and basic understanding metabolic pathways renal excretion of drugs, factors affecting renal excretion of drugs, renal clearance, Non renal routes of drug excretion of drugs

Bioavailability and Bioequivalence: Definition and Objectives of bioavailability, absolute and relative bioavailability, measurement of bioavailability, *in-vitro* drug dissolution models, *in-vitro-in-vivo* correlations, bioequivalence studies, methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.

UNIT- III

10 Hours

Pharmacokinetics: Definition and introduction to Pharmacokinetics, Compartment models, Non compartment models, physiological models, One compartment open model. (a). Intravenous Injection (Bolus) (b). Intravenous infusion and (c) Extra vascular administrations. Pharmacokinetics parameters - K_E , $t_{1/2}$, V_d , AUC , K_a , Cl_t and CL_R - definitions methods of eliminations, understanding of their significance and application

UNIT- IV**08 Hours**

Multicompartment models: Two compartment open model. IV bolus

Kinetics of multiple dosing, steady state drug levels, calculation of loading and maintenance doses and their significance in clinical settings.

UNIT- V**07 Hours**

Nonlinear Pharmacokinetics: a. Introduction, b. Factors causing Non-linearity. c. Michaelis-menton method of estimating parameters, Explanation with example of drugs.

Recommended Books: (Latest Editions)

1. Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi.
2. Biopharmaceutics and Pharmacokinetics; By Robert F Notari
3. Applied biopharmaceutics and pharmacokinetics, Leon Shargel and Andrew B.C.YU 4th edition,Prentice-Hall International edition,USA
4. Bio pharmaceutics and Pharmacokinetics-A Treatise, By D. M. Brahmankar and Sunil B.Jaiswal, Vallabh Prakashan Pitampura, Delhi
5. Pharmacokinetics: By Milo Gibaldi Donald, R. Mercei Dekker Inc.
6. Hand Book of Clinical Pharmacokinetics, By Milo Gibaldi and Laurie Prescott by ADIS Health Science Press.
7. Biopharmaceutics; By Swarbrick
8. Clinical Pharmacokinetics, Concepts and Applications: By Malcolm Rowland and
9. Thomas, N. Tozen, Lea and Febrger, Philadelphia, 1995.
10. Dissolution, Bioavailability and Bioequivalence, By Abdou H.M, Mack, Publishing Company,Pennsylvania 1989.
11. Biopharmaceutics and Clinical Pharmacokinetics-An introduction 4th edition Revised and expanded by Robert F Notari Marcel Dekker Inc, New York and Basel, 1987.
12. Remington's Pharmaceutical Sciences, By Mack Publishing Company, Pennsylvania

BP 605 T. PHARMACEUTICAL BIOTECHNOLOGY (Theory)

45 Hours

Scope:

- Biotechnology has a long promise to revolutionize the biological sciences and technology.
- Scientific application of biotechnology in the field of genetic engineering, medicine and fermentation technology makes the subject interesting.
- Biotechnology is leading to new biological revolutions in diagnosis, prevention and cure of diseases, new and cheaper pharmaceutical drugs.
- Biotechnology has already produced transgenic crops and animals and the future promises lot more.
- It is basically a research-based subject.

Objectives: Upon completion of the subject student shall be able to;

1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries
2. Genetic engineering applications in relation to production of pharmaceuticals
3. Importance of Monoclonal antibodies in Industries
4. Appreciate the use of microorganisms in fermentation technology

Unit I

10 Hours

- a) Brief introduction to Biotechnology with reference to Pharmaceutical Sciences.
- b) Enzyme Biotechnology- Methods of enzyme immobilization and applications.
- c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries.
- d) Brief introduction to Protein Engineering.
- e) Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase.
- f) Basic principles of genetic engineering.

Unit II

10 Hours

- a) Study of cloning vectors, restriction endonucleases and DNA ligase.
- b) Recombinant DNA technology. Application of genetic engineering in medicine.
- c) Application of r DNA technology and genetic engineering in the production of:
 - i) Interferon
 - ii) Vaccines- hepatitis- B
 - iii) Hormones-Insulin.
- d) Brief introduction to PCR

Unit III

10 Hours

Types of immunity- humoral immunity, cellular immunity

- a) Structure of Immunoglobulins
- b) Structure and Function of MHC
- c) Hypersensitivity reactions, Immune stimulation and Immune suppressions.
- d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity.
- e) Storage conditions and stability of official vaccines
- f) Hybridoma technology- Production, Purification and Applications
- g) Blood products and Plasma Substitutes.

Unit IV

08Hours

- a) Immuno blotting techniques- ELISA, Western blotting, Southern blotting.
- b) Genetic organization of Eukaryotes and Prokaryotes
- c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons.
- d) Introduction to Microbial biotransformation and applications.
- e) Mutation: Types of mutation/mutants.

Unit V

07 Hours

- a) Fermentation methods and general requirements, study of media, equipments, sterilization methods, aeration process, stirring.
- b) Large scale production fermenter design and its various controls.
- c) Study of the production of - penicillins, citric acid, Vitamin B12, Glutamic acid, Griseofulvin,
- d) Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substitutes.

Recommended Books (Latest edition):

1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.
2. RA Goldshy et. al., : Kuby Immunology.
3. J.W. Goding: Monoclonal Antibodies.
4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology by Royal

Society of Chemistry.

5. Zaborsky: Immobilized Enzymes, CRC Press, Degraland, Ohio.
6. S.B. Primrose: Molecular Biotechnology (Second Edition) Blackwell Scientific Publication.
7. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, 2nd edition, Aditya books Ltd., New Delhi

BP606TPHARMACEUTICAL QUALITY ASSURANCE (Theory)

45 Hours

Scope: This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It deals with the important aspects like cGMP, QC tests, documentation, quality certifications and regulatory affairs.

Objectives: Upon completion of the course student shall be able to:

- understand the cGMP aspects in a pharmaceutical industry
- appreciate the importance of documentation
- understand the scope of quality certifications applicable to pharmaceutical industries
- understand the responsibilities of QA & QC departments

Course content:

UNIT – I

10 Hours

Quality Assurance and Quality Management concepts: Definition and concept of Quality control, Quality assurance and GMP

Total Quality Management (TQM): Definition, elements, philosophies

ICH Guidelines: purpose, participants, process of harmonization, Brief overview of QSEM, with special emphasis on Q-series guidelines, ICH stability testing guidelines

Quality by design (QbD): Definition, overview, elements of QbD program, tools

ISO 9000 & ISO14000: Overview, Benefits, Elements, steps for registration

NABL accreditation : Principles and procedures

UNIT - II

10 Hours

Organization and personnel: Personnel responsibilities, training, hygiene and personal records.

Premises: Design, construction and plant layout, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination.

Equipments and raw materials: Equipment selection, purchase specifications, maintenance, purchase specifications and maintenance of stores for raw materials.

UNIT – III

10 Hours

Quality Control: Quality control test for containers, rubber closures and secondary packing

materials.

Good Laboratory Practices: General Provisions, Organization and Personnel, Facilities, Equipment, Testing Facilities Operation, Test and Control Articles, Protocol for Conduct of a Nonclinical Laboratory Study, Records and Reports, Disqualification of Testing Facilities

UNIT – IV

08 Hours

Complaints: Complaints and evaluation of complaints, Handling of return good, recalling and waste disposal.

Document maintenance in pharmaceutical industry: Batch Formula Record, Master Formula Record, SOP, Quality audit, Quality Review and Quality documentation, Reports and documents, distribution records.

UNIT – V

07 Hours

Calibration and Validation: Introduction, definition and general principles of calibration, qualification and validation, importance and scope of validation, types of validation, validation master plan. Calibration of pH meter, Qualification of UV-Visible spectrophotometer, General principles of Analytical method Validation.

Warehousing: Good warehousing practice, materials management

Recommended Books: (Latest Edition)

1. Quality Assurance Guide by organization of Pharmaceutical Products of India.
2. Good Laboratory Practice Regulations, 2nd Edition, Sandy Weinberg Vol. 69.
3. Quality Assurance of Pharmaceuticals- A compendium of Guide lines and Related materials Vol I WHO Publications.
4. A guide to Total Quality Management- Kushik Maitra and Sedhan K Ghosh
5. How to Practice GMP's – P P Sharma.
6. ISO 9000 and Total Quality Management – Sadhank G Ghosh
7. The International Pharmacopoeia – Vol I, II, III, IV- General Methods of Analysis and Quality specification for Pharmaceutical Substances, Excipients and Dosage forms
8. Good laboratory Practices – Marcel Deckker Series
9. ICH guidelines, ISO 9000 and 14000 guidelines

SEMESTER VII

BP701T. INSTRUMENTAL METHODS OF ANALYSIS (Theory)

45 Hours

Scope: This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs. This subject is designed to impart a fundamental knowledge on the principles and instrumentation of spectroscopic and chromatographic technique. This also emphasizes on theoretical and practical knowledge on modern analytical instruments that are used for drug testing.

Objectives: Upon completion of the course the student shall be able to

1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
2. Understand the chromatographic separation and analysis of drugs.
3. Perform quantitative & qualitative analysis of drugs using various analytical instruments.

Course Content:

UNIT –I

10 Hours

UV Visible spectroscopy

Electronic transitions, chromophores, auxochromes, spectral shifts, solvent effect on absorption spectra, Beer and Lambert's law, Derivation and deviations.

Instrumentation - Sources of radiation, wavelength selectors, sample cells, detectors- Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode.

Applications - Spectrophotometric titrations, Single component and multi component analysis

Fluorimetry

Theory, Concepts of singlet, doublet and triplet electronic states, internal and external conversions, factors affecting fluorescence, quenching, instrumentation and applications

UNIT –II

10 Hours

IR spectroscopy

Introduction, fundamental modes of vibrations in poly atomic molecules, sample handling, factors affecting vibrations

Instrumentation - Sources of radiation, wavelength selectors, detectors - Golay cell, Bolometer, Thermocouple, Thermister, Pyroelectric detector and applications

Flame Photometry-Principle, interferences, instrumentation and applications

Atomic absorption spectroscopy- Principle, interferences, instrumentation and applications

Nepheloturbidometry- Principle, instrumentation and applications

UNIT –III

10 Hours

Introduction to chromatography

Adsorption and partition column chromatography-Methodology, advantages, disadvantages and applications.

Thin layer chromatography- Introduction, Principle, Methodology, Rf values, advantages, disadvantages and applications.

Paper chromatography-Introduction, methodology, development techniques, advantages, disadvantages and applications

Electrophoresis– Introduction, factors affecting electrophoretic mobility, Techniques of paper, gel, capillary electrophoresis, applications

UNIT –IV

08 Hours

Gas chromatography - Introduction, theory, instrumentation, derivatization, temperature programming, advantages, disadvantages and applications

High performance liquid chromatography (HPLC)-Introduction, theory, instrumentation, advantages and applications.

UNIT –V

07 Hours

Ion exchange chromatography- Introduction, classification, ion exchange resins, properties, mechanism of ion exchange process, factors affecting ion exchange, methodology and applications

Gel chromatography- Introduction, theory, instrumentation and applications

Affinity chromatography- Introduction, theory, instrumentation and applications

BP705P. INSTRUMENTAL METHODS OF ANALYSIS (Practical)

4 Hours/Week

- 1 Determination of absorption maxima and effect of solvents on absorption maxima of organic compounds
- 2 Estimation of dextrose by colorimetry
- 3 Estimation of sulfanilamide by colorimetry
- 4 Simultaneous estimation of ibuprofen and paracetamol by UV spectroscopy
- 5 Assay of paracetamol by UV- Spectrophotometry
- 6 Estimation of quinine sulfate by fluorimetry
- 7 Study of quenching of fluorescence
- 8 Determination of sodium by flame photometry
- 9 Determination of potassium by flame photometry
- 10 Determination of chlorides and sulphates by nephelo turbidometry
- 11 Separation of amino acids by paper chromatography
- 12 Separation of sugars by thin layer chromatography
- 13 Separation of plant pigments by column chromatography
- 14 Demonstration experiment on HPLC
- 15 Demonstration experiment on Gas Chromatography

Recommended Books (Latest Editions)

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
6. Organic Chemistry by I. L. Finar
7. Organic spectroscopy by William Kemp
8. Quantitative Analysis of Drugs by D. C. Garrett
9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
10. Spectrophotometric identification of Organic Compounds by Silverstein

BP 702 T. INDUSTRIAL PHARMACYII (Theory)

45 Hours

Scope: This course is designed to impart fundamental knowledge on pharmaceutical product development and translation from laboratory to market

Objectives: Upon completion of the course, the student shall be able to:

1. Know the process of pilot plant and scale up of pharmaceutical dosage forms
2. Understand the process of technology transfer from lab scale to commercial batch
3. Know different Laws and Acts that regulate pharmaceutical industry
4. Understand the approval process and regulatory requirements for drug products

Course Content:

UNIT-I

10 Hours

Pilot plant scale up techniques: General considerations - including significance of personnel requirements, space requirements, raw materials, Pilot plant scale up considerations for solids, liquid orals, semi solids and relevant documentation, SUPAC guidelines, Introduction to platform technology

UNIT-II

10 Hours

Technology development and transfer: WHO guidelines for Technology Transfer(TT): Terminology, Technology transfer protocol, Quality risk management, Transfer from R & D to production (Process, packaging and cleaning), Granularity of TT Process (API, excipients, finished products, packaging materials) Documentation, Premises and equipments, qualification and validation, quality control, analytical method transfer, Approved regulatory bodies and agencies, Commercialization - practical aspects and problems (case studies), TT agencies in India - APCTD, NRDC, TIFAC, BCIL, TBSE / SIDBI; TT related documentation - confidentiality agreement, licensing, MoUs, legal issues

UNIT-III

10 Hours

Regulatory affairs: Introduction, Historical overview of Regulatory Affairs, Regulatory authorities, Role of Regulatory affairs department, Responsibility of Regulatory Affairs Professionals

Regulatory requirements for drug approval: Drug Development Teams, Non-Clinical Drug Development, Pharmacology, Drug Metabolism and Toxicology, General considerations of Investigational New Drug (IND) Application, Investigator's Brochure (IB) and New Drug Application (NDA), Clinical research / BE studies, Clinical Research Protocols, Biostatistics in Pharmaceutical Product Development, Data Presentation for FDA Submissions, Management of Clinical Studies.

UNIT-IV**08 Hours**

Quality management systems: Quality management & Certifications: Concept of Quality, Total Quality Management, Quality by Design (QbD), Six Sigma concept, Out of Specifications (OOS), Change control, Introduction to ISO 9000 series of quality systems standards, ISO 14000, NABL, GLP

UNIT-V**07 Hours**

Indian Regulatory Requirements: Central Drug Standard Control Organization (CDSCO) and State Licensing Authority: Organization, Responsibilities, Certificate of Pharmaceutical Product (COPP), Regulatory requirements and approval procedures for New Drugs.

Recommended Books: (Latest Editions)

1. Regulatory Affairs from Wikipedia, the free encyclopedia modified on 7th April available at http://en.wikipedia.org/wiki/Regulatory_Affairs.
2. International Regulatory Affairs Updates, 2005. available at <http://www.iraup.com/about.php>
3. Douglas J Pisano and David S. Mantus. Text book of FDA Regulatory Affairs A Guide for Prescription Drugs, Medical Devices, and Biologics' Second Edition.
4. Regulatory Affairs brought by learning plus, inc. available at <http://www.cgmp.com/ra.htm>.

BP 703T. PHARMACY PRACTICE (Theory)

45 Hours

Scope: In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug information, and therapeutic drug monitoring for improved patient care. In community pharmacy, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counselling for improved patient care in the community set up.

Objectives: Upon completion of the course, the student shall be able to

1. know various drug distribution methods in a hospital
2. appreciate the pharmacy stores management and inventory control
3. monitor drug therapy of patient through medication chart review and clinical review
4. obtain medication history interview and counsel the patients
5. identify drug related problems
6. detect and assess adverse drug reactions
7. interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states
8. know pharmaceutical care services
9. do patient counseling in community pharmacy;
10. appreciate the concept of Rational drug therapy.

Unit I:

10 Hours

a) Hospital and its organization

Definition, Classification of hospital- Primary, Secondary and Tertiary hospitals, Classification based on clinical and non- clinical basis, Organization Structure of a Hospital, and Medical staffs involved in the hospital and their functions.

b) Hospital pharmacy and its organization

Definition, functions of hospital pharmacy, Organization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacists.

c) Adverse drug reaction

Classifications - Excessive pharmacological effects, secondary pharmacological effects, idiosyncrasy, allergic drug reactions, genetically determined toxicity, toxicity following sudden withdrawal of drugs, Drug interaction- beneficial interactions, adverse interactions, and pharmacokinetic drug interactions, Methods for detecting

drug interactions, spontaneous case reports and record linkage studies, and Adverse drug reaction reporting and management.

d) Community Pharmacy

Organization and structure of retail and wholesale drug store, types and design, Legal requirements for establishment and maintenance of a drug store, Dispensing of proprietary products, maintenance of records of retail and wholesale drug store.

Unit II:

10 Hours

a) Drug distribution system in a hospital

Dispensing of drugs to inpatients, types of drug distribution systems, charging policy and labelling, Dispensing of drugs to ambulatory patients, and Dispensing of controlled drugs.

b) Hospital formulary

Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary.

c) Therapeutic drug monitoring

Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring.

d) Medication adherence

Causes of medication non-adherence, pharmacist role in the medication adherence, and monitoring of patient medication adherence.

e) Patient medication history interview

Need for the patient medication history interview, medication interview forms.

f) Community pharmacy management

Financial, materials, staff, and infrastructure requirements.

Unit III:

10 Hours

a) Pharmacy and therapeutic committee

Organization, functions, Policies of the pharmacy and therapeutic committee in including drugs into formulary, inpatient and outpatient prescription, automatic stop order, and emergency drug list preparation.

b) information services

Drug

Drug and Poison information centre, Sources of drug information, Computerised services, and storage and retrieval of information.

c) Patient counseling

Definition of patient counseling; steps involved in patient counseling, and Special cases that require the pharmacist

d) Education and training program in the hospital

Role of pharmacist in the education and training program, Internal and external training program, Services to the nursing homes/clinics, Code of ethics for community pharmacy, and Role of pharmacist in the interdepartmental communication and community health education.

e) Prescribed medication order and communication skills

Prescribed medication order- interpretation and legal requirements, and Communication skills- communication with prescribers and patients.

Unit IV 8 Hours

a) Budget preparation and implementation

Budget preparation and implementation

b) Clinical Pharmacy

Introduction to Clinical Pharmacy, Concept of clinical pharmacy, functions and responsibilities of clinical pharmacist, Drug therapy monitoring - medication chart review, clinical review, pharmacist intervention, Ward round participation, Medication history and Pharmaceutical care.

Dosing pattern and drug therapy based on Pharmacokinetic & disease pattern.

c) Over the counter (OTC) sales

Introduction and sale of over the counter, and Rational use of common over the counter medications.

Unit V 7 Hours

a) Drug store management and inventory control

Organisation of drug store, types of materials stocked and storage conditions, Purchase and inventory control: principles, purchase procedure, purchase order, procurement and stocking, Economic order quantity, Reorder quantity level, and Methods used for the analysis of the drug expenditure

b) Investigational use of drugs

Description, principles involved, classification, control, identification, role of hospital pharmacist, advisory committee.

c) Interpretation of Clinical Laboratory Tests

Blood chemistry, hematology, and urinalysis

Recommended Books (Latest Edition):

1. Merchant S.H. and Dr. J.S.Quadry. *A textbook of hospital pharmacy*, 4th ed. Ahmadabad: B.S. Shah Prakakshan; 2001.
2. Parthasarathi G, Karin Nyfort-Hansen, Milap C Nahata. *A textbook of Clinical Pharmacy Practice- essential concepts and skills*, 1st ed. Chennai: Orient Longman Private Limited; 2004.
3. William E. Hassan. *Hospital pharmacy*, 5th ed. Philadelphia: Lea & Febiger; 1986.
4. Tipnis Bajaj. *Hospital Pharmacy*, 1st ed. Maharashtra: Career Publications; 2008.
5. Scott LT. *Basic skills in interpreting laboratory data*, 4th ed. American Society of Health System Pharmacists Inc; 2009.
6. Parmar N.S. *Health Education and Community Pharmacy*, 18th ed. India: CBS Publishers & Distributers; 2008.

Journals:

1. Therapeutic drug monitoring. ISSN: 0163-4356
2. Journal of pharmacy practice. ISSN : 0974-8326
3. American journal of health system pharmacy. ISSN: 1535-2900 (online)
4. Pharmacy times (Monthly magazine)

BP 704T: NOVEL DRUG DELIVERY SYSTEMS (Theory)

45 Hours

Scope: This subject is designed to impart basic knowledge on the area of novel drug delivery systems.

Objectives: Upon completion of the course student shall be able

1. To understand various approaches for development of novel drug delivery systems.
2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation

Course content:

Unit-I

10 Hours

Controlled drug delivery systems: Introduction, terminology/definitions and rationale, advantages, disadvantages, selection of drug candidates. Approaches to design controlled release formulations based on diffusion, dissolution and ion exchange principles. Physicochemical and biological properties of drugs relevant to controlled release formulations

Polymers: Introduction, classification, properties, advantages and application of polymers in formulation of controlled release drug delivery systems.

Unit-II

10 Hours

Microencapsulation: Definition, advantages and disadvantages, microspheres /microcapsules, microparticles, methods of microencapsulation, applications

Mucosal Drug Delivery system: Introduction, Principles of bioadhesion / mucoadhesion, concepts, advantages and disadvantages, transmucosal permeability and formulation considerations of buccal delivery systems

Implantable Drug Delivery Systems: Introduction, advantages and disadvantages, concept of implants and osmotic pump

Unit-III

10 Hours

Transdermal Drug Delivery Systems: Introduction, Permeation through skin, factors affecting permeation, permeation enhancers, basic components of TDDS, formulation approaches

Gastroretentive drug delivery systems: Introduction, advantages, disadvantages, approaches for GRDDS – Floating, high density systems, inflatable and gastroadhesive systems and their applications

Nasopulmonary drug delivery system: Introduction to Nasal and Pulmonary routes of drug delivery, Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers

Unit-IV

08 Hours

Targeted drug Delivery: Concepts and approaches advantages and disadvantages, introduction to liposomes, niosomes, nanoparticles, monoclonal antibodies and their applications

Unit-V

07 Hours

Ocular Drug Delivery Systems: Introduction, intra ocular barriers and methods to overcome –Preliminary study, ocular formulations and ocuserts

Intrauterine Drug Delivery Systems: Introduction, advantages and disadvantages, development of intra uterine devices (IUDs) and applications

Recommended Books: (Latest Editions)

1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992.
3. Encyclopedia of Controlled Delivery. Edith Mathiowitz, Published by Wiley Interscience Publication, John Wiley and Sons, Inc, New York. Chichester/Weinheim
4. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
5. S.P. Vyas and R.K. Khar, Controlled Drug Delivery -concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002.

Journals

1. Indian Journal of Pharmaceutical Sciences (IPA)
2. Indian Drugs (IDMA)
3. Journal of Controlled Release (Elsevier Sciences)
4. Drug Development and Industrial Pharmacy (Marcel & Decker)
5. International Journal of Pharmaceutics (Elsevier Sciences)

SEMESTER VIII

BP801T. BIOSTATISTICS AND RESEARCH METHODOLOGY (Theory)

45 Hours

Scope: To understand the applications of Biostatistics in Pharmacy. This subject deals with descriptive statistics, Graphics, Correlation, Regression, logistic regression Probability theory, Sampling technique, Parametric tests, Non Parametric tests, ANOVA, Introduction to Design of Experiments, Phases of Clinical trials and Observational and Experimental studies, SPSS, R and MINITAB statistical software's, analyzing the statistical data using Excel.

Objectives: Upon completion of the course the student shall be able to

- Know the operation of M.S. Excel, SPSS, R and MINITAB[®], DoE (Design of Experiment)
- Know the various statistical techniques to solve statistical problems
- Appreciate statistical techniques in solving the problems.

Course content:

Unit-I

10 Hours

Introduction: Statistics, Biostatistics, Frequency distribution

Measures of central tendency: Mean, Median, Mode- Pharmaceutical examples

Measures of dispersion: Dispersion, Range, standard deviation, Pharmaceutical problems

Correlation: Definition, Karl Pearson's coefficient of correlation, Multiple correlation - Pharmaceuticals examples

Unit-II

10 Hours

Regression: Curve fitting by the method of least squares, fitting the lines $y = a + bx$ and $x = a + by$, Multiple regression, standard error of regression- Pharmaceutical Examples

Probability: Definition of probability, Binomial distribution, Normal distribution, Poisson's distribution, properties - problems

Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM) - Pharmaceutical examples

Parametric test: t-test(Sample, Pooled or Unpaired and Paired), ANOVA, (One way and Two way), Least Significance difference

Unit-III

10 Hours

Non Parametric tests: Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test

Introduction to Research: Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism

Graphs: Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph

Designing the methodology: Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.

Unit-IV

8 Hours

Blocking and confounding system for Two-level factorials

Regression modeling: Hypothesis testing in Simple and Multiple regression models

Introduction to Practical components of Industrial and Clinical Trials Problems:

Statistical Analysis Using Excel, SPSS, MINITAB[®], DESIGN OF EXPERIMENTS, R - Online Statistical Software's to Industrial and Clinical trial approach

Unit-V

7Hours

Design and Analysis of experiments:

Factorial Design: Definition, 2^2 , 2^3 design. Advantage of factorial design

Response Surface methodology: Central composite design, Historical design, Optimization Techniques

Recommended Books (Latest edition):

1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc. New York.
2. Fundamental of Statistics – Himalaya Publishing House- S.C.Guptha
3. Design and Analysis of Experiments –PHI Learning Private Limited, R. Pannerselvam,
4. Design and Analysis of Experiments – Wiley Students Edition, Douglas and C. Montgomery

BP 802T SOCIAL AND PREVENTIVE PHARMACY

Hours: 45

Scope:

The purpose of this course is to introduce to students a number of health issues and their challenges. This course also introduced a number of national health programmes. The roles of the pharmacist in these contexts are also discussed.

Objectives:

After the successful completion of this course, the student shall be able to:

- Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.
- Have a critical way of thinking based on current healthcare development.
- Evaluate alternative ways of solving problems related to health and pharmaceutical issues

Course content:

Unit I:

10 Hours

Concept of health and disease: Definition, concepts and evaluation of public health. Understanding the concept of prevention and control of disease, social causes of diseases and social problems of the sick.

Social and health education: Food in relation to nutrition and health, Balanced diet, Nutritional deficiencies, Vitamin deficiencies, Malnutrition and its prevention.

Sociology and health: Socio cultural factors related to health and disease, Impact of urbanization on health and disease, Poverty and health

Hygiene and health: personal hygiene and health care; avoidable habits

Unit II:

10 Hours

Preventive medicine: General principles of prevention and control of diseases such as cholera, SARS, Ebola virus, influenza, acute respiratory infections, malaria, chicken guinea, dengue, lymphatic filariasis, pneumonia, hypertension, diabetes mellitus, cancer, drug addiction-drug substance abuse

Unit III:

10 Hours

National health programs, its objectives, functioning and outcome of the following: HIV AND AIDS control programme, TB, Integrated disease surveillance program (IDSP), National leprosy control programme, National mental health program, National

programme for prevention and control of deafness, Universal immunization programme, National programme for control of blindness, Pulse polio programme.

Unit IV:

08 Hours

National health intervention programme for mother and child, National family welfare programme, National tobacco control programme, National Malaria Prevention Program, National programme for the health care for the elderly, Social health programme; role of WHO in Indian national program

Unit V:

07 Hours

Community services in rural, urban and school health: Functions of PHC, Improvement in rural sanitation, national urban health mission, Health promotion and education in school.

Recommended Books (Latest edition):

1. Short Textbook of Preventive and Social Medicine, Prabhakara GN, 2nd Edition, 2010, ISBN: 9789380704104, JAYPEE Publications
2. Textbook of Preventive and Social Medicine (Mahajan and Gupta), Edited by Roy Rabindra Nath, Saha Indranil, 4th Edition, 2013, ISBN: 9789350901878, JAYPEE Publications
3. Review of Preventive and Social Medicine (Including Biostatistics), Jain Vivek, 6th Edition, 2014, ISBN: 9789351522331, JAYPEE Publications
4. Essentials of Community Medicine—A Practical Approach, Hiremath Lalita D, Hiremath Dhananjaya A, 2nd Edition, 2012, ISBN: 9789350250440, JAYPEE Publications
5. Park Textbook of Preventive and Social Medicine, K Park, 21st Edition, 2011, ISBN-14: 9788190128285, BANARSIDAS BHANOT PUBLISHERS.
6. Community Pharmacy Practice, Ramesh Adepu, BSP publishers, Hyderabad

Recommended Journals:

1. Research in Social and Administrative Pharmacy, Elsevier, Ireland

BP803ET. PHARMA MARKETING MANAGEMENT (Theory)

45 Hours

Scope:

The pharmaceutical industry not only needs highly qualified researchers, chemists and, technical people, but also requires skilled managers who can take the industry forward by managing and taking the complex decisions which are imperative for the growth of the industry. The Knowledge and Know-how of marketing management groom the people for taking a challenging role in Sales and Product management.

Course Objective: The course aims to provide an understanding of marketing concepts and techniques and their applications in the pharmaceutical industry.

Unit I

10 Hours

Marketing:

Definition, general concepts and scope of marketing; Distinction between marketing & selling; Marketing environment; Industry and competitive analysis; Analyzing consumer buying behavior; industrial buying behavior.

Pharmaceutical market:

Quantitative and qualitative aspects; size and composition of the market; demographic descriptions and socio-psychological characteristics of the consumer; market segmentation & targeting. Consumer profile; Motivation and prescribing habits of the physician; patients' choice of physician and retail pharmacist. Analyzing the Market; Role of market research.

Unit II

10 Hours

Product decision:

Classification, product line and product mix decisions, product life cycle, product portfolio analysis; product positioning; New product decisions; Product branding, packaging and labeling decisions, Product management in pharmaceutical industry.

Unit III

10 Hours

Promotion:

Methods, determinants of promotional mix, promotional budget; An overview of personal selling, advertising, direct mail, journals, sampling, retailing, medical exhibition, public relations, online promotional techniques for OTC Products.

Unit IV**10 Hours****Pharmaceutical marketing channels:**

Designing channel, channel members, selecting the appropriate channel, conflict in channels, physical distribution management: Strategic importance, tasks in physical distribution management.

Professional sales representative (PSR):

Duties of PSR, purpose of detailing, selection and training, supervising, norms for customer calls, motivating, evaluating, compensation and future prospects of the PSR.

Unit V**10 Hours****Pricing:**

Meaning, importance, objectives, determinants of price; pricing methods and strategies, issues in price management in pharmaceutical industry. An overview of DPCO (Drug Price Control Order) and NPPA (National Pharmaceutical Pricing Authority).

Emerging concepts in marketing:

Vertical & Horizontal Marketing; Rural Marketing; Consumerism; Industrial Marketing; Global Marketing.

Recommended Books: (Latest Editions)

1. Philip Kotler and Kevin Lane Keller: Marketing Management, Prentice Hall of India, New Delhi
2. Walker, Boyd and Larreche : Marketing Strategy- Planning and Implementation, Tata MC GrawHill, New Delhi.
3. Dhruv Grewal and Michael Levy: Marketing, Tata MC Graw Hill
4. Arun Kumar and N Menakshi: Marketing Management, Vikas Publishing, India
5. Rajan Saxena: Marketing Management; Tata MC Graw-Hill (India Edition)
6. Ramaswamy, U.S & Nanakamari, S: Marketing Managemnt:Global Perspective, IndianContext,Macmilan India, New Delhi.
7. Shanker, Ravi: Service Marketing, Excell Books, New Delhi
8. Subba Rao Changanti, Pharmaceutical Marketing in India (GIFT – Excel series) Excel Publications.

BP804 ET: PHARMACEUTICAL REGULATORY SCIENCE (Theory)

45Hours

Scope: This course is designed to impart the fundamental knowledge on the regulatory requirements for approval of new drugs, and drug products in regulated markets of India & other countries like US, EU, Japan, Australia, UK etc. It prepares the students to learn in detail on the regulatory requirements, documentation requirements, and registration procedures for marketing the drug products.

Objectives: Upon completion of the subject student shall be able to;

1. Know about the process of drug discovery and development
2. Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
3. Know the regulatory approval process and their registration in Indian and international markets

Course content:

Unit I

10Hours

New Drug Discovery and development

Stages of drug discovery, Drug development process, pre-clinical studies, non-clinical activities, clinical studies, Innovator and generics, Concept of generics, Generic drug product development.

Unit II

10Hours

Regulatory Approval Process

Approval processes and timelines involved in Investigational New Drug (IND), New Drug Application (NDA), Abbreviated New Drug Application (ANDA). Changes to an approved NDA / ANDA.

Regulatory authorities and agencies

Overview of regulatory authorities of India, United States, European Union, Australia, Japan, Canada (Organization structure and types of applications)

Unit III

10Hours

Registration of Indian drug product in overseas market

Procedure for export of pharmaceutical products, Technical documentation, Drug Master Files (DMF), Common Technical Document (CTD), electronic Common Technical

Document (eCTD), ASEAN Common Technical Document (ACTD)research.

Unit IV

08Hours

Clinical trials

Developing clinical trial protocols, Institutional Review Board / Independent Ethics committee - formation and working procedures, Informed consent process and procedures, GCP obligations of Investigators, sponsors & Monitors, Managing and Monitoring clinical trials, Pharmacovigilance - safety monitoring in clinical trials

Unit V

07Hours

Regulatory Concepts

Basic terminology, guidance, guidelines, regulations, Laws and Acts, Orange book, Federal Register, Code of Federal Regulatory, Purple book

Recommended books (Latest edition):

1. Drug Regulatory Affairs by Sachin Itkar, Dr. N.S. Vyawahare, Nirali Prakashan.
2. The Pharmaceutical Regulatory Process, Second Edition Edited by Ira R. Berry and Robert P. Martin, Drugs and the Pharmaceutical Sciences, Vol.185. Informa Health care Publishers.
3. New Drug Approval Process: Accelerating Global Registrations By Richard A Guarino, MD, 5th edition, Drugs and the Pharmaceutical Sciences, Vol.190.
4. Guidebook for drug regulatory submissions / Sandy Weinberg. By John Wiley & Sons. Inc.
5. FDA Regulatory Affairs: a guide for prescription drugs, medical devices, and biologics /edited by Douglas J. Pisano, David Mantus.
6. Generic Drug Product Development, Solid Oral Dosage forms, Leon Shargel and Isader Kaufer, Marcel Dekker series, Vol.143
7. Clinical Trials and Human Research: A Practical Guide to Regulatory Compliance By Fay A. Rozovsky and Rodney K. Adams
8. Principles and Practices of Clinical Research, Second Edition Edited by John I. Gallin and Frederick P. Ognibene
9. Drugs: From Discovery to Approval, Second Edition By Rick Ng

BP 805T: PHARMACOVIGILANCE (Theory)

45 hours

Scope: This paper will provide an opportunity for the student to learn about development of pharmacovigilance as a science, basic terminologies used in pharmacovigilance, global scenario of Pharmacovigilance, train students on establishing pharmacovigilance programme in an organization, various methods that can be used to generate safety data and signal detection. This paper also develops the skills of classifying drugs, diseases and adverse drug reactions.

Objectives:

At completion of this paper it is expected that students will be able to (know, do, and appreciate):

1. Why drug safety monitoring is important?
2. History and development of pharmacovigilance
3. National and international scenario of pharmacovigilance
4. Dictionaries, coding and terminologies used in pharmacovigilance
5. Detection of new adverse drug reactions and their assessment
6. International standards for classification of diseases and drugs
7. Adverse drug reaction reporting systems and communication in pharmacovigilance
8. Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle
9. Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation
10. Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India
11. ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning
12. CIOMS requirements for ADR reporting
13. Writing case narratives of adverse events and their quality.

Course Content

Unit I

10 Hours

Introduction to Pharmacovigilance

- History and development of Pharmacovigilance
- Importance of safety monitoring of Medicine
- WHO international drug monitoring programme
- Pharmacovigilance Program of India(PvPI)

Introduction to adverse drug reactions

- Definitions and classification of ADRs
- Detection and reporting
- Methods in Causality assessment
- Severity and seriousness assessment
- Predictability and preventability assessment
- Management of adverse drug reactions

Basic terminologies used in pharmacovigilance

- Terminologies of adverse medication related events
- Regulatory terminologies

Unit II

10 hours

Drug and disease classification

- Anatomical, therapeutic and chemical classification of drugs
- International classification of diseases
- Daily defined doses
- International Non proprietary Names for drugs

Drug dictionaries and coding in pharmacovigilance

- WHO adverse reaction terminologies
- MedDRA and Standardised MedDRA queries
- WHO drug dictionary
- Eudravigilance medicinal product dictionary

Information resources in pharmacovigilance

- Basic drug information resources
- Specialised resources for ADRs

Establishing pharmacovigilance programme

- Establishing in a hospital
- Establishment & operation of drug safety department in industry
- Contract Research Organisations (CROs)
- Establishing a national programme

Unit III

10 Hours

Vaccine safety surveillance

- Vaccine Pharmacovigilance
- Vaccination failure
- Adverse events following immunization

Pharmacovigilance methods

- Passive surveillance – Spontaneous reports and case series
- Stimulated reporting
- Active surveillance – Sentinel sites, drug event monitoring and registries
- Comparative observational studies – Cross sectional study, case control study and cohort study
- Targeted clinical investigations

Communication in pharmacovigilance

- Effective communication in Pharmacovigilance
- Communication in Drug Safety Crisis management
- Communicating with Regulatory Agencies, Business Partners, Healthcare facilities & Media

Unit IV

8 Hours

Safety data generation

- Pre clinical phase
- Clinical phase
- Post approval phase (PMS)

ICH Guidelines for Pharmacovigilance

- Organization and objectives of ICH
- Expedited reporting
- Individual case safety reports
- Periodic safety update reports
- Post approval expedited reporting
- Pharmacovigilance planning
- Good clinical practice in pharmacovigilance studies

Unit V

7 hours

Pharmacogenomics of adverse drug reactions

- Genetics related ADR with example focusing PK parameters.

Drug safety evaluation in special population

- Paediatrics
- Pregnancy and lactation
- Geriatrics

CIOMS

- CIOMS Working Groups
- CIOMS Form

CDSCO (India) and Pharmacovigilance

- D&C Act and Schedule Y
- Differences in Indian and global pharmacovigilance requirements

Recommended Books (Latest edition):

1. Textbook of Pharmacovigilance: S K Gupta, Jaypee Brothers, Medical Publishers.
2. Practical Drug Safety from A to Z By Barton Cobert, Pierre Biron, Jones and Bartlett Publishers.
3. Mann's Pharmacovigilance: Elizabeth B. Andrews, Nicholas, Wiley Publishers.
4. Stephens' Detection of New Adverse Drug Reactions: John Talbot, Patrick Walle, Wiley Publishers.
5. An Introduction to Pharmacovigilance: Patrick Waller, Wiley Publishers.
6. Cobert's Manual of Drug Safety and Pharmacovigilance: Barton Cobert, Jones & Bartlett Publishers.
7. Textbook of Pharmacoepidemiology edited by Brian L. Strom, Stephen E Kimmel, Sean Hennessy, Wiley Publishers.
8. A Textbook of Clinical Pharmacy Practice -Essential Concepts and Skills: G. Parthasarathi, Karin Nyfort Hansen, Milap C. Nahata
9. National Formulary of India
10. Text Book of Medicine by Yashpal Munjal

11. Text book of Pharmacovigilance: concept and practice by GP Mohanta and PK Manna

12. <http://www.who/umc.org/DynPage.aspx?id=105825&mn1=7347&mn2=7259&mn3=7297>
13. <http://www.ich.org/>
14. <http://www.cioms.ch/>
15. <http://cdsco.nic.in/>
16. http://www.who.int/vaccine_safety/en/
17. http://www.ipc.gov.in/PvPI/pv_home.html

**BP 806 ET. QUALITY CONTROL AND STANDARDIZATION OF HERBALS
(Theory)**

Scope: In this subject the student learns about the various methods and guidelines for evaluation and standardization of herbs and herbal drugs. The subject also provides an opportunity for the student to learn cGMP, GAP and GLP in traditional system of medicines.

Objectives: Upon completion of the subject student shall be able to;

1. know WHO guidelines for quality control of herbal drugs
2. know Quality assurance in herbal drug industry
3. know the regulatory approval process and their registration in Indian and international markets
4. appreciate EU and ICH guidelines for quality control of herbal drugs

Unit I

10 hours

Basic tests for drugs – Pharmaceutical substances, Medicinal plants materials and dosage forms
WHO guidelines for quality control of herbal drugs.
Evaluation of commercial crude drugs intended for use

Unit II

10 hours

Quality assurance in herbal drug industry of cGMP, GAP, GMP and GLP in traditional system of medicine.

WHO Guidelines on current good manufacturing Practices (cGMP) for Herbal Medicines
WHO Guidelines on GACP for Medicinal Plants.

Unit III

10 hours

EU and ICH guidelines for quality control of herbal drugs.
Research Guidelines for Evaluating the Safety and Efficacy of Herbal Medicines

Unit IV

08 hours

Stability testing of herbal medicines. Application of various chromatographic techniques in standardization of herbal products.
Preparation of documents for new drug application and export registration
GMP requirements and Drugs & Cosmetics Act provisions.

Unit V

07 hours

Regulatory requirements for herbal medicines.

WHO guidelines on safety monitoring of herbal medicines in pharmacovigilance systems

Comparison of various Herbal Pharmacopoeias.

Role of chemical and biological markers in standardization of herbal products

Recommended Books: (Latest Editions)

1. Pharmacognosy by Trease and Evans
2. Pharmacognosy by Kokate, Purohit and Gokhale
3. Rangari, V.D., Text book of Pharmacognosy and Phytochemistry Vol. I , Carrier Pub., 2006.
4. Aggrawal, S.S., Herbal Drug Technology. Universities Press, 2002.
5. EMEA. Guidelines on Quality of Herbal Medicinal Products/Traditional Medicinal Products,
6. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.
7. Shinde M.V., Dhalwal K., Potdar K., Mahadik K. Application of quality control principles to herbal drugs. International Journal of Phytomedicine 1(2009); p. 4-8.
8. WHO. Quality Control Methods for Medicinal Plant Materials, World Health Organization, Geneva, 1998. WHO. Guidelines for the Appropriate Use of Herbal Medicines. WHO Regional Publications, Western Pacific Series No 3, WHO Regional office for the Western Pacific, Manila, 1998.
9. WHO. The International Pharmacopeia, Vol. 2: Quality Specifications, 3rd edn. World Health Organization, Geneva, 1981.
10. WHO. Quality Control Methods for Medicinal Plant Materials. World Health Organization, Geneva, 1999.
11. WHO. WHO Global Atlas of Traditional, Complementary and Alternative Medicine. 2 vol. set. Vol. 1 contains text and Vol. 2, maps. World Health Organization, Geneva, 2005.
12. WHO. Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants. World Health Organization, Geneva, 2004.

BP 807 ET. COMPUTER AIDED DRUG DESIGN (Theory)

45 Hours

Scope: This subject is designed to provide detailed knowledge of rational drug design process and various techniques used in rational drug design process.

Objectives: Upon completion of the course, the student shall be able to understand

- Design and discovery of lead molecules
- The role of drug design in drug discovery process
- The concept of QSAR and docking
- Various strategies to develop new drug like molecules.
- The design of new drug molecules using molecular modeling software

Course Content:

UNIT-I

10 Hours

Introduction to Drug Discovery and Development

Stages of drug discovery and development

Lead discovery and Analog Based Drug Design

Rational approaches to lead discovery based on traditional medicine, Random screening, Non-random screening, serendipitous drug discovery, lead discovery based on drug metabolism, lead discovery based on clinical observation.

Analog Based Drug Design: Bioisosterism, Classification, Bioisosteric replacement. Any three case studies

UNIT-II

10 Hours

Quantitative Structure Activity Relationship (QSAR)

SAR versus QSAR, History and development of QSAR, Types of physicochemical parameters, experimental and theoretical approaches for the determination of physicochemical parameters such as Partition coefficient, Hammett's substituent constant and Taft's steric constant. Hansch analysis, Free Wilson analysis, 3D-QSAR approaches like COMFA and COMSIA.

UNIT-III

10 Hours

Molecular Modeling and virtual screening techniques

Virtual Screening techniques: Drug likeness screening, Concept of pharmacophore mapping and pharmacophore based Screening,

Molecular docking: Rigid docking, flexible docking, manual docking, Docking based screening. *De novo* drug design.

UNIT-IV**08 Hours****Informatics & Methods in drug design**

Introduction to Bioinformatics, chemoinformatics. ADME databases, chemical, biochemical and pharmaceutical databases.

UNIT-V**07 Hours**

Molecular Modeling: Introduction to molecular mechanics and quantum mechanics. Energy Minimization methods and Conformational Analysis, global conformational minima determination.

Recommended Books (Latest Editions)

1. Robert GCK, ed., "Drug Action at the Molecular Level" University Park Press Baltimore.
2. Martin YC. "Quantitative Drug Design" Dekker, New York.
3. Delgado JN, Remers WA eds "Wilson & Gisvold's Text Book of Organic Medicinal & Pharmaceutical Chemistry" Lippincott, New York.
4. Foye WO "Principles of Medicinal chemistry 'Lea & Febiger.
5. Koro Ikovas A, Burckhalter JH. "Essentials of Medicinal Chemistry" Wiley Interscience.
6. Wolf ME, ed "The Basis of Medicinal Chemistry, Burger's Medicinal Chemistry" John Wiley & Sons, New York.
7. Patrick Graham, L., An Introduction to Medicinal Chemistry, Oxford University Press.
8. Smith HJ, Williams H, eds, "Introduction to the principles of Drug Design" Wright Boston.
9. Silverman R.B. "The organic Chemistry of Drug Design and Drug Action" Academic Press New York.

BP808ET: CELL AND MOLECULAR BIOLOGY (Elective subject)

45 Hours

Scope:

- Cell biology is a branch of biology that studies cells – their physiological properties, their structure, the organelles they contain, interactions with their environment, their life cycle, division, death and cell function.
- This is done both on a microscopic and molecular level.
- Cell biology research encompasses both the great diversity of single-celled organisms like bacteria and protozoa, as well as the many specialized cells in multi-cellular organisms such as humans, plants, and sponges.

Objectives: Upon completion of the subject student shall be able to;

- Summarize cell and molecular biology history.
- Summarize cellular functioning and composition.
- Describe the chemical foundations of cell biology.
- Summarize the DNA properties of cell biology.
- Describe protein structure and function.
- Describe cellular membrane structure and function.
- Describe basic molecular genetic mechanisms.
- Summarize the Cell Cycle

Course content:

Unit I

10Hours

- a) Cell and Molecular Biology: Definitions theory and basics and Applications.
- b) Cell and Molecular Biology: History and Summation.
- c) Properties of cells and cell membrane.
- d) Prokaryotic versus Eukaryotic
- e) Cellular Reproduction
- f) Chemical Foundations – an Introduction and Reactions (Types)

Unit II

10 Hours

- a) DNA and the Flow of Molecular Information
- b) DNA Functioning
- c) DNA and RNA
- d) Types of RNA
- e) Transcription and Translation

Unit III

10 Hours

- a) Proteins: Defined **and** Amino Acids
- b) Protein Structure

- c) Regularities in Protein Pathways
- d) Cellular Processes
- e) Positive Control and significance of Protein Synthesis

Unit IV

08 Hours

- a) Science of Genetics
- b) Transgenics and Genomic Analysis
- c) Cell Cycle analysis
- d) Mitosis and Meiosis
- e) Cellular Activities and Checkpoints

Unit V

07 Hours

- a) Cell Signals: Introduction
- b) Receptors for Cell Signals
- c) Signaling Pathways: Overview
- d) Misregulation of Signaling Pathways
- e) Protein-Kinases: Functioning

Recommended Books (latest edition):

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Pepler: Microbial Technology.
9. Edward: Fundamentals of Microbiology.
10. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
11. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company
12. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.
13. RA Goldshy et. al., : Kuby Immunology.

BP809ET. COSMETIC SCIENCE(Theory)

45Hours

UNIT I

10Hours

Classification of cosmetic and cosmeceutical products

Definition of cosmetics as per Indian and EU regulations, Evolution of cosmeceuticals from cosmetics, cosmetics as quasi and OTC drugs

Cosmetic excipients: Surfactants, rheology modifiers, humectants, emollients, preservatives. Classification and application

Skin: Basic structure and function of skin.

Hair: Basic structure of hair. Hair growth cycle.

Oral Cavity: Common problem associated with teeth and gums.

UNIT II

10 Hours

Principles of formulation and building blocks of skin care products:

Face wash,

Moisturizing cream, Cold Cream, Vanishing cream and their advantages and disadvantages. Application of these products in formulation of cosmeceuticals.

Antiperspirants & deodorants- Actives & mechanism of action.

Principles of formulation and building blocks of Hair care products:

Conditioning shampoo, Hair conditioner, anti-dandruff shampoo.

Hair oils.

Chemistry and formulation of Para-phenylene diamine based hair dye.

Principles of formulation and building blocks of oral care products:

Toothpaste for bleeding gums, sensitive teeth. Teeth whitening, Mouthwash.

UNIT III

10 Hours

Sun protection, Classification of Sunscreens and SPF.

Role of herbs in cosmetics:

Skin Care: Aloe and turmeric

Hair care: Henna and amla.

Oral care: Neem and clove

Analytical cosmetics: BIS specification and analytical methods for shampoo, skin-cream and toothpaste.

UNIT IV

08 Hours.

Principles of Cosmetic Evaluation: Principles of sebumeter, corneometer. Measurement of TEWL, Skin Color, Hair tensile strength, Hair combing properties

Soaps, and syndet bars. Evolution and skin benefits.

UNIT V

07 Hours

Oily and dry skin, causes leading to dry skin, skin moisturisation. Basic understanding of the terms Comedogenic, dermatitis.

Cosmetic problems associated with Hair and scalp: Dandruff, Hair fall causes

Cosmetic problems associated with skin: blemishes, wrinkles, acne, prickly heat and body odor.

Antiperspirants and Deodorants- Actives and mechanism of action

References

- 1) Harry's Cosmeticology, Wilkinson, Moore, Seventh Edition, George Godwin.
- 2) Cosmetics – Formulations, Manufacturing and Quality Control, P.P. Sharma, 4th Edition, Vandana Publications Pvt. Ltd., Delhi.
- 3) Text book of cosmeticology by Sanju Nanda & Roop K. Khar, Tata Publishers.

BP810 ET. PHARMACOLOGICAL SCREENING METHODS

45 Hours

Scope: This subject is designed to impart the basic knowledge of preclinical studies in experimental animals including design, conduct and interpretations of results.

Objectives

Upon completion of the course the student shall be able to,

- Appreciate the applications of various commonly used laboratory animals.
- Appreciate and demonstrate the various screening methods used in preclinical research
- Appreciate and demonstrate the importance of biostatistics and research methodology
- Design and execute a research hypothesis independently

Unit –I	08 Hours
Laboratory Animals: Study of CPCSEA and OECD guidelines for maintenance, breeding and conduct of experiments on laboratory animals, Common lab animals: Description and applications of different species and strains of animals. Popular transgenic and mutant animals. Techniques for collection of blood and common routes of drug administration in laboratory animals, Techniques of blood collection and euthanasia.	
Unit –II	10 Hours
Preclinical screening models a. Introduction: Dose selection, calculation and conversions, preparation of drug solution/suspensions, grouping of animals and importance of sham negative and positive control groups. Rationale for selection of animal species and sex for the study. b. Study of screening animal models for Diuretics, nootropics, anti-Parkinson's, antiasthmatics, Preclinical screening models: for CNS activity- analgesic, antipyretic, anti-inflammatory, general anaesthetics, sedative and hypnotics, antipsychotic, antidepressant, antiepileptic, antiparkinsonism, alzheimer's disease	

<p>Unit –III</p> <p>Preclinical screening models: for ANS activity, sympathomimetics, sympatholytics, parasympathomimetics, parasympatholytics, skeletal muscle relaxants, drugs acting on eye, local anaesthetics</p>	
<p>Unit –IV</p> <p>Preclinical screening models: for CVS activity- antihypertensives, diuretics, antiarrhythmic, antidyslipidemic, anti aggregatory, coagulants, and anticoagulants</p> <p>Preclinical screening models for other important drugs like antiulcer, antidiabetic, anticancer and antiasthmatics.</p>	
<p>Research methodology and Bio-statistics</p> <p>Selection of research topic, review of literature, research hypothesis and study design</p> <p>Pre-clinical data analysis and interpretation using Students ‘t’ test and One-way ANOVA. Graphical representation of data</p>	05 Hours

Recommended Books (latest edition):

1. Fundamentals of experimental Pharmacology-by M.N.Ghosh
2. Hand book of Experimental Pharmacology-S.K.Kulakarni
3. CPCSEA guidelines for laboratory animal facility.
4. Drug discovery and Evaluation by Vogel H.G.
5. Drug Screening Methods by Suresh Kumar Gupta and S. K. Gupta
6. Introduction to biostatistics and research methods by PSS Sundar Rao and J Richard

BP 811 ET. ADVANCED INSTRUMENTATION TECHNIQUES

45 Hours

Scope: This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs. This subject is designed to impart advanced knowledge on the principles and instrumentation of spectroscopic and chromatographic hyphenated techniques. This also emphasizes on theoretical and practical knowledge on modern analytical instruments that are used for drug testing.

Objectives: Upon completion of the course the student shall be able to

- understand the advanced instruments used and its applications in drug analysis
- understand the chromatographic separation and analysis of drugs.
- understand the calibration of various analytical instruments
- know analysis of drugs using various analytical instruments.

Course Content:

UNIT-I

10 Hours

Nuclear Magnetic Resonance spectroscopy

Principles of H-NMR and C-NMR, chemical shift, factors affecting chemical shift, coupling constant, Spin - spin coupling, relaxation, instrumentation and applications

Mass Spectrometry- Principles, Fragmentation, Ionization techniques – Electron impact, chemical ionization, MALDI, FAB, Analyzers-Time of flight and Quadrupole, instrumentation, applications

UNIT-II

10 Hours

Thermal Methods of Analysis: Principles, instrumentation and applications of Thermogravimetric Analysis (TGA), Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC)

X-Ray Diffraction Methods: Origin of X-rays, basic aspects of crystals, X-ray

Crystallography, rotating crystal technique, single crystal diffraction, powder diffraction, structural elucidation and applications.

UNIT-III

10 Hours

Calibration and validation-as per ICH and USFDA guidelines

Calibration of following Instruments

Electronic balance, UV-Visible spectrophotometer, IR spectrophotometer,

Fluorimeter, Flame Photometer, HPLC and GC

UNIT-IV

08 Hours

Radio immune assay:Importance, various components, Principle, different methods, Limitation and Applications of Radio immuno assay

Extraction techniques:General principle and procedure involved in the solid phase extraction and liquid-liquid extraction

UNIT-V

07 Hours

Hyphenated techniques-LC-MS/MS, GC-MS/MS, HPTLC-MS.

Recommended Books (Latest Editions)

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
6. Organic Chemistry by I. L. Finar
7. Organic spectroscopy by William Kemp
8. Quantitative Analysis of Drugs by D. C. Garrett
9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
10. Spectrophotometric identification of Organic Compounds by Silverstein

BP 812 ET. DIETARY SUPPLEMENTS AND NUTRACEUTICALS

No. of hours :3

Tutorial:1

Credit point:4

Scope :

This subject covers foundational topics that are important for understanding the need and requirements of dietary supplements among different groups in the population.

Objective:

This module aims to provide an understanding of the concepts behind the theoretical applications of dietary supplements. By the end of the course, students should be able to :

1. Understand the need of supplements by the different group of people to maintain healthy life.
2. Understand the outcome of deficiencies in dietary supplements.
3. Appreciate the components in dietary supplements and the application.
4. Appreciate the regulatory and commercial aspects of dietary supplements including health claims.

UNIT I

07 hours

- a. Definitions of Functional foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e. weight control, diabetes, cancer, heart disease, stress, osteoarthritis, hypertension etc.
- b. Public health nutrition, maternal and child nutrition, nutrition and ageing, nutrition education in community.
- c. Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as nutraceuticals/functional foods: Spirulina, Soyabean, Ginseng, Garlic, Broccoli, Gingko, Flaxseeds

UNIT II

15 hours

Phytochemicals as nutraceuticals: Occurrence and characteristic features(chemical nature medicinal benefits) of following

- a) Carotenoids- and -Carotene, Lycopene, Xanthophylls, leutin
- b) Sulfides: Diallyl sulfides, Allyl trisulfide.
- c) Polyphenolics: Resveratrol
- d) Flavonoids- Rutin, Naringin, Quercetin, Anthocyanidins, catechins, Flavones
- e) Prebiotics / Probiotics.: Fructo oligosaccharides, Lacto bacillum
- f) Phyto estrogens : Isoflavones, daidzein, Geobustan, lignans
- g) Tocopherols
- h) Proteins, vitamins, minerals, cereal, vegetables and beverages as functional foods: oats, wheat bran, rice bran, sea foods, coffee, tea and the like.

UNIT III

07 hours

- a) Introduction to free radicals: Free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids.

- b) Dietary fibres and complex carbohydrates as functional food ingredients..

UNIT IV

10 hours

- a) Free radicals in Diabetes mellitus, Inflammation, Ischemic reperfusion injury, Cancer, Atherosclerosis, Free radicals in brain metabolism and pathology, kidney damage, muscle damage. Free radicals involvement in other disorders. Free radicals theory of ageing.
- b) Antioxidants: Endogenous antioxidants – enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, catalase, Glutathione peroxidase, Glutathione Vitamin C, Vitamin E, - Lipoic acid, melatonin
Synthetic antioxidants: Butylated hydroxy Toluene, Butylated hydroxy Anisole.
- c) Functional foods for chronic disease prevention

UNIT V

06 hours

- a) Effect of processing, storage and interactions of various environmental factors on the potential of nutraceuticals.
- b) Regulatory Aspects; FSSAI, FDA, FPO, MPO, AGMARK. HACCP and GMPs on Food Safety. Adulteration of foods.
- c) Pharmacopoeial Specifications for dietary supplements and nutraceuticals.

References:

1. Dietetics by Sri Lakshmi
2. Role of dietary fibres and nutraceuticals in preventing diseases by K.T Agusti and P.Faizal: BSPublication.
3. Advanced Nutritional Therapies by Cooper. K.A., (1996).
4. The Food Pharmacy by Jean Carper, Simon & Schuster, UK Ltd., (1988).
5. Prescription for Nutritional Healing by James F.Balch and Phyllis A.Balch 2nd Edn., Avery Publishing Group, NY (1997).
6. G. Gibson and C.williams Editors *2000 Functional foods* Woodhead Publ.Co.London.
7. Goldberg, I. *Functional Foods*. 1994. Chapman and Hall, New York.
8. Labuza, T.P. 2000 Functional Foods and Dietary Supplements: Safety, Good Manufacturing Practice (GMPs) and Shelf Life Testing in *Essentials of Functional Foods* M.K. Sachmidl and T.P. Labuza eds. Aspen Press.
9. Handbook of Nutraceuticals and Functional Foods, Third Edition (Modern Nutrition)
10. Shils, ME, Olson, JA, Shike, M. 1994 *Modern Nutrition in Health and Disease*. Eighth edition. Lea and Febiger

Semester VIII – Elective course on Pharmaceutical Product Development

No of Hours: 3

Tutorial:1

Credit points:4

Unit-I

10 Hours

Introduction to pharmaceutical product development, objectives, regulations related to preformulation, formulation development, stability assessment, manufacturing and quality control testing of different types of dosage forms

Unit-II

10 Hours

An advanced study of Pharmaceutical Excipients in pharmaceutical product development with a special reference to the following categories

- i. Solvents and solubilizers
- ii. Cyclodextrins and their applications
- iii. Non - ionic surfactants and their applications
- iv. Polyethylene glycols and sorbitols
- v. Suspending and emulsifying agents
- vi. Semi solid excipients

Unit-III

10 Hours

An advanced study of Pharmaceutical Excipients in pharmaceutical product development with a special reference to the following categories

- i. Tablet and capsule excipients
- ii. Directly compressible vehicles
- iii. Coat materials
- iv. Excipients in parenteral and aerosols products
- v. Excipients for formulation of NDDS

Selection and application of excipients in pharmaceutical formulations with specific industrial applications

Unit-IV

08 Hours

Optimization techniques in pharmaceutical product development. A study of various optimization techniques for pharmaceutical product development with specific examples. Optimization by factorial designs and their applications. A study of QbD and its application in pharmaceutical product development.

Unit-V

07 Hours

Selection and quality control testing of packaging materials for pharmaceutical product development- regulatory considerations.

Recommended Books (Latest editions)

1. Pharmaceutical Statistics Practical and Clinical Applications by Stanford Bolton, CharlesBon; Marcel Dekker Inc.
2. Encyclopedia of Pharmaceutical Technology, edited by James swarbrick, Third Edition, Informa Healthcare publishers.
3. Pharmaceutical Dosage Forms, Tablets, Volume II, edited by Herbert A. Lieberman and Leon Lachman; Marcel Dekker, Inc.
4. The Theory and Practice of Industrial Pharmacy, Fourth Edition, edited by Roop kKhar, S P Vyas, Farhan J Ahmad, Gaurav K Jain; CBS Publishers and Distributors Pvt.Ltd. 2013.
5. Martin's Physical Pharmacy and Pharmaceutical Sciences, Fifth Edition, edited by Patrick J. Sinko, BI Publications Pvt. Ltd.
6. Targeted and Controlled Drug Delivery, Novel Carrier Systems by S. P. Vyas and R. K.Khar, CBS Publishers and Distributors Pvt. Ltd, First Edition 2012.
7. Pharmaceutical Dosage Forms and Drug Delivery Systems, Loyd V. Allen Jr., Nicholas B.Popovich, Howard C. Ansel, 9th Ed. 40
8. Aulton's Pharmaceutics – The Design and Manufacture of Medicines, Michael E. Aulton, 3rd Ed.
9. Remington – The Science and Practice of Pharmacy, 20th Ed.
10. Pharmaceutical Dosage Forms – Tablets Vol 1 to 3, A. Liberman, Leon Lachman and Joseph B. Schwartz
11. Pharmaceutical Dosage Forms – Disperse Systems Vol 1 to 3, H.A. Liberman, Martin, M.R and Gilbert S. Banker.
12. Pharmaceutical Dosage Forms – Parenteral Medication Vol 1 & 2, Kenneth E. Avis and H.A. Libermann.
13. Advanced Review Articles related to the topics.



BOARD of GOVERNORS in supersession of Medical Council of India

COMPETENCY BASED UNDERGRADUATE CURRICULUM FOR THE INDIAN MEDICAL GRADUATE

Knows Knows how Shows Shows how Performs

Describe

Enumerate

Observe

Demonstrate

Assist

Counsel

Prescribe

Analyse

Integrate

Guide

ELECTIVES

Communicate

Module 6

Correlate

Interpret

Critique

Collaborate

Clinician

Communicator

Team Leader

Professional

Lifelong Learner

Knowledge

Skills

Attitude

Values

Responsiveness

Communication

Curriculum Implementation Support Program

**Module on Electives
for
Undergraduate Medical Education
Program
2020**



**Medical Council of India
Pocket-14, Sector-8, Dwarka,
New Delhi 110 077**

All rights reserved. No part of this publication/documents may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission from the Medical Council of India, except for the use in Curriculum Implementation Support Program by medical teachers and institutions as well as in the case of brief quotations embodied in critical reviews and certain other non-commercial uses permitted by Copyright Law. 2019.

How to cite: Medical Council of India. Electives for the Undergraduate Medical Education Training Program, 2020: p 1- 30.

Dr. Vinod K. Paul

MD, Ph.D, FASc, FNASc, FAMS, FNA

Chairman

**Board of Governors in Super-session of
Medical Council of India**

Sector-8, Pocket-14,

Dwarka, New Delhi-110 077

Ph: +91-11-25367039

Fax: +91-11-25367031

Website: www.mciindia.org



डॉ विनोद कुमार पॉल

एम.डी., पी.एच.डी., एफ.ए.एस. एफ.ए.एन.एस.,
एफ.ए.एम.एस., एफ.एन.ए.

अध्यक्ष

भारतीय आयुर्विज्ञान परिषद के

अधिक्रमण में शासी बोर्ड

सेक्टर-8, पॉकेट-14,

द्वारका, नई दिल्ली-110 077

फोन: +91-11-25367039

फैक्स: +91-11-25367031

वेबसाइट: www.mciindia.org

Foreword ELECTIVES

Students who join medicine come in with many professional and personal aspirations. While meeting the needs of the profession and nation, the MBBS program is also designed to create time and opportunity for students to explore future interests. Allowing students time to experience a specialty or project of their choice is thus key to helping student interest bloom.

Creating a diversity of choices within a specified framework that will allow students to be part of a laboratory, participate in research, be part of a super-specialty care team or interact with patients in a community care setting is a mandate of the new regulations notified by the Government of India. Electives allow students to get a taste of a future career; they also allow them to pursue academic interests, do projects and work in diverse environments. These experiences outside the traditional boundaries of the core program allow students to reflect, plan and grow their careers. They also allow students to begin the process of professional networking early.

Institutions must give sufficient importance to the planning and execution of electives. Besides creating diverse opportunities, thought must be given to providing a safe and enabling environment for students to learn. Identifying and orienting preceptors for this purpose, developing portfolio and log book events and continuous program evaluation are key to the success of the program. I urge all institutions to look beyond traditional boundaries to create areas of opportunity for students. Strategic collaborations with centers of excellence will increase value for students while building bridges of collaborative work among institutions.

This booklet is designed to help institutions plan and execute elective rotations. The Expert Group has elucidated a balanced approach that can be followed by all institutions. As always we are keen to learn and share any best practices that institutions develop. I am grateful to the Academic Cell of MCI and the Expert Group as well as the nodal and regional centers of the MCI for their continued contribution in supporting institutions and teachers in implementing the forward looking changes in the new competency based UG curriculum.

**Chairman
Board of Governors**

Phone : 25367033, 25367035, 25367036
दूरभाष : 25367033, 25367035, 25367036
Fax : 0091-11-25367024
E-mail : mci@bol.net.in
Website : www.mciindia.org



पॉकेट - 14, सेक्टर - 8,
द्वारका फेस- 1
नई दिल्ली-110 077
Pocket- 14, Sector- 8,
Dwarka Phase - 1
New Delhi-110077

भारतीय आयुर्विज्ञान परिषद्
MEDICAL COUNCIL OF INDIA
BOARD OF GOVERNORS
IN SUPERSESSION OF MEDICAL COUNCIL OF INDIA

Foreword

Electives

Changes in the Graduate Medical Education Regulations notified by the Government of India in 2019 have been done with a view to create physicians of first contact who are relevant to both their community and the globe. These regulations aim at defining outcomes and help students work towards these. These Regulations also envisage a broader role for trainees as scholars, researchers and specialists. In order to diversify experience, stimulate interest in research and discover learning beyond primary care, an opportunity has been created in the new MBBS program for the student to undertake electives of his or her choice subject to availability. Two months of elective time one each in the basic sciences or research and the other in clinical sciences or community clinics have been created. Leverage has been given to institutions to create these electives based on local circumstances and perceived need. Elective postings are compulsory for students and its successful completion is necessary for students to be able to attend the final examination.

This booklet is intended as a guide for institutions to plan the elective postings. Institutions are requested to provide the opportunity for students to take electives of their choice, if needed through external collaborations, if such opportunities are limited while following the guidelines mentioned in the Graduate Medical Education Regulations and this booklet. I would like to express my gratitude to the Academic Cell of MCI and the Expert Group whose constant guidance has helped in the successful roll out of the new curriculum.

Secretary General, MCI

Expert Group

1. **Dr. Avinash Supe**
Former Director (ME and MH) and Dean, Emeritus Professor,
Departments of G I Surgery and Medical Education
Seth GS Medical College and KEM Hospital, Mumbai – 400012
2. **Dr. Krishna G. Seshadri**
Member, Board of Management
Visiting Professor
Departments of Endocrinology, Diabetes and Medical Education
Sri Balaji Vidyapeeth, Puducherry - 607 403
3. **Dr. R. Sajith Kumar**
Professor and Head, Departments of Infectious Disease and Medical Education
Convener, MCI Nodal Centre for Faculty Development
Government Medical College, Kottayam, Kerala – 686008
4. **Dr. P.V. Chalam**
Principal and Professor, Department of Surgery
Bhaskar Medical College, RR Dist., Telangana – 500075
5. **Dr. Praveen Singh**
Professor and Head, Departments of Anatomy and Medical Education
Convener, MCI Nodal Centre for Faculty Development
Pramukhswami Medical College, Karamsad, Gujarat - 388325
6. **Dr. Tejinder Singh**
Professor, Department Medical Education
Sri Guru Ram Das Institute of Medical Sciences and Research
Amritsar, Punjab – 143501
7. **Dr. P.V. Vijayaraghavan**
Convener, MCI Nodal Centre,
Vice Chancellor and Professor of Orthopedics,
Sri Ramachandra Medical College and Research Institute,
Porur, Chennai-600116.
8. **Dr. Subir K. Maulik**
Professor, Department of Pharmacology
All India Institute of Medical Sciences, New Delhi-110029
9. **Dr. M Rajalakshmi**
Chief Consultant, Academic Cell, Medical Council of India,
Pocket 14, Sector 8, Dwarka, New Delhi 110077.

Additional Contributions from

1. **Dr. Purnima Barua**
Associate Professor, Department of Microbiology
Convener, MCI Nodal Centre for Faculty Development
Jorhat medical college & Hospital, Jorhat - 7850001

Curriculum Implementation Support Program

Module:

ELECTIVES

Electives

Introduction

The MBBS program is geared to create a primary care provider of first contact. It also visualises the student as a future scholar, specialist, researcher and scientist.

Provision of avenues in the competency based undergraduate MBBS program for the student to explore and experience various streams of the profession is important. Electives are learning experiences that will provide the learner with an opportunity to gain immersive experience of a career stream, discipline or research project.

The opportunity to “work” in a clinical, laboratory, research, community set up or in a team-based setting at an early stage in the profession is an invaluable experience for learners as this will have lasting impact on their professional life. An elective allows students to think of a career beyond examinations and gives them an impetus to think laterally besides laying down the foundation for future professional pathways. It also allows students to match their aspirations with the ground reality in a field of their dreams.

The revised Regulations on Graduate Medical Education, part II 2019 (GMER 2019) have created such opportunity in the MBBS program providing students options to do electives in basic sciences, join in ongoing clinical programs and in research settings. This document is meant to guide institutions, Curriculum Committee members and MEU faculty of colleges, and teachers on how to prepare and experience the conduct of an elective that incorporates the principles enshrined in the GMER document, 2019.

Objectives

The participant must be able to develop electives for block 1 and block 2 as envisaged in GMER 2019 document.

Glossary

Elective: An elective is a learning experience created in the curriculum to provide an opportunity for the learner to explore, discover and experience areas or streams of interest.

Block: is a defined time period during which learning experiences are created in a particular specialty, subject or theme.

Log Book: Is a *verified record* of the progression of the learner documenting the acquisition of the requisite knowledge, skills, attitude and/or competencies.

Portfolio: is a collection of the learner's progression in tasks and competencies. A portfolio is an evidence of events documented in the log book. It includes selected assignments, self-assessment, feedback, work-based and in-training formative assessments, reflections and learnings from planned activity in the curriculum.

Log books are thus linked to portfolios and may be included in the portfolio.

Definitions

An Elective is a learning experience created in the curriculum to provide an opportunity for the learner to explore, discover and experience areas or streams interest in the profession.

Curricular Element or Program addressed

Electives

Relevant extract from Regulations on Graduate Medical Education, Regulations on Graduate Medical Education (Amendment), 2019, part - II for MBBS course starting from academic year 2019-20 onwards

9.3. Electives

9.3.1 Objectives: To provide the learner with opportunities:

- (a) For diverse learning experiences,
- (b) To do research/community projects that will stimulate enquiry, self-directed, experiential learning and lateral thinking.

9.3.2 Two months are designated for elective rotations after completion of the examination at end of the third MBBS Part I and before commencement of third MBBS Part II.

9.3.3 It is mandatory for learners to do an elective. The elective time should not be used to make up for missed clinical postings, shortage of attendance or other purposes.

9.3.4 Structure

- (a) The learner shall rotate through two elective blocks of 04 weeks each.
- (b) Block 1 shall be done in a pre-selected preclinical or para-clinical or other basic sciences laboratory OR under a researcher in an ongoing research project. During the electives, regular clinical postings shall continue.
- (c) Block 2 shall be done in a clinical department (including specialties, super-specialties, ICUs, blood bank and casualty) from a list of electives developed and available in the institution OR as a supervised learning experience at a rural or urban community clinic.
- (d) Institutions will pre-determine the number and nature of electives, names of the supervisors, and the number of learners in each elective based on the local conditions, available resources and faculty.

9.3.5 Each institution will develop its own mechanism for allocation of electives.

9.3.6 It is preferable that the list of elective choices are made available to the learners in the beginning of the academic year.

9.3.7 The learner must submit a learning log book based on both blocks of the elective.

9.3.8 75% attendance in the electives and submission of log book maintained during elective postings is required for eligibility to appear in the final MBBS examination.

9.3.9 Institutions may use part of this time for strengthening basic skill certification.

Description of Curricular program

Two choices of electives are offered to medical students before the commencement of III MBBS part 2. For the purpose of this document these shall be called Block 1 and Block 2. The salient features of each block and their differences are summarised in Table 1.

Table 1: Salient features of Electives in Block 1 and Block 2

	Block 1	Block 2
When	Before commencement of III rd MBBS part 2	Before commencement of III rd MBBS part 2
Duration	4 weeks	4 weeks
Focus of electives	Pre-/para - clinical disciplines or in other basic sciences laboratory or join ongoing research programs	Clinical specialties or community clinics (rural or urban)
Nature of learning	Supervised Experiential Immersive Self-directed	Supervised Experiential Immersive Self-directed
Regular clinical postings	Will continue	Will not be offered
Attendance	Mandatorily 75% attendance is required as prerequisite to be allowed	Mandatorily 75% attendance is required as prerequisite to be allowed

	to take Part 2 summative examination	to take Part 2 summative examination
Assessment	Formative Record of activities in log book and portfolio (or annexure to log book) to be submitted as prerequisite to be allowed to take Part 2 summative exam	Formative Record of activities in log book and portfolio (or annexure to log book) to be submitted as prerequisite to be allowed to take Part 2 summative exam
Out of institution experience	Allowed (note clinical postings allowed to continue)*	Allowed within the city*
Out of city or state experience	Continuation of clinical postings makes this difficult	Allowed with due approval*

* See caveat in text

The primary purpose of block 1 is to provide the learner with research experience in basic sciences OR laboratory sciences OR in clinical sciences. The purpose of block 2 is to provide the learner an explorative experience with guided patient care in a specialty of choice.

Electives in both blocks will require planning and coordination by the institution, various departments involved and preceptors who will directly supervise and guide students. Coordination will also be required with external institutions, community clinics and preceptors as may be required for the conduct of electives.

1. Planning the learning experience

The first step in the process is to plan the learning experience. Given the diversity of blocks there will be some variation in the content style and degree of learning; however, each elective should have the following:

- a. defined learning objectives,
- b. an identified preceptor responsible for guiding the student,

- c. a pre-published timetable of activities identified for the learner during the elective,
- d. list of learning resources for the learner to be used during the elective,
- e. provision to be part of the team to obtain an immersive learning experience,
- f. prerequisites, if any, to be completed before joining the elective,
- g. defined formative assessments with appropriate requirements for portfolio and log book entry, and
- h. program evaluation by the stakeholders.

A template for planning learning experiences is provided in Table 2.

Examples of several kinds of learning experiences are found in annexure 1.

Table 2: Template for planning learning experiences in electives

Name of Block	
Name of Elective	
Location of hospital lab or research facility	
Name of internal preceptor(s)	
Name of external preceptor (if any)	
Learning objectives of the elective	
Number of students that can be accommodated in this elective	
Prerequisites for the elective	
Learning resources for students	
List of activities in which the student will participate	
Portfolio entries required	
Log book entry required	
Assessment	
Other comments	

2. Identifying learning experiences

To ensure that there is an immersive learning experience and greater attention to the learner, each preceptor identified must be tagged with only a minimum number of students. Therefore, it is important to identify a sufficient number of preceptors, laboratory positions, and existing research projects (for block 1) and specialties and community clinics, for block 2. Input from both faculty and students can be sourced to identify electives that are feasible and desired.

If required and feasible, collaboration with external resources including central and private research institutes and laboratories, hospitals and clinics can be done ensuring that the quality and principles outlined in section 1 are maintained. Student-initiated external rotations may be permitted as long as they do not violate institutional rules and conform with the broad principles outlined. Rotations outside the city will require prior permission from the Medical Council of India. Examples (neither exhaustive nor comprehensive) of block 1 and block 2 electives are provided in Table 3.

Table 3: Examples of Block 1 and Block 2 learning experiences

Block 1	Block 2
Laboratory Experience:	Clinical Specialty Experience:
Pathology	Emergency room
Microbiology, Virology	Intensive Care unit
Biochemistry	Psychiatry
Genetics	Adolescent Reproductive Health issues
Molecular biology	Neonatology
Immunology	Dermatology
Pharmaco-vigilance and clinical pharmacology	Health care quality and safety

Infection Control	Rehabilitation and palliative care
Community outreach experience	Sports medicine
Assisted living	Clinical Ethics
Hospice care	Super-specialty experience
School Health programs	Hematology
Community outreach for National Health Programs	Oncology
Maternal and child health outreach	Rheumatology
Research	Endocrinology and Diabetes
Student initiated research	Nephrology
Participation in faculty research	Neurosurgery
Community and epidemiologic surveys	Cardiology / Cardiac Surgery
Others	GI surgery
Bioinformatics / Tissue engineering	Organ Transplant Anesthesia
Computers and artificial intelligence in health care	Urban or Rural community experience
	Rural Community Health Center
	Primary Health Center
	Corporation health clinic
	Selected private primary care clinic

3. Student counseling and allocation of electives

The list of available learning experiences for each block and the names of preceptors for each should be available to students on the institutional notice board at least three months before the commencement of the electives. A process for submitting applications for both blocks with choices should be made available to

the students. Written information on each learning experience must be available for students to examine and make an informed choice.

A counseling session with faculty mentors to help students choose electives is desirable. The faculty mentors must ascertain a student's expectation from the electives he/she has chosen. Students must also be made aware of the rules regarding attendance, work schedule, documentation and assessment requirements for each elective. The allocation of electives may be done based on student choice and availability of rotation by faculty who have been identified to be in-charge of the electives program, for each block. The allocation must be done sufficiently in advance and the students informed so that the prerequisites for the electives, if any (such as knowledge training in good laboratory practices, good research practices, CPR training etc.) can be completed by the student. A process to identify the veracity of student initiated electives must be in place.

4. Student research

Block 1 may also be used by students under the guidance of a preceptor to complete funded (e.g. ICMR student grant, institutional grant etc,) or unfunded research projects. In addition, predefined work, monitoring, presentation and writing plan may be finalised by the learner and the preceptor, prior to starting the elective. Students may also participate in a pre-existing research project ongoing under the preceptor.

It is important to define the objectives, role of the student in the project and his or her part in the writing and publication or presentation of a part of the project. An assessment by the preceptor of the student's role, contribution, involvement and performance must be made. Documentation of experiences, observations, reflections and presentations by the student may be added to the portfolio or as annexure to the log book. Appropriate log book entries that document the student participation and which are verified by the preceptor are critical for successful

completion of the work undertaken. Similar arrangements must be made if an external preceptor or institution is identified.

5. External institutions

Given the number of positions available in each elective and the need to provide a broad diverse experience for students, colleges can enter into agreements with external institutions within the country to accommodate students for undertaking an elective experience in both block 1 and block 2, as long as this is not in conflict with the rules and policies of the Medical Council of India, the college of the student and the institution identified and the conditions outlined above are complied with. Student-initiated external rotations may not be discouraged provided they meet the expectations of the program as outlined. Out of city/state experiences may be decided based on institutional policy (since clinical postings will continue during block 1, out of city programs may not be feasible here). Out of state electives in block 2 require prior permission from the Medical Council of India. Identifying suitable preceptors in the host institution and briefing them of the expectations and requirements of the program is important. A local preceptor or faculty who can liaise with the external preceptor will help to solve problems and ensure smooth conduct of the elective.

6. Student safety

In each of these electives especially in those involving external rotations, safety of the student should be paramount. Rotations in which the student may be exposed to potentially hazardous situations must be avoided. It must be made clear to the preceptors by the college authorities that students need to be supervised and must not be involved in patient care as the responsible health provider. When required, students must complete the prerequisite training such as good laboratory practice, universal precautions, good clinical practice etc. before being allowed to participate in electives. The student must be oriented to the program through a formal

orientation process that spells out the expectations/outcomes and the precautions to be observed.

7. Assessment

Assessment will be formative (refer to MCI module no. 3 on Assessment, for details). Attendance of not less than 75% and successful completion of items that require log book entry and their submission is a requirement for the student to become eligible to take the final examination. Assessment elements could include participation in grand rounds, seminars, case records, submission of assignments, reflection on learnings, preparation of abstracts for research posters, design and participation in patient education programs etc. The module on Log book available on the MCI Website may be consulted for further information.

8. Program evaluation

Provision for evaluation of the program based on information from all stakeholders should be made in order to evaluate the effectiveness of the program and need for modifications and improvement.

9. Curricular governance

The Curriculum Committee of the college constituted as per MCI norms and headed by the Dean of the college will be responsible for the design, conduct, implementation and evaluation of the elective program. The design and conduct of block 1 may be assigned to Phase 1 and Phase 2 subcommittees constituted by the Dean while that of block 2 may be assigned to Phase 2 Sub-committee. The departmental heads and preceptors are responsible for the day-to-day conduct of the program, guiding and supervising and assessing students.

Annexure 1

1. Example of a learning experience in block 1

Table 4: Example of a block 1 learning experience

Name of Block	Block 1
Name of Elective	Medical Genetics
Location of hospital Lab or research facility	Medical College hospital
Name of internal preceptor(s)	Name/s
Name of external preceptor (if applicable)	N/A
Learning objectives of elective	<ol style="list-style-type: none"> 1. to demonstrate the conduct of commonly available genetic tests in a controlled environment 2. to enumerate indications for common genetic tests 3. To enumerate the testing protocol for commonly performed genetic tests 4. to demonstrate the correct method to perform a karyotype 5. to present a genetic history and determine the nature of inheritance of a given condition
Number of students that can be accommodated in this elective	4
Prerequisites for elective	Necessary immunisations, Universal precaution certification
Learning resources for students	Departmental handbook provided
List of activities of student participation	<ol style="list-style-type: none"> 1. Work daily with a supervisor in observing, assisting and performing genetic tests 2. Participate in departmental education activities 3. Present at least two tests done by student as a case work up

Portfolio entries required	<ol style="list-style-type: none"> 1. Documentation of worked up cases 2. Documentation of presentation done
Log book entry required	Completion of posting signed by preceptor with a “meets expectation ‘(M)’ grade”
Assessment	<p>Formative: attendance; day-to-day participation in departmental activity; performance of assigned tasks and presentation of worked up case in department</p>
Other comments	

2. Example of a learning experience in block 2

Table 5: Example of a block 2 learning experience

Name of Block	Block 2
Name of Elective	Diabetology
Location of hospital Lab or research facility	Medical College hospital
Name of internal preceptor(s)	Name/s
Name of external preceptor if applicable	N/A
Learning objectives of elective	<ol style="list-style-type: none"> 1. To provide care for patients with diabetes in a supervised environment 2. To function effectively as a team member in a multidisciplinary team managing diabetes 3. To counsel patients about diabetes care appropriately 4. To describe the pathophysiological clinical correlates as they apply to care of patients with diabetes
Number of students that can be accommodated in this elective	6
Prerequisites for elective	Must have received necessary immunisations, Basic Life Support training
List of activities of student participation	<ol style="list-style-type: none"> 1. Participate in OP and IP rounds 2. Participate in afternoon teaching sessions of the department 3. Present at least two cases that are fully worked up in the teaching session 4. Participate in patient education and multidisciplinary team meetings 5. Participate in audit meetings
Learning Resources	Seshadri K: Clinician's handbook of diabetes

Portfolio entries required	Assignments provided Two worked up case records that have been presented Documentation of self-directed learning as summary and reflection
Log book entry required	Satisfactory completion of posting by a preceptor with a “meets expectation ‘M’ grade”
Assessment	Attendance Formative: Participation in OP & IP rounds and team activities, Presentation of worked up cases, Documentation of attendance and required portfolio and log book entries
Other comments	

3. Example of a research rotation in block 1

Table 6: Example of a research learning experience in block 1

Name of Block	Block 1
Name of Elective	Research (Preceptor initiated)
Location of hospital Lab or research facility	Medical College hospital
Name of internal preceptor(s)	Name
Name of external preceptor	N/A
Learning objectives of elective	<ol style="list-style-type: none"> 1. To collect data as prescribed in the protocol 2. To document data in the electronic case record correctly 3. To demonstrate the use of statistical software to do basic research calculations 4. To write an abstract based on the collated data 5. To present abstract to a group of peers and supervisors
Number of students that can be accommodated in this elective	4
Prerequisites for elective	Good clinical practice, Good laboratory practice
List of activities of student participation	<ol style="list-style-type: none"> 1. Work with supervisor in making observations, collect data and document as per protocol 2. Work with statistician to provide a statistical analysis of the data 3. Participate in research meetings of the department, internal and external meetings 4. Write abstract of work done 5. Present abstract in an internal meeting and if possible at an external meeting as a poster or oral presentation

Learning Resources	Sackett DL: Clinical epidemiology Robbins & Cotran Pathological basis of disease
Portfolio entries required	Laboratory notes Statistical work sheet Abstract created
Log book entry required	Satisfactory completion of posting with a “meets expectation ‘(M)’ grade”
Assessment	Attendance Successful completion of research objectives and log book entry
Other comments	

4. Example of an external rotation in block 2

Table 7: Example of a community clinic rotation in block 2

Name of Block	Block 2
Name of Elective	Community Clinic
Location of hospital Lab or research facility	Primary health care center in (name of) a village
Name of internal preceptor(s)	Name
Name of external preceptor if applicable	Name
Learning objectives of elective	<ol style="list-style-type: none"> 1. To provide primary care to patients in a resource limited setting under supervision 2. To function as a member of a health care team in a primary care center 3. To participate in health outreach activities of a primary care center
Number of students that can be accommodated in this elective	6
Prerequisites for elective	Required immunisations to be taken, BLS, Basic Suturing and first aid
List of activities of student participation	<ol style="list-style-type: none"> 1. Provide patient care under the supervision of a community clinic preceptor 2. Assist in common procedures in a community care clinic 3. Counsel patients in their own language 4. Participate in national health care programs offered through the PHC 5. Participate in team meetings of the PHC
Learning Resources	The Washington Manual of Medical Therapeutics, 2019

Portfolio entries required	Daily log of patients seen and activities participated At least 04 fully worked up patients to be documented
Log book entry required	Satisfactory completion of posting by external preceptor co-signed by institutional preceptor
Assessment	Attendance Successful verification of required portfolio entries, Successful completion of the posting as certified in the log book with a “meets expectation ‘M’ grade”
Other comments	

5. Example of a block 1 rotation in emerging infections

Table 8: Example of a learning experience in block 1 in virology

Name of Block	Block 1
Name of Elective	Emerging viral infections
Location of hospital Lab or research facility	Medical college hospital
Name of internal preceptor(s)	Name
Name of external preceptor if applicable	N/A
Learning objectives of elective	<ol style="list-style-type: none"> 1. To obtain experience in the laboratory investigation of viral outbreaks 2. To obtain experience in diagnostic testing in viral diseases
Number of students that can be accommodated in this elective	6
Prerequisites for elective	Universal precautions and Good laboratory practice modules to be completed
List of activities of student participation	<ol style="list-style-type: none"> 1. Participate in laboratory activities including sample processing, sequencing RT PCR viral cultures etc. 2. Participate in academic programs of the department 3. Write up the laboratory work up of two patients with viral illness 4. Visit to a center with electronic or confocal microscope 5. Present at least two cases in departmental academic forum
Learning Resources	Handbook of Virology testing
Portfolio entries required	Lab Notes and work book entries; Presentations done

Log book entry required	Satisfactory completion of posting authenticated by preceptor
Assessment	Attendance Successful verification of required portfolio entries, Successful completion of the posting as certified in the log book with a “meets expectation ‘M’ grade”
Other comments	

6. Example of a block 2 rotation in emerging infections

Table 9: Example of a learning experience in block 2 in virology

Name of Block	Block 2
Name of Elective	Clinical infectious disease and virology
Location of hospital Lab or research facility	Medical college hospital
Name of internal preceptor(s)	Name
Name of external preceptor if applicable	N/A
Learning objectives of elective	<ol style="list-style-type: none"> 1. To function as part of an infectious disease team 2. To be able to approach and investigate infection outbreaks 3. Get hands on experience on contact tracing, community isolation measures, and use of technology 4. To understand the principles of the management of viral infections
Number of students that can be accommodated in this elective	6
Prerequisites for elective	Universal precautions and must have taken required immunizations; CPR training
List of activities of student participation	<ol style="list-style-type: none"> 1. Participate in inpatient and outpatient team rounds 2. Participate in community outbreak investigations 3. Counsel patients on correct precautions during outbreaks 4. Diagnose and understand the principles in the management of viral diseases 5. Liaise with the laboratory in the diagnosis 6. Present at least one patient or outbreak investigation in the departmental meeting

Learning Resources	Handbook of clinical virology
Portfolio entries required	Case record of at least one patient Record of patient counseling session or contact tracing done
Log book entry required	Satisfactory completion of posting by preceptor
Assessment	Attendance, Successful verification of required portfolio entries, Successful completion of the posting as certified in the log book with a “meets expectation ‘M’ grade”
Other comments	

(To be printed)

MODULES

B.Sc. Nursing Program

***MANDATORY MODULES &
ELECTIVE MODULES***

(Modular content/learning resources)



INDIAN NURSING COUNCIL

8th Floor, NBCC Centre, Plot No. 2, Community Centre,
Okhla Phase-1, New Delhi-110020

Price: Rs.

Copyright © 2022 by Indian Nursing Council

First Print 2022

All rights reserved. No part of this publication may be reproduced, reviewed, abstracted, stored in a retrieval system or transmitted in any form or by any means including photocopying without the prior written permission of the Indian Nursing Council, New Delhi.

PREFACE

Indian Nursing Council (INC) is a statutory body under the Ministry of Health and Family Welfare, Government of India. The main function of INC is to achieve Uniform Standards of Nursing Education in the country. National Health Policy (NHP, 2002) had emphasized on improving the skill-level of nurses, and on increasing the ratio of degree-holding nurses vis-à-vis diploma-holding nurses. NHP (2017) emphasized the need for standardization of quality of clinical training. The main focus of NEP (2020) relevant to higher education and healthcare education is towards competency and outcome-based curriculum using innovative educational approaches and technology, promotive, preventive and community health, and ethics & values.

The revision of curriculum was undertaken by the Council considering the various recommendations of NHP and NEP. The revised curriculum adopts semester, credit and choice-based system. Modular learning, simulation learning, relationship and transformational learning approaches are integrated throughout. In order to facilitate the teachers to effectively implement the revised syllabus, it has been presented in a format, wherein details of the units have been worked out with specific teaching/learning activities. The curriculum mainly utilizes competency based and outcome-based approaches. The newer roles of B.Sc. nurses as community health officer (CHO) in Health & Wellness centres, and Nurse Practitioner Midwifery (NPM) as nurse led midwife as envisaged by GoI are integrated into Community Health Nursing and Midwifery courses respectively. The duration of the program is eight semesters including internship (i.e. 4 years).

Modular learning is integrated throughout the program. In many of the nursing courses, national guidelines/protocols prepared by MOH&FW and INC supporting the GoI initiatives, are included in the syllabus and delivered as mandatory modules that have to be completed by students in the respective courses and semesters as specified in the curriculum. Choice based system permits students to make choices in the field of electives. The elective courses are chosen in areas relevant to clinical and professional practice. The mandatory and elective modules with relevant learning resources are prepared by INC and are available as booklet for use by students and faculty.

I am confident that this learning resource package/booklet for mandatory as well as elective modules is hoped to enable the students to be updated with recent GoI guidelines and prepared to provide safe, competent and quality nursing and midwifery care contributing towards achievement of SDGs, functioning in a variety of settings in either public/government or private healthcare settings.

I take this opportunity to acknowledge the contribution of Dr. Punitha Ezhilarasu, Ex Dean of College of Nursing CMC Vellore and Senior Consultant at INC, members of the INC Nursing Education committee and various subject experts in the preparation of these modules that are included in the revised and redesigned BSc N curriculum. I sincerely thank my INC officials Dr. Asha Sharma, Vice President, Dr. Sarvjeet Kaur, Secretary and Ms. K.S Bharati, Joint Secretary for their contribution in its preparation. I also acknowledge Ms. K.S. Bharati and Mr. Satish Agrawal for designing and formatting the booklet.



(T. Dileep Kumar)
President,

Indian Nursing Council
Ex-Nursing Adviser to Govt. of India

I. MANDATORY MODULES

(Modular content/learning resources)

I**TABLE OF CONTENTS**

S.NO.	MODULE TITLE	PAGE NO.
1.	FIRST AID (Nursing Foundation I)	7
2.	HEALTH ASSESSMENT (Nursing Foundation II)	10
3.	BASIC LIFE SUPPORT/BASIC CARDIOPULMONARY LIFE SUPPORT (BLS/BCLS) (Adult Health Nursing I)	40
4.	FUNDAMENTALS OF PRESCRIBING (Pharmacology II)	41
5.	PALLIATIVE CARE	53
6.	FACILITY BASED NEWBORN CARE (FBNBC) AND ESSENTIAL NEWBORN CARE (ENBC) (Child Health Nursing I)	56
7.	INTEGRATED MANAGEMENT OF NEONATAL AND CHILDHOOD ILLNESSES (IMNCI) (Child Health Nursing I)	59
8.	PEDIATRIC LIFE SUPPORT (PLS) (Child Health Nursing I)	61
9.	SKILLED BIRTH ATTENDANT (SBA) & SAFE DELIVERY APP (Midwifery/Obstetrics & Gynecology Nursing I & II)	63

1. FIRST AID (Nursing Foundation I)

PLACEMENT: I SEMESTER

Theory: 20 hours

Practical: 20 hours

Module Overview: This module covers various basic first aid techniques including basic CPR and common emergencies. It further aims to train students to develop first aid competencies to deal with specific emergencies to preserve life.

Competencies (Learning Outcomes): The student will be able to

1. Explain basic principles of first aid and law related to first aid.
2. Describe various first aid techniques such as basic CPR, recovery position, top to toe assessment and hygiene and handwashing.
3. Identify common emergencies that require immediate attention and first aid.
4. Perform basic first aid techniques to deal with specific and common emergencies to preserve life.
5. Perform first aid measures such as dressings, bandages, and safe transportation.
6. Prepare first aid kit.

Learning Activities:

- Lectures and demonstration
- Self-study/Reading assignments
- Written assignments
- Role play
- Mock drill
- Practice in Skill/Simulation Lab

Assessment Methods:

- Test paper (Objective type/short answer/situation type): 20 marks
- Assignments: 10 marks
- OSCE (First aid competencies): 20 marks

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

Explanatory Note:

{**Weightage to Internal Assessment:** 10 marks taken out of 50 marks mentioned above have to be added to 30 marks of continuous assessment of Nursing Foundation I to make up the total of 40 marks.

Final 40/4 = 10 marks of continuous assessment to be added to 15 marks from sessional exams to make up the total internal assessment marks of 25}.

CONTENT OUTLINE T-Theory, Practical-P

Unit	Time (Hours)	Learning Outcome	Content	Teaching/Learning Activities	Assessment Methods
I	T-2	Explain basic principles of first aid and law related to first aid.	First Aid: <ul style="list-style-type: none">• Introduction• Aims• First aid and law General Principles: <ul style="list-style-type: none">○ Safety○ Seeking help○ Quick assessment	<ul style="list-style-type: none">• Lecture cum discussion• Role play	<ul style="list-style-type: none">• MCQ• Short answers

Unit	Time (Hours)	Learning Outcome	Content	Teaching/Learning Activities	Assessment Methods
			<ul style="list-style-type: none"> ○ Observation - consciousness and breathing ○ Provision of first aid 		
II	T-5 P-6	Describe various first aid techniques such as basic CPR, recovery position, top to toe assessment and hygiene and handwashing.	First aid techniques <ul style="list-style-type: none"> ● Basic CPR - Adult & baby/child ● Securing open airway ● Recovery position ● Initial top-to-toe assessment ● Hygiene & Handwashing technique 	<ul style="list-style-type: none"> ● Lecture cum discussion ● Demonstration ● Practice in skill lab/Simulation lab 	<ul style="list-style-type: none"> ● Short answers ● OSCE
III	T-8 P-8	Identify common emergencies that require immediate attention and first aid. Perform basic first aid techniques to deal with specific and common emergencies to preserve life.	First aid management of Common emergencies <ul style="list-style-type: none"> ● Review of anatomy & physiology of systems mentioned below. ● Respiratory system: <ul style="list-style-type: none"> ○ Drowning ○ Strangulation & hanging ○ Choking ○ Suffocation by smoke ○ Asthma ● CVS <ul style="list-style-type: none"> ○ Chest discomfort/pain ○ Bleeding ○ Shock ● Injury & fractures <ul style="list-style-type: none"> ○ Head, neck & spinal injuries ○ Injuries & fractures to bones, joints, and muscles ○ Dislocations ○ Strains & Sprains ○ Immobilization techniques ● Unconsciousness & Nervous system related emergencies <ul style="list-style-type: none"> ○ Unconsciousness ○ Stroke ○ Convulsions, epilepsy ● GI & Endo system related emergencies <ul style="list-style-type: none"> ○ Diarrhea ○ Food poisoning ○ Diabetes ● Skin, burns, heat exhaustion, fever & hypothermia <ul style="list-style-type: none"> ○ Burns ○ Heat stroke ○ Fever ○ Hypothermia ● Poisoning ● Bites & stings <ul style="list-style-type: none"> ○ Animal bites, insect stings & bites ○ Snake bites ● Sensory system related <ul style="list-style-type: none"> ○ Foreign bodies in eye, ear, nose, or skin 	<ul style="list-style-type: none"> ● Self-study, Review & written assignment ● Lecture cum discussion ● Demonstration ● Role play ● Practice in skill lab/clinical <ul style="list-style-type: none"> ● Mock drill 	<ul style="list-style-type: none"> ● Case study ● Written Assignment ● OSCE

Unit	Time (Hours)	Learning Outcome	Content	Teaching/Learning Activities	Assessment Methods
			<ul style="list-style-type: none"> ○ Swallowed foreign objects ● Urinary system, reproductive system, and emergency childbirth ● Psychological first aid ● Emergency situations and disaster management 		
IV	T-4 P-6	Demonstrate competency in performing first aid measures such as dressings, bandages, and safe transportation	Selected First Aid Techniques <ul style="list-style-type: none"> ● Dressing ● Bandaging ● Transportation 	<ul style="list-style-type: none"> ● Demonstration ● Practice 	<ul style="list-style-type: none"> ● OSCE
V	T-1	Describe first aid kit	First Aid Kit <ul style="list-style-type: none"> ● Content of first aid box - small, medium, and large ● First medical responder first aid kit 	<ul style="list-style-type: none"> ● Display & discussion 	<ul style="list-style-type: none"> ● Short answers ● Observation Report

Learning Resources: (Latest version to be consulted as and when revised)

- Indian First aid manual by IRCS (Seventh edition, 2016)
- Standard first aid training course outline (IRCS, 2019)
- Subsequent and latest revisions must be consulted and used by teachers and students.
- FAST mobile app prepared by NDMA & IRCS may also be used.

2. HEALTH ASSESSMENT (Nursing Foundation II)

PLACEMENT: II SEMESTER

Theory: 20 hours

Practical-Skill Lab: 20 hours

Module Overview: This module covers methods of health assessment, nursing health history, comprehensive physical assessment and guide to perform physical assessment.

Competencies (Learning Outcomes): The student will be able to

1. Identify the purposes of the physical examination.
2. Describe the preparation for health assessment.
3. Explain the four methods/techniques used in physical examination: inspection, palpation, percussion, and auscultation.
4. Perform comprehensive health assessment that includes nursing health history and system wise physical examination.
5. Identify expected findings during health assessment.

Learning Activities:

- Lectures
- Demonstration
- Practice in Skill/Simulation Lab
- Case study method (case scenario and questions)
- Self-study/Reading assignments
- Written assignments

Assessment Methods:

- Test paper - Objective type/Short answers - 20 marks
- Assignments - 10 marks
- OSCE-20 (Nursing Health history, System wise physical assessment, Comprehensive physical assessment and identification of abnormal findings)

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

CONTENT OUTLINE T - Theory, P - Practical

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	T-4 P-4	Identify The Purposes of the Physical Examination and Describe the Preparation for Health Assessment. Explain the Four Methods/ Techniques used in Health Assessment:	Health Assessment <ul style="list-style-type: none"> • Definition/Meaning • Purposes • Preparation for Health Assessment • Methods of Health Assessment <ul style="list-style-type: none"> ○ Inspection, ○ Palpation, ○ Percussion, and ○ Auscultation. 	<ul style="list-style-type: none"> • Lecture • Demonstration • Practice in Skill Lab and Clinical 	<ul style="list-style-type: none"> • MCQ • Short answers • OSCE
Ii	T-8 P-8	Perform Comprehensive Health Assessment that includes	Comprehensive Health Assessment <ul style="list-style-type: none"> • Nursing Health History • <i>Physical Assessment</i> 	<ul style="list-style-type: none"> • Self-Study Review of Anatomy of System and Organs 	<ul style="list-style-type: none"> • Short answers • Written assignments • OSCE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		Nursing Health History and System Wise Physical Examination.	○ Comprehensive Physical Examination - System Wise	<ul style="list-style-type: none"> • Lecture • Demonstration • Practice in Skill Lab and Clinical 	
iii	T-8 P-8	Identify Expected Findings during Health Assessment	Guide To Perform Head-to-Toe Physical Assessment to identify Normal/Abnormal Findings <ul style="list-style-type: none"> • Assessment Techniques and Normal Findings 	<ul style="list-style-type: none"> • Lecture cum discussion • Demonstration • Practice in Skill Lab And Clinical • Identification of Findings 	<ul style="list-style-type: none"> • Short answers • Written assignments • OSCE

Learning Resource:

Health Assessment Module prepared by INC, given below.

HEALTH ASSESSMENT (Nursing Foundation II)

S.No.	Content	Page No.
1	INTRODUCTION	12
	Purposes of health assessment	12
	Preparation for health assessment	12
	Methods of health assessment	12
2	A. COMPREHENSIVE HEALTH ASSESSMENT	13
	I. Nursing Health History	13
	II. Physical Assessment	13
	1. Assessment of mental status, anthropometric measurements and vital signs	13
	2. Assessment of the integumentary system	13
	3. Assessment of head and neck	13
	4. Assessment of breast and axillae	14
	5. Assessment of respiratory system - thorax & lungs	14
	6. Assessment of cardiovascular system - Heart	14
	7. Assessment of abdomen	14
	8. Assessment of male and female genitalia	15
	9. Assessment of rectum and anus	15
	10. Assessment of musculoskeletal system	15
	11. Assessment of peripheral vascular system	15
	12. Assessment of neurological system	15
3	B. GUIDE IN PERFORMING A HEAD-TO-TOE PHYSICAL ASSESSMENT	15
	1. Integumentary system	15
	2. Head and Neck	15
	3. Anterior & Posterior thorax (Breast & axillae, thorax, lungs, heart)	23
	4. Abdomen	26
	5. Male and female genitalia	29
	6. Rectum and anus	29
	7. Extremities (Musculoskeletal system & Peripheral vascular system)	29
	8. Neurological system	30
4	Annexure 1: Terminology relevant to Neurological system	36
5	Annexure 2: Sample Health Assessment Format (Adult)	38

HEALTH ASSESSMENT

INTRODUCTION

Health assessment is the evaluation of the health status by performing a physical examination after taking a health history. Successful assessment requires a practical understanding of what is involved, the time and resources necessary to undertake assessment, and sufficient integration of findings into planning and implementation of treatment and care.

Purposes of Health Assessment

- To identify the patient's response to health and illness
- To determine the nursing care needs of the patient
- To evaluate outcomes of health care and patient progress
- To screen for presence of risk factors.

Preparation for Health Assessment (infection control, preparation of equipment, environment and patient)

- *Infection control*
 - Use standard precautions as appropriate
 - Use personal protective equipment (gloves, mask, etc.)
 - Perform hand hygiene
 - Utilize clean instruments.
- *Preparation of environment*
 - Ensure adequate lighting is available
 - Use sound proof room or minimize noise
 - Use special examination tables as needed
 - Provide ideal room temperature
 - Ensure adequate privacy (curtains)
 - Provide safety and prevent falls.
- *Preparation of equipment*
 - Collect and arrange all equipment for easy access
 - Check functioning of all equipment (change batteries if needed)
 - Warm equipment before use, if required
 - Equipment usually collected are Sphygmomanometer, stethoscope, thermometer, cotton balls, tongue depressor, reflex hammer, swab stick, k-basin, tuning fork, etc.

Preparation of the patient

- *Physical preparation of the patient*
 - Ensure physical comfort
 - Position patient as required
 - Dress and drape patient appropriately
 - Keep patient warm
 - Assist patient to restroom prior to examination and collect samples (urine/stool) if required.
- *Psychological preparation of the patient*
 - Explain the procedure and its need to the patient. Clarify doubts to reduce anxiety
 - Maintain a calm, open and professional approach
 - Provide chaperone when the patient is of the opposite gender of the nurse
 - Look for verbal and non-verbal cues to identify patient's discomfort and stop or postpone the examination if needed.

Methods of Physical Assessment

1. *Inspection*: It is the use of vision and hearing to detect normal and abnormal findings. Adequate lighting should be ensured with paying attention to detail. The same area on the opposite side should be compared whenever applicable. Inspection is done to assess moisture, color, and texture of body surface as well as shape, position, size, and symmetry of the body parts.
2. *Palpation*: It is the use of the hands and the sense of touch to gather data. The pads of the fingers are used. Different parts of the hand are best suited for specific purposes. For example, the dorsal aspect of the hand is best for assessing temperature changes. Hand hygiene is to be ensured.

Types of palpation: Light palpation (<1 cm), Moderate palpation (1-2 cm) & Deep palpation (2 cm) and Bimanual Palpation & palpation with single hand.

The purpose is to assess the texture, temperature, tenderness, moisture, size, distention, pulsation, and mobility of organs or masses

3. *Percussion*: It means tapping of various body organs and structures to produce vibration and sound. It is the act of striking the body surface to elicit sounds that can be heard or vibration that can be felt.
Types of percussion: Direct percussion and Indirect (use of plexor & pleximeter) percussion.
The purpose is to determine the location, size and density of underlying tissue structures and if tissue is fluid filled, air filled or solid.
Sounds heard: Flatness (muscle or bone), dullness (organs), resonance (lungs filled with air), hyper resonance (emphysematous lung), tympany (air filled stomach).
4. *Auscultation*: The act of listening to sounds within the body to evaluate the condition of body organs (stethoscope) can be performed with unaided ear or stethoscope. Sounds are described according to their
 - a. Pitch: The frequency of the vibrations (ranging from high to low)
 - b. Intensity: The loudness or softness of a sound
 - c. Duration: The sound length (short, medium, or long)
 - d. Quality: Subjective description of sounds (gurgling, swishing)
5. *Olfaction*: It is the use of sense of smell to perceive and differentiate odors.
Example: Acetone breath in Diabetic Keto Acidosis

A. COMPREHENSIVE HEALTH ASSESSMENT

A comprehensive health assessment includes:

I. Nursing Health History

- A general survey - Demographic data, Physical environmental history, Biological environmental history
- Health history - Family and Personal health history
- A complete medical history-past and present medical history

II. Physical Assessment

1. General appearance, mental status, anthropometric measurements and vital signs

General appearance and mental status: Physical assessment begins with observation of the patient's general appearance, level of comfort, and mental status.

Anthropometric measurements: Measurement of height, weight and BMI follows next.

Vital signs: The pulse, blood pressure, bodily temperature and respiratory rate are measured and documented.

2. Assessment of the Integumentary System (Hair, Skin and Nails)

Inspection: The color of the skin, the quality, distribution and condition of the bodily hair, the size, the location, color and type of any skin lesions are assessed and documented, the color of the nail beds, and the angle of curvature where the nails meet the skin of the fingers are also inspected.

Palpation: The temperature, level of moisture, turgor and the presence or absence of any edema or swelling on the skin are assessed.

3. Assessment of the Head& Neck (The Face and Skull, Eyes, Ears, Nose, Mouth, Throat, Neck)

3.1 Face and Skull

Inspection: The size, shape and symmetry of the face and skull, facial movements and symmetry are inspected.

Palpation: The presence of any lumps, soreness, and masses are assessed.

3.2 Eyes

Inspection: Pupils in reference to their bilateral equality, reaction to light and accommodation, the presence of any discharge, irritation, redness and abnormal eye movement are assessed.

Standardized Testing: The Snellen chart for visual acuity

3.3 Ears

Inspection: The auricles are inspected in terms of color, symmetry, elasticity and any tenderness or lesions; the external ear canal is inspected for color and the presence of any drainage and ear wax; and the tympanic membrane in terms of color, integrity and the lack of any bulging is also assessed.

Standardized Testing: The Rinne test and the Weber test for the assessment of hearing can be done using a tuning fork.

3.4 Nose

Inspection: The color, size, shape, symmetry, and any presence of drainage, flaring, tenderness, and masses are assessed; the nasal passages are assessed visually using an otoscope of the correct size for an infant, child and adult; the sense of smell is also assessed.

Palpation: The sinuses are assessed for any signs of tenderness and infection.

3.5 Mouth and Throat

Inspection: The lips are visualized for their symmetry and color; the buccal membranes, the gums and the tongue are inspected for color, any lesions and their level of dryness or moisture; the tongue is inspected for symmetry of movement; teeth are inspected for the presence of any loose or missing teeth; the uvula is assessed for movement, position, size and color; the salivary glands are examined for signs of inflammation or redness; the oropharynx, tonsils, hard and soft palates are also inspected for color, redness and any lesions. Lastly, the gag reflex is assessed. The mouth and the throat are assessed using a tongue blade and a light source.

3.6 Neck

Inspection: The neck and head movement is visualized; the thyroid gland is inspected for any swelling and also for normal movement during swallowing.

Palpation: The neck, the lymph nodes, and trachea are palpated for size and any irregularities.

4. Assessment of the Breast and Axillae

Inspection: The breasts are visualized to assess the size, shape, symmetry, color and the presence of any dimpling, lesions, swelling, edema, visible lumps and nipple retractions. The nipples are also assessed for the presence of any discharge, which is not normal for either gender except when the female is pregnant or lactating.

Palpation: The nurse performs a complete breast examination using the finger tips to determine if any lumps are felt. The lymph nodes in the axillary areas are also palpated for any enlargement or swelling.

5. Assessment of Respiratory System (Thorax and Lungs)

5.1 Assessment of the Thorax

Inspection: The anterior and posterior thorax is inspected for size, symmetry, shape and for the presence of any skin lesions and/or misalignment of the spine; chest movements are observed for the normal movement of the diaphragm during respirations.

Palpation: The posterior thorax is assessed for respiratory excursion and fremitus.

Percussion: It is done to assess normal and abnormal sounds over the thorax

5.2 Assessment of the Lungs

Auscultation: The assessment of normal and adventitious breath sounds.

Percussion: It is done to identify for normal and abnormal sounds. Normal breath sounds like vesicular breath sounds, bronchial breath sounds, bronchovesicular breath sounds are auscultated and assessed in the same manner that adventitious breath sounds like rales, wheezes, friction rubs, rhonchi, and abnormal bronchophony, egophony, and whispered pectoriloquy are auscultated, assessed and documented.

6. Assessment of the Cardiovascular System (Heart)

Inspection: Pulsations indicating the possibility of an aortic aneurysm are identified by inspection.

Auscultation: Listening to systolic heart sounds like the normal S₁ heart sound and abnormal clicks, the diastolic heart sounds of S₂, S₃, S₄, diastolic knocks and mitral valve sounds, all of which are abnormal with the exception of S₂ which can be normal among patients less than 40 years of age.

7. Assessment of the Abdomen

Inspection: The abdomen is visualized to determine its size, contour, symmetry and the presence of any lesions. As previously mentioned, the abdomen is also inspected to determine the presence of any pulsations that could indicate the possible presence of an abdominal aortic aneurysm.

Auscultation: The bowel sounds are assessed in all four quadrants which are the upper right quadrant, the upper left quadrant, the lower right quadrant and the lower left quadrant.

Palpation: Light palpation, which is then followed with deep palpation, is done to assess for the presence of any masses, tenderness, and pain, guarding and rebound tenderness.

8. Assessment of the Male and Female Genitalia

Inspection: The skin and the pubic hair are inspected. The labia, clitoris, vagina and urethral opening are inspected among female patients. The penis, urethral meatus, and the scrotum are inspected among male patients.

Palpation: The inguinal lymph nodes are palpated for the presence of any tenderness, swelling or enlargements. A testicular examination is done for male patients.

9. Assessment of the Rectum and Anus

Inspection: The rectum, anus and the surrounding area are examined for any abnormalities.

Palpation: With a gloved hand, the rectal sphincter is palpated for muscular tone, and the presence of any blood, tenderness, pain or nodules.

10. Assessment of the Musculoskeletal System

Inspection: The major muscles of the body are inspected by the nurse to determine their size, and strength, and the presence of any tremors, contractures, muscular weakness and/or paralysis. All joints are assessed for their full range of motion. The areas around the bones and the major muscle groups are also inspected to determine any areas of deformity, swelling and/or tenderness.

Palpation: The muscles are palpated to determine the presence of any spasticity, flaccidity, pain, tenderness, and tremors.

11. Assessment of the Peripheral Vascular System

Inspection: The extremities are inspected for any abnormal color and any signs of poor perfusion to the extremities, particularly the lower extremities. While the patient is in a supine position, the nurse also assesses the jugular veins for any bulging pulsations or distention.

Auscultation: The nurse assesses the carotids for the presence of any abnormal bruits.

Palpation: The peripheral veins are gently touched to determine the temperature of the skin, the presence of any tenderness and swelling.

The peripheral vein pulses are also palpated bilaterally to determine regularity, number of beats, volume and bilateral equality in terms of these characteristics.

12. Assessment of the Neurological System

Of all of the bodily systems that are assessed, the neurological system is perhaps the most extensive and complex.

The neurological system is assessed with:

Inspection

Balance, gait, gross motor function, fine motor function and coordination, sensory functioning, temperature sensory functioning, kinesthetic sensations and tactile sensory motor functioning, as well as all of the cranial nerves are assessed.

Some of the terms and terminology relating to the neurological system and neurological system disorders are given in **Annexure 1**.

B. GUIDE IN PERFORMING A HEAD-TO-TOE PHYSICAL ASSESSMENT

1. Integumentary System (Hair, Skin and Nails)

Inspection: The color of the skin, the quality, distribution and condition of the bodily hair, the size, the location, color and type of any skin lesions are assessed and documented, the color of the nail beds, and the angle of curvature where the nails meet the skin of the fingers are also inspected.

Palpation: The temperature, level of moisture, turgor and the presence or absence of any edema or swelling on the skin are assessed.

2. Head & Neck (Skull, Scalp, Hair, Face, Eyes, Ears, Nose, Mouth, Throat, Neck)

- Observe the size, shape and contour of the skull.
- Observe scalp in several areas by separating the hair at various locations; inquire about any injuries. Note presence of lice, nits, dandruff or lesions.
- Palpate the head by running the pads of the fingers over the entire surface of skull; inquire about tenderness upon doing so. (wear gloves if necessary)
- Observe and feel the hair condition.

Normal Findings:

2.1 Skull

- Generally round, with prominences in the frontal and occipital area (Normocephalic).
- No tenderness noted upon palpation.

2.2 Scalp

- Lighter in color than the complexion.
- Can be moist or oily.
- No scars noted.
- Free from lice, nits and dandruff.
- No lesions should be noted.
- No tenderness or masses on palpation.

2.3 Hair

- Can be black, brown or blonde depending on the race.
- Evenly distributed, covers the whole scalp.
- No evidences of Alopecia.
- Maybe thick or thin, coarse or smooth.
- Neither brittle nor dry.

2.4 Face

- Observe the face for shape.
- Inspect for Symmetry.
 - Inspect for the palpebral fissure (distance between the eye lids of each eye); should be equal in both eyes.
 - Ask the patient to smile, There should be bilateral Nasolabial fold (creases extending from the angle of the corner of the mouth). Slight asymmetry in the fold is normal.
 - If both are met, then the Face is symmetrical
- Test the functioning of Cranial Nerves that innervates the facial structures

2.5 Eyes

Eyebrows, Eyes and Eyelashes

- All three structures are assessed using the modality of inspection.

Normal findings

Eyebrows

- Symmetrical and in line with each other.
- Maybe black, brown or blond depending on race.
- Evenly distributed.



Severe exophthalmos

Eyes

- Evenly placed and in line with each other.
- None protruding.
- Equal palpebral fissure.

Eyelashes

- Color dependent on race.
- Evenly distributed.
- Turned outward.

Eyelids and Lacrimal Apparatus

- Inspect the eyelids for position and symmetry.
- Palpate the eyelids for the lacrimal glands.
 - To examine the lacrimal gland, the examiner, lightly slides the pad of the index finger against the client's upper orbital rim.
 - Inquire for any pain or tenderness.
- Palpate for the nasolacrimal duct to check for obstruction.
 - To assess the nasolacrimal duct, the examiner presses with the index finger against the client's lower inner orbital rim, at the lacrimal sac, **NOT AGAINST THE NOSE.**
 - In the presence of blockage, this will cause regurgitation of fluid in the puncta

Normal Findings

Eyelids

- Upper eyelids cover the small portion of the iris, cornea, and sclera when eyes are open.
- No PTOSIS noted. (Drooping of upper eyelids).
- Meets completely when eyes are closed.
- Symmetrical.

Lacrimal Apparatus

- Lacrimal gland is normally non palpable.
- No tenderness on palpation.
- No regurgitation from the nasolacrimal duct.

Conjunctivae

- The bulbar and palpebral conjunctivae are examined by separating the eyelids widely and having the client look up, down and to each side. When separating the lids, the examiner should exert **NO PRESSURE** against the eyeball; rather, the examiner should hold the lids against the ridges of the bony orbit surrounding the eye.

In examining the palpebral conjunctiva, everting the upper eyelid is necessary and is done as follow:

1. Ask the client to look down but keep his eyes slightly open. This relaxes the levator muscles, whereas closing the eyes contracts the orbicularis muscle, preventing lid eversion.
2. Gently grasp the upper eyelashes and pull gently downward. Do not pull the lashes outward or upward; this, too, causes muscles contraction.
3. Place a cotton tip application about 1cm above the lid margin and push gently downward with the applicator while still holding the lashes. This everts the lid.
4. Hold the lashes of the everted lid against the upper ridge of the bony orbit, just beneath the eyebrow, never pushing against the eyeball.
5. Examine the lid for swelling, infection, and presence of foreign objects.
6. To return the lid to its normal position, move the lid slightly forward and ask the client to look up and to blink. The lid returns easily to its normal position.

Normal Findings

- Both conjunctivae are pinkish or red in color.
- With presence of many minute capillaries.
- Moist
- No ulcers
- No foreign objects

Sclerae

- The sclerae is easily inspected during the assessment of the conjunctivae.

Normal Findings

- Sclerae is white in color (anicteric sclera)
- No yellowish discoloration (icteric sclera).
- Some capillaries maybe visible.
- Some people may have pigmented sclera.

Cornea

- The cornea is best inspected by directing penlight obliquely from several positions.

Normal findings

- There should be no irregularities on the surface.
- Looks smooth.
- The cornea is clear or transparent. The features of the iris should be fully visible through the cornea.
- There is a positive corneal reflex.

Anterior Chamber and Iris

- The anterior chamber and the iris are easily inspected in conjunction with the cornea. The technique of oblique illumination is also useful in assessing the anterior chamber.

Normal Findings

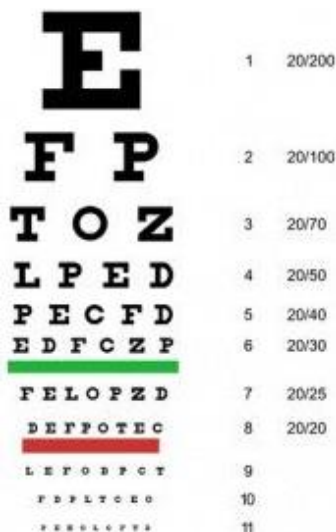
- The anterior chamber is transparent.
- No noted visible materials.
- Color of the iris depends on the person's race (black, blue, brown or green).
- From the side view, the iris should appear flat and should not be bulging forward. There should be NO crescent shadow casted on the other side when illuminated from one side.

Pupils

- Examination of the pupils involves several inspections, including assessment of the size, shape reaction to light is directed is observed for direct response of constriction. Simultaneously, the other eye is observed for consensual response of constriction.
- The test for papillary accommodation is the examination for the change in pupillary size as it is switched from a distant to a near object.
- Ask the client to stare at the objects across room.
- Then ask the client to fix his gaze on the examiner's index fingers, which is placed 5 inches from the client's nose.
- Visualization of distant objects normally causes pupillary dilation and visualization of nearer objects causes pupillary constriction and convergence of the eye.

Normal Findings

- Pupillary size ranges from 3-7 mm, and are equal in size.
- Equally round.
- Constrict briskly/sluggishly when light is directed to the eye, both directly and consensual.
- Pupils dilate when looking at distant objects, and constrict when looking at nearer objects.
- If all of which are met, we document the findings using the notation PERRLA, pupils equally round, reactive to light, and accommodation.



A Snellen chart

- The optic nerve (Cranial Nerve II) is assessed by testing for visual acuity and peripheral vision.
- Visual acuity is tested using a Snellen chart, for those who are illiterate and unfamiliar with the western alphabet, the illiterate E chart, in which the letter E faces in different directions, maybe used.
- The chart has a standardized number at the end of each line of letters; these numbers indicates the degree of visual acuity when measured at a distance of 20 feet.

- The numerator 20 is the distance in feet between the chart and the client, or the standard testing distance. The denominator 20 is the distance from which the normal eye can read the lettering, which correspond to the number at the end of each letter line; therefore the larger the denominator the poorer the vision.
- Measurement of 20/20 vision is an indication of either refractive error or some other optic disorder.
- In testing for visual acuity you may refer to the following:
 - The room used for this test should be well lighted.
 - A person who wears corrective lenses should be tested with and without them to check for the adequacy of correction.
 - Only one eye should be tested at a time; the other eye should be covered by an opaque card or eye cover, not with client's finger.
 - Make the client read the chart by pointing at a letter randomly at each line; maybe started from largest to smallest or vice versa.
 - A person who can read the largest letter on the chart (20/200) should be checked if they can perceive hand movement about 12 inches from their eyes, or if they can perceive the light of the penlight directed to their eyes.

Peripheral vision or visual fields

- The assessment of visual acuity is indicative of the functioning of the macular area, the area of central vision. However, it does not test the sensitivity of the other areas of the retina which perceive the more peripheral stimuli. The Visual field confrontation test, provide a rather gross measurement of peripheral vision.
- The performance of this test assumes that the examiner has normal visual fields, since that client's visual fields are to be compared with the examiners.

Follow the steps on conducting the test:

- The examiner and the client sit or stand opposite each other, with the eyes at the same, horizontal level with the distance of 1.5 – 2 feet apart.
- The client covers the eye with opaque card, and the examiner covers the eye that is opposite to the client covered eye.
- Instruct the client to stare directly at the examiner's eye, while the examiner stares at the client's open eye. Neither looks out at the object approaching from the periphery.
- The examiner holds an object such as pencil or penlight, in his hand and gradually moves it in from the periphery of both directions horizontally and from above and below.
- Normally the client should see the same time the examiners sees it. The normal visual field is 180 degrees.

2.6 Ears

- Inspect the auricles of the ears for parallelism, size position, appearance and skin color.
- Palpate the auricles and the mastoid process for firmness of the cartilage of the auricles, tenderness when manipulating the auricles and the mastoid process.
- Inspect the auditory meatus or the ear canal for color, presence of cerumen, discharges, and foreign bodies.
- For adult pull the pinna upward and backward to straighten the canal.
- For children pull the pinna downward and backward to straighten the canal
- Perform otoscopic examination of the tympanic membrane, noting the color and landmarks.

Normal Findings

- The ear lobes are bean shaped, parallel, and symmetrical.
- The upper connection of the ear lobe is parallel with the outer canthus of the eye.
- Skin is same in color as in the complexion.
- No lesions noted on inspection.
- The auricles are has a firm cartilage on palpation.
- The pinna recoils when folded.
- There is no pain or tenderness on the palpation of the auricles and mastoid process.
- The ear canal has normally some cerumen of inspection.
- No discharges or lesions noted at the ear canal.
- On otoscopic examination the tympanic membrane appears flat, translucent and pearly gray in color.

2.7 Nose and Paranasal Sinuses

- The external portion of the nose is inspected for the following:
 - Placement and symmetry.
 - Patency of nares (done by occluding a nostril one at a time, and noting for difficulty in breathing)

- Flaring of alae nasi
- Discharge
- The external nares are palpated for:
 - Displacement of bone and cartilage.
 - For tenderness and masses
 - The internal nares are inspected by hyper extending the neck of the client, the ulnar aspect of the examiners hand over the forehead of the client, and using the thumb to push the tip of the nose upward while shining a light into the nares.
- Inspect for the following:
 - Position of the septum.
 - Check septum for perforation. (Can also be checked by directing the lighted penlight on the side of the nose, illumination at the other side suggests perforation).
 - The nasal mucosa (turbinates) for swelling, exudates and change in color.

Paranasal Sinuses

- Examination of the paranasal sinuses is indirectly. Information about their condition is gained by inspection and palpation of the overlying tissues. Only frontal and maxillary sinuses are accessible for examination.
- By palpating both cheeks simultaneously, one can determine tenderness of the maxillary sinusitis, and pressing the thumb just below the eyebrows, we can determine tenderness of the frontal sinuses.

Normal Findings

- Nose in the midline
- No Discharges.
- No flaring alae nasi.
- Both nares are patent.
- No bone and cartilage deviation noted on palpation.
- No tenderness noted on palpation.
- Nasal septum in the mid line and not perforated.
- The nasal mucosa is pinkish to red in color. (Increased redness turbinates are typical of allergy).
- No tenderness noted on palpation of the paranasal sinuses.

2.8 Mouth and Oropharynx, Lips

Inspected for:

- Symmetry and surface abnormalities
- Color
- Edema

Normal Findings

- With visible margin
- Symmetrical in appearance and movement
- Pinkish in color
- No edema

Temporomandibular Joint

- Palpate while the mouth is opened wide and then closed for:
 - Crepitus
 - Deviations
 - Tenderness

Normal Findings

- Moves smoothly no crepitus.
- No deviations noted
- No pain or tenderness on palpation and jaw movement.

Gums

Inspected for:

- Color
- Bleeding
- Retraction of gums.

Normal Findings

- Pinkish in color
- No gum bleeding
- No receding gums

Teeth

Inspected for:

- Number
- Color
- Dental carries
- Dental fillings
- Alignment and malocclusions (2 teeth in the space for 1, or overlapping teeth)
- Tooth loss
- Breath should also be assessed during the process.

Normal Findings

- 28 for children and 32 for adults.
- White to yellowish in color
- With or without dental carries and/or dental fillings.
- With or without malocclusions.
- No halitosis.

Tongue

Palpated for:

- Texture

Normal Findings

- Pinkish with white taste buds on the surface.
- No lesions noted.
- No varicosities on ventral surface.
- Frenulum is thin attaches to the posterior 1/3 of the ventral aspect of the tongue.
- Gag reflex is present.
- Able to move the tongue freely and with strength.
- Surface of the tongue is rough.

Uvula

Inspected for:

- Position
- Color
- Cranial Nerve X (Vagus nerve) - Tested by asking the client to say "Ah" note that the uvula will move upward and forward.

Normal Findings

- Positioned in the mid line.
- Pinkish to red in color.
- No swelling or lesion noted.
- Moves upward and backwards when asked to say "ah"

Throat

Tonsils

Inspected for:

- Inflammation
- Size
- A Grading system used to describe the size of the tonsils can be used.
 - Grade 1 – Tonsils behind the pillar.
 - Grade 2 – Between pillar and uvula.
 - Grade 3 – Touching the uvula
 - Grade 4 – In the midline.

2.9 Neck

- The neck is inspected for position symmetry and obvious lumps visibility of the thyroid gland and Jugular Venous Distension
- Check the Range of Movement of the neck.

Normal Findings

- The neck is straight.
- No visible mass or lumps.
- Symmetrical
- No jugular venous distension (suggestive of cardiac congestion).
- The neck is palpated just above the suprasternal notch using the thumb and the index finger.

Normal Findings

- The trachea is palpable.
- It is positioned in the line and straight.
- Lymph nodes are palpated using palmar tips of the fingers via systemic circular movements. Describe lymph nodes in terms of size, regularity, consistency, tenderness and fixation to surrounding tissues.

Normal Findings

- May not be palpable. Maybe normally palpable in thin patients.
- Non tender if palpable.
- Firm with smooth rounded surface.
- Slightly movable.
- About less than 1 cm in size.
- The thyroid is initially observed by standing in front of the patient and asking the patient to swallow. Palpation of the thyroid can be done either by posterior or anterior approach.



Posterior Approach:

1. Let the patient sit on a chair while the examiner stands behind him.
2. In examining the isthmus of the thyroid, locate the cricoid cartilage and directly below that is the isthmus.
3. Ask the patient to swallow while feeling for any enlargement of the thyroid isthmus.
4. To facilitate examination of each lobe, the client is asked to turn his head slightly toward the side to be examined to displace the sternocleidomastoid, while the other hand of the examiner pushes the thyroid cartilage towards the side of the thyroid lobe to be examined.
5. Ask the patient to swallow as the procedure is being done.
6. The examiner may also palpate for thyroid enlargement by placing the thumb deep to and behind the sternocleidomastoid muscle, while the index and middle fingers are placed deep to and in front of the muscle.
7. Then the procedure is repeated on the other side.

Anterior approach:

1. The examiner stands in front of the patient and with the palmar surface of the middle and index fingers palpates below the cricoid cartilage.
2. Ask the patient to swallow while palpation is being done.
3. In palpating the lobes of the thyroid, similar procedure is done as in posterior approach. The patient is asked to turn his head slightly to one side and then the other of the lobe to be examined.
4. Again the examiner displaces the thyroid cartilage towards the side of the lobe to be examined.

- Again, the examiner palpates the area and hooks thumb and fingers around the sternocleidomastoid muscle.

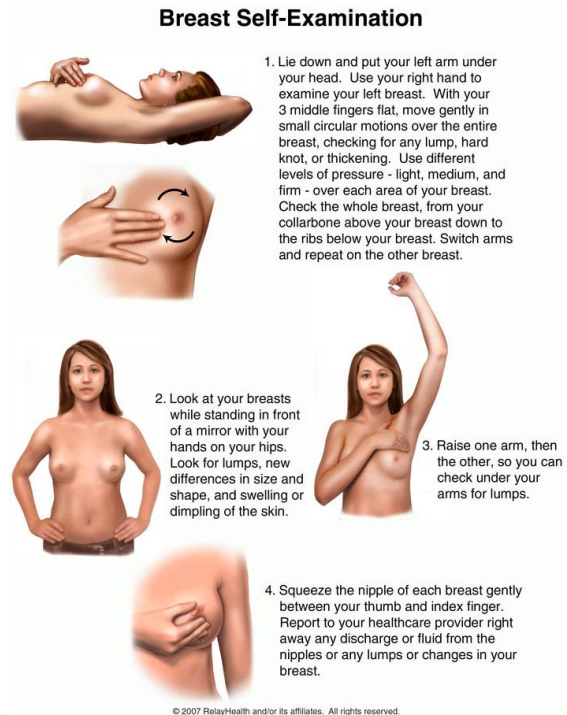
Normal Findings

- Normally the thyroid is non palpable.
- Isthmus maybe visible in a thin neck.
- No nodules are palpable.
- Auscultation of the Thyroid is necessary when there is thyroid enlargement. The examiner may hear bruits, as a result of increased and turbulence in blood flow in an enlarged thyroid.

3. Anterior and Posterior Thorax (Breast & Axillae, Thorax, Lungs and Heart)

3.1 Breast and Axilla

Breast



Inspection of the Breast

- There are 4 major sitting position of the client used for clinical breast examination. Every patient should be examined in each position.
 - The patient is seated with her arms on her side
 - The patient is seated with her arms abducted over the head.
 - The patient is seated and is pushing her hands into her hips, simultaneously eliciting contraction of the pectoral muscles.
 - The patient is seated and is leaning over while the examiner assists in supporting and balancing her.
- While the patient is performing these manoeuvres, the breasts are carefully observed for symmetry, bulging, retraction, and fixation.
- An abnormality may not be apparent in the breasts at rest a mass may cause the breasts, through invasion of the suspensory ligaments, to fix, preventing them from upward movement in position 2 and 4.
- Position 3 specifically assists in eliciting dimpling if a mass has infiltrated and shortened suspensory ligaments.

Normal Findings

- The overlying the breast should be even.
- May or may not be completely symmetrical at rest.
- The areola is rounded or oval, with same color, (Color varies form light pink to dark brown depending on race).
- Nipples are rounded, everted, same size and equal in color.
- No “orange peel” skin is noted which is present in edema.
- The veins maybe visible but not engorge and prominent.

- No obvious mass noted.
- Not fixated and moves bilaterally when hands are abducted over the head, or is leaning forward.
- No retractions or dimpling.

Palpation of the Breast

- Palpate the breast along imaginary concentric circles, following a clockwise rotary motion, from the periphery to the center going to the nipples. Be sure that the breast is adequately surveyed. Breast examination is best done 1 week post menses.
- Each areolar areas are carefully palpated to determine the presence of underlying masses.
- Each nipple is gently compressed to assess for the presence of masses or discharge.

Normal Findings

- No lumps or masses are palpable.
- No tenderness upon palpation.
- No discharges from the nipples.
- NOTE: The male breasts are observed by adapting the techniques used for female clients. However, the various sitting position used for woman is unnecessary.

Axillae

The lymph nodes in the axillary areas are also palpated for any enlargement or swelling.

3.2 Thorax

Inspection: The anterior and posterior thorax is inspected for size, symmetry, shape and for the presence of any skin lesions and/or misalignment of the spine; chest movements are observed for the normal movement of the diaphragm during respirations.

Palpation: The posterior thorax is assessed for respiratory excursion and fremitus.

Percussion: It is done to identify normal and abnormal sounds over the thorax.

3.3 Lungs

Auscultation: The assessment of normal and adventitious breath sounds is done by auscultation.

Percussion: It is done to assess normal and abnormal sounds. Normal breath sounds like vesicular breath sounds, bronchial breath sounds, bronchovesicular breath sounds are auscultated and assessed in the same manner that adventitious breath sounds like rales, wheezes, friction rubs, rhonchi, and abnormal bronchophony, egophony, and whispered pectoriloquy are auscultated, assessed and documented.

3.4 Heart

Inspection of the Heart

- The chest wall and epigastrium is inspected while the client is in supine position. Observe for pulsation and heaves or lifts

Normal Findings

- Pulsation of the apical impulse maybe visible. (this can give us some indication of the cardiac size).
- There should be no lift or heaves.

Palpation of the Heart

- The entire precordium is palpated methodically using the palms and the fingers, beginning at the apex, moving to the left sternal border, and then to the base of the heart.

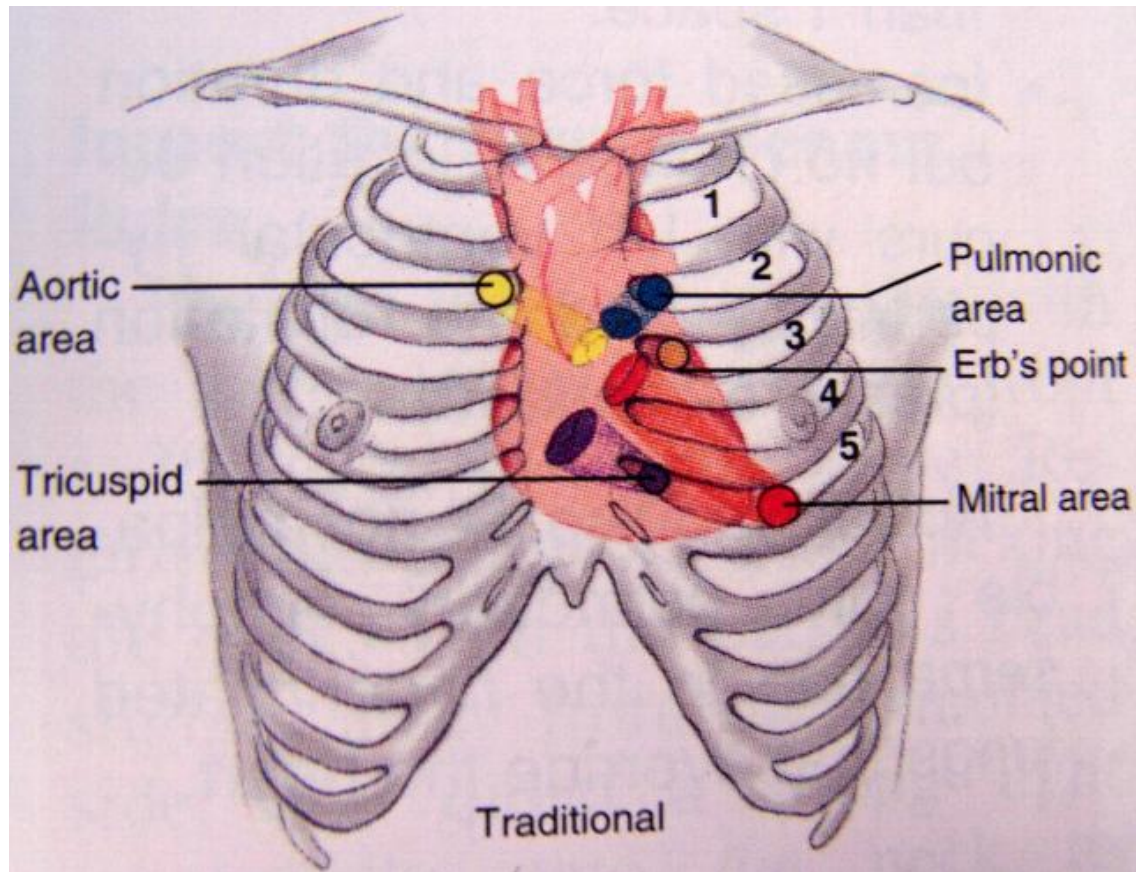
Normal Findings

- No, palpable pulsation over the aortic, pulmonic, and mitral valves.
- Apical pulsation can be felt on palpation.
- There should be no noted abnormal heaves, and thrills felt over the apex.

Percussion of the Heart

- The technique of percussion is of limited value in cardiac assessment. It can be used to determine borders of cardiac dullness.

Auscultation of the Heart



- Anatomic areas for auscultation of the heart:
 - Aortic Valve – Right 2nd ICS sternal border.
 - Pulmonic Valve – Left 2nd ICS sternal border.
 - Tricuspid Valve – Left 5th ICS sternal border.
 - Mitral Valve – Left 5th ICS midclavicular line

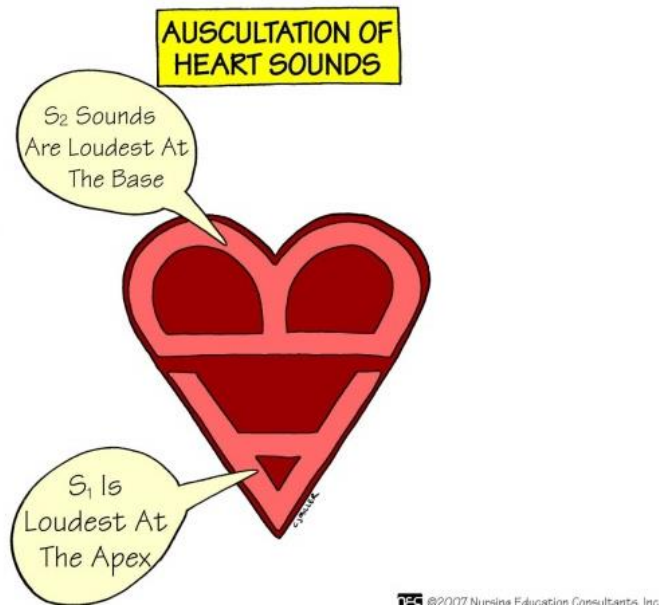
Positioning the patient for auscultation:

1. If the heart sounds are faint or undetectable, try listening to them with the patient seated and leaning forward, or lying on his left side, which brings the heart closer to the surface of the chest.
2. Having the patient seated and leaning forward is best suited for hearing high-pitched sounds related to semilunar valves problem.
3. The left lateral recumbent position is best suited low-pitched sounds, such as mitral valve problems and extra heart sounds.

Auscultating the heart:

1. Auscultate the heart in all anatomic areas aortic, pulmonic, tricuspid and mitral
2. Listen for the S1 and S2 sounds (S1 closure of AV valves; S2 closure of semilunar valve). S1 sound is best heard over the mitral valve; S2 is best heard over the aortic valve.
3. Listen for abnormal heart sounds e.g. S3, S4, and Murmurs.
4. Count heart rate at the apical pulse for one full minute.

Auscultation of Heart Sounds



Normal Findings

- S₁ & S₂ can be heard at all anatomic site.
- No abnormal heart sounds is heard (e.g. Murmurs, S₃ & S₄).
- Cardiac rate ranges from 60-100 bpm.

4. Abdomen

In abdominal assessment, be sure that the client has emptied the bladder for comfort. Place the client in a supine position with the knees slightly flexed to relax abdominal muscles.

Inspection of the abdomen

- Inspect for skin integrity (Pigmentation, lesions, striae, scars, veins, and umbilicus).
- Contour (flat, rounded, scapold)
- Distension
- Respiratory movement
- Visible peristalsis
- Pulsations

Normal Findings

- Skin color is uniform, no lesions.
- Some patients may have striae or scar.
- No venous engorgement.
- Contour may be flat, rounded or scaphoid
- Thin patients may have visible peristalsis.
- Aortic pulsation maybe visible on thin clients.

Auscultation of the Abdomen

- This method precedes percussion because bowel motility, and thus bowel sounds, may be increased by palpation or percussion.
- The stethoscope and the hands should be warmed; if they are cold, they may initiate contraction of the abdominal muscles.
- Light pressure on the stethoscope is sufficient to detect bowel sounds and bruits. Intestinal sounds are relatively high-pitched; the bell may be used in exploring arterial murmurs and venous hum.

Peristaltic sounds

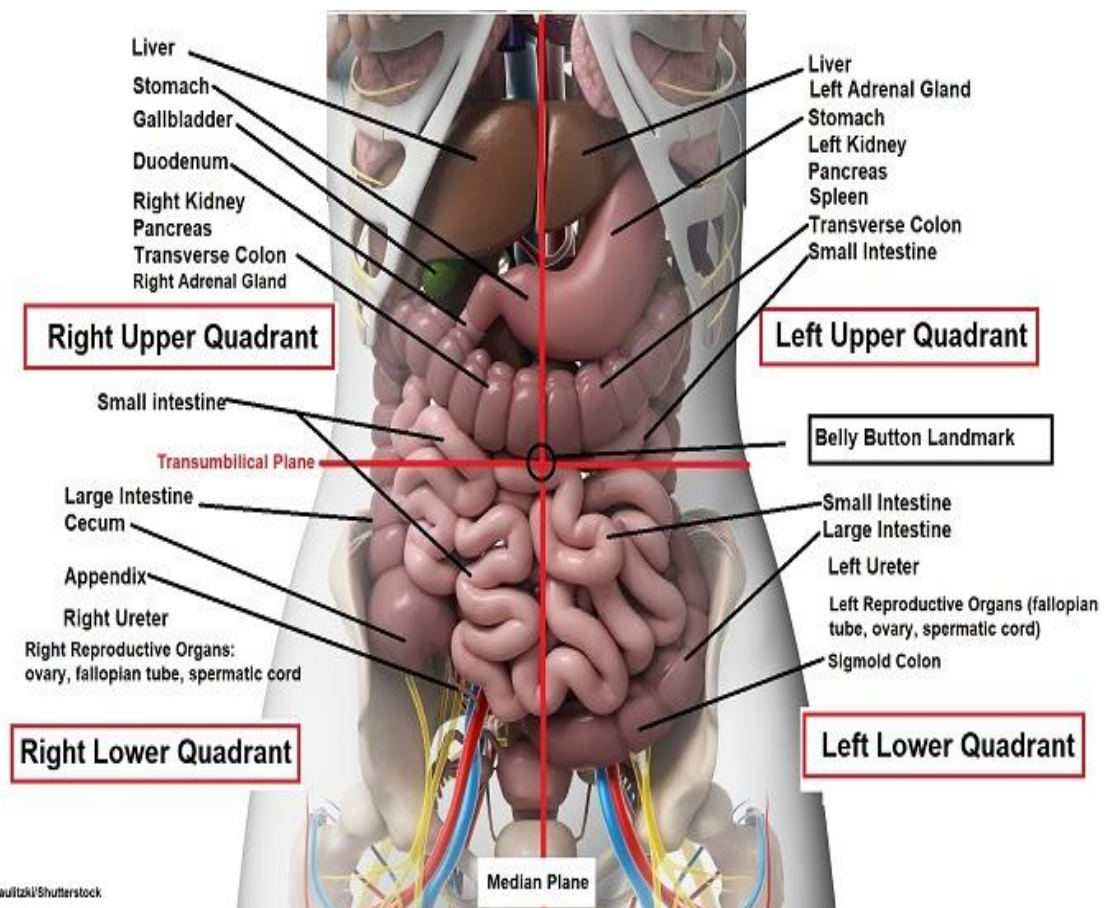
- These sounds are produced by the movements of air and fluids through the gastrointestinal tract. Peristalsis can provide diagnostic clues relevant to the motility of bowel.
- Listening to the bowel sounds (borborygmi) can be facilitated by following these steps:

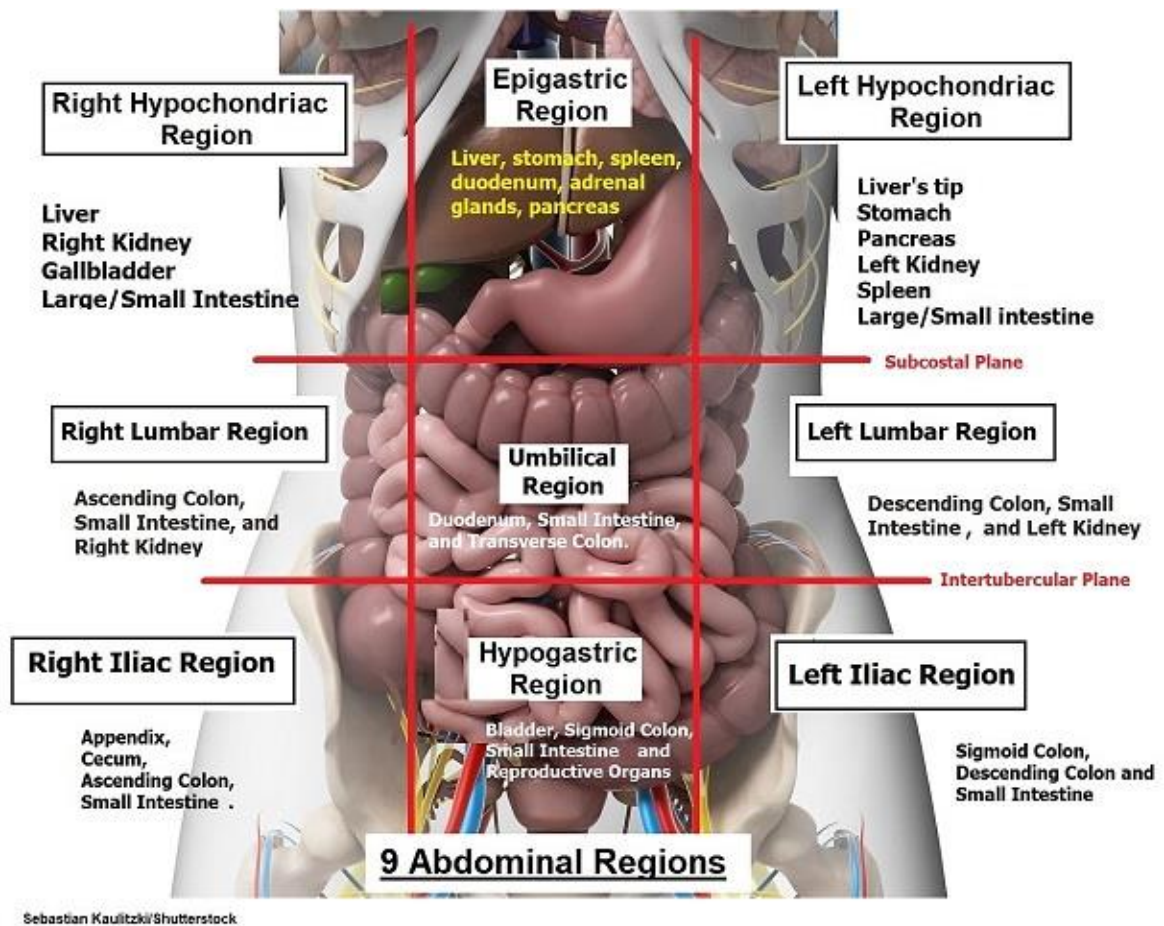
- Divide the abdomen in four quadrants.
- Listen over all auscultation sites, starting at the right lower quadrants, following the cross pattern of the imaginary lines in creating the abdominal quadrants. This direction ensures that we follow the direction of bowel movement.
- Peristaltic sounds are quite irregular. Thus it is recommended that the examiner listen for at least 5 minutes, especially at the periumbilical area, before concluding that no bowel sounds are present.
- The normal bowel sounds are high-pitched, gurgling noises that occur approximately every 5 – 15 seconds. It is suggested that the number of bowel sound may be as low as 3 to as high as 20 per minute, or roughly, one bowel sound for each breath sound.
- Some factors that affect bowel sound:
 - Presence of food in the GI tract.
 - State of digestion.
 - Pathologic conditions of the bowel (inflammation, Gangrene, paralytic ileus, peritonitis).
 - Bowel surgery
 - Constipation or Diarrhoea.
 - Electrolyte imbalances.
 - Bowel obstruction.

Percussion of the abdomen

- Abdominal percussion is aimed at detecting fluid in the peritoneum (ascites), gaseous distension, and masses, and in assessing solid structures within the abdomen.
- The direction of abdominal percussion follows the auscultation site at each abdominal guardant as detailed below.

The abdomen can be divided into four quadrants or nine regions as follows.





- The entire abdomen should be percussed lightly or a general picture of the areas of tympani and dullness.
- Tympany will predominate because of the presence of gas in the small and large bowel. Solid masses will percuss as dull, such as liver in the RUQ, spleen at the 6th or 9th rib just posterior to or at the mid axillary line on the left side.
- Percussion in the abdomen can also be used in assessing the liver span and size of the spleen.

Percussion of the liver

- The palms of the left hand are placed over the region of liver dullness.
- The area is struck lightly with a fist of right hand.
- Normally tenderness should not be elicited by this method.
- Tenderness elicited by this method is usually a result of hepatitis or cholecystitis.

Renal Percussion

- Can be done by either indirect or direct method.
- Percussion is done over the costovertebral junction.
- Tenderness elicited by such method suggests renal inflammation.

Palpation of the Abdomen

Light palpation

- It is a gentle exploration performed while the client is in supine position. With the examiner's hands parallel to the floor.
- The fingers depress the abdominal wall, at each quadrant, by approximately 1 cm without digging, but gently palpating with slow circular motion.
- This method is used for eliciting slight tenderness, large masses, and muscles, and muscle guarding.
- Tensing of abdominal musculature may occur because of:
 - The examiner's hands are too cold or are pressed to vigorously or deep into the abdomen.
 - The client is ticklish or guards involuntarily.
 - Presence of subjacent pathologic condition.

Normal Findings

- No tenderness noted.
- With smooth and consistent tension.
- No muscles guarding.

***Deep Palpation**

It is the indentation of the abdomen performed by pressing the distal half of the palmar surfaces of the fingers into the abdominal wall.

- The abdominal wall may slide back and forth while the fingers move back and forth over the organ being examined.
- Deeper structures, like the liver, and retro peritoneal organs, like the kidneys, or masses may be felt with this method.
- In the absence of disease, pressure produced by deep palpation may produce tenderness over the cecum, the sigmoid colon, and the aorta.

Liver palpation

- There are two types of bi manual palpation recommended for palpation of the liver. The first one is the superimposition of the right hand over the left hand.
 - Ask the patient to take 3 normal breaths.
 - Then ask the client to breathe deeply and hold. This would push the liver down to facilitate palpation.
 - Press hand deeply over the RUQ
- The second methods:
 - The examiner's left hand is placed beneath the client at the level of the right 11th and 12th ribs.
 - Place the examiner's right hands parallel to the costal margin or the RUQ.
 - An upward pressure is placed beneath the client to push the liver towards the examining right hand, while the right hand is pressing into the abdominal wall.
 - Ask the client to breathe deeply.
 - As the client inspires, the liver maybe felt to slip beneath the examining fingers.

***Percussion and Palpation of deep structures such as liver and kidneys to be done under supervision**

Normal Findings

- The liver usually cannot be palpated in a normal adult. However, in extremely thin but otherwise well individuals, it may be felt the coastal margins.
- When the normal liver margin is palpated, it must be smooth, regular in contour, firm and non-tender.

5. Male and Female Genitalia

Inspection: The skin and the pubic hair are inspected. The labia, clitoris, vagina and urethral opening are inspected among female clients. The penis, urethral meatus, and the scrotum are inspected among male clients.

Palpation: The inguinal lymph nodes are palpated for the presence of any tenderness, swelling or enlargements. A testicular examination is done for male clients.

6. Rectum and Anus

Inspection: The rectum, anus and the surrounding area is examined for any abnormalities.

Palpation: With a gloved hand, the rectal sphincter is palpated for muscular tone, and the presence of any blood, tenderness, pain or nodules.

7. Extremities (Musculoskeletal system& Peripheral Vascular System)

Inspection

- Observe for size, contour, bilateral symmetry, and involuntary movement.
- Look for gross deformities, edema, presence of trauma such as ecchymosis or other discoloration.
- Always compare both extremities.

Palpation

- Feel for evenness of temperature. Normally it should be even for all the extremities.
- Tonicity of muscle. (Can be measured by asking client to squeeze examiner's fingers and noting for equality of contraction).
- Perform range of motion.
- Test for muscle strength (performed against gravity and against resistance and described in the table below:

Table showing the Lovett scale for grading for muscle strength and functional level

Grade	Muscle function level	Lovett Scale
0	0% of normal strength	0 (Zero)
1	10% of normal strength; no movement, contraction of muscle is palpable or visible	T (Trace)
2	25% of normal strength; full muscle movement against gravity	P (Poor)
3	50% of normal strength; normal movement against gravity	F (Fair)
4	75% of normal strength; normal movement against gravity and against minimal resistance	G (Good)
5	100% of normal strength; normal movement against gravity and against minimal resistance	N (Normal)

Normal Findings

- Both extremities are equal in size.
- Have the same contour with prominences of joints.
- No involuntary movements.
- No edema
- Color is even.
- Temperature is warm and even.
- Has equal contraction and even.
- Can perform complete range of motion.
- No crepitus must be noted on joints.
- Can counter act gravity and resistance on ROM.

Peripheral Vascular System

Inspection: The extremities are inspected for any abnormal color and any signs of poor perfusion to the extremities, particularly the lower extremities. While the patient is in a supine position, the nurse also assesses the jugular veins for any bulging pulsations or distention.

Auscultation: The nurse assesses the carotids for the presence of any abnormal bruits.

Palpation: The peripheral veins are gently touched to determine the temperature of the skin, the presence of any tenderness and swelling.

The peripheral vein pulses are also palpated bilaterally to determine regularity, number of beats, volume and bilateral equality in terms of these characteristics.

8. Neurological system

Neurological assessment - mental status includes level of consciousness (LOC), orientation, and memory.

Balance is assessed using the relatively simple Romberg test. The Romberg test is the test that law enforcement use to test people for drunkenness. Gait can be assessed by simply observing the client as they are walking or by coaching the person to walk heel to toe as the nurse observes the client for their gait.

Gross motor functioning is bilaterally assessed by having the client contract their muscles; and fine motor coordination and functioning is observed for both the upper and the lower extremities as the client manipulates objects.

Sensory functioning is determined by touching various parts of the body, bilaterally, with a pen or another blunt item while the client has their eyes closed. The client is prompted to report whether or not they feel the blunt item as the nurse touches the area. Similarly, a hot and cold object is placed on the skin on various parts of the body to assess temperature sensory functioning. The client will then report whether they feel heat, cold or nothing at all.

Kinesthetic sensations are assessed to determine the client’s ability to perceive and report their bodily positioning without the help of visual cues.

Tactile sensory functioning is assessed for the client’s ability to have stereognosis, extinction, one point discrimination and two point discrimination. One and two point discrimination relates to the client’s ability to feel whether or not they have gotten one or two pin pricks that the nurse gently applies. Stereognosis is the

client's ability to feel and identify a familiar object while their eyes are closed. For example, the nurse may place a pen, a button or a paper clip in the client's hand to determine whether or not the client can identify the object without any visual cues. Extinction is the client's ability to identify whether or not they are being touched by the person doing the assessment with either one or two bilateral touches. For example, the nurse may touch both knees and then ask the client if they felt one or two touches while the client has their eyes closed.

8.1 Reflexes

Reflexes are automatic muscular responses to a stimulus. When reflexes are absent or otherwise altered, it can indicate a neurological deficit even earlier than other signs and symptoms of the neurological deficit appear.

Reflexes can be described as primitive and long term. Primitive reflexes are normally present at the time of birth and these reflexes normally disappear as the baby grows older; neurological deficits are suspected when these primitive reflexes remain beyond the point in time when they are expected to disappear. Reflexes, other than the primitive reflexes remain intact and active during the entire life span, under normal conditions.

Deep Tendon and Superficial Reflexes

A **deep tendon reflex** is often associated with muscle stretching. **Tendon reflex** tests are used to determine the integrity of the spinal cord and peripheral nervous system, and they can be used to determine the presence of a neuromuscular disease.

Superficial reflexes. **Superficial reflexes** are motor responses to scraping of the skin. They are graded simply as present or absent, although markedly asymmetrical responses should be considered abnormal as well

- **Pupil reflex:** Pupil reflexes include pupil dilation and pupil accommodation. The "PERLA" mnemonic for pupil reflexes stands for Pupils Equally Reactive to Light and Accommodation which is a normal finding. The pupil reflexes for their reactions to light are assessed by using a flash light in a darkened room. Pupils will normally dilate as the light is withdrawn and they will normally constrict when the light is brought close to the pupils. The pupils are assessed not only for their reaction to light, they are also assessed in terms of their accommodation. Normally, the pupils will dilate when an object is moved away from the eye and they will constrict as the object is being brought closer to the eye.
- **Plantar reflex:** The plantar reflex is elicited when the person performing this assessment strokes the bottom of the foot and the client's toes curl down. The Babinski sign occurs when the foot goes into dorsiflexion and the great toe curls up; this sign is an abnormal response to this stimulation and it can indicate the presence of deep vein thrombosis.
- **Biceps reflex:** This reflex is assessed by placing the thumb on the biceps tendon while the person is in a sitting position and then tapping the thumb with the Taylor hammer.
- **Triceps reflex:** This reflex is elicited by tapping the triceps tendon with the Taylor hammer above the elbow while the client has their hands on their legs when the client is in a sitting position.
- **Patellar tendon reflex:** This reflex, often referred to as the knee jerk reflex, is elicited by tapping the patellar area with the Taylor hammer.
- **Calcaneal reflex:** This reflex, often referred to as the Achilles reflex, is the calcaneal reflex on the ankle with the Taylor hammer.
- **Gag reflex:** The gag reflex is elicited when the back of the mouth and the posterior tongue is stimulated with a tongue blade.
- **Blinking reflex:** This reflex is elicited when the eyes are touched or they are stimulated a sudden bright light or an irritant.
- An **abdominal reflex** is a superficial neurological **reflex** stimulated by stroking of the **abdomen** around the umbilicus. It can be helpful in determining the level of a CNS lesion.

All reflexes should be done bilaterally in rapid succession so that all differences between the right and the left reflexes can be determined and assessed. For example, when the person who is performing these assessments should assess the biceps reflex of the right arm and then immediately assess the biceps reflex of the left arm so that any differences or inequalities can be assessed and documented.

Reflexes

□ Deep Tendon Reflexes (DTR)

- Biceps (C5-C6)
- Triceps (C7-C8)
- Brachioradialis (C5-C6)
- Quadriceps (Patellar) (L2-L4)
- Achilles (L5-S2)

□ Superficial Reflexes

- Plantar Reflex/Babinski (L4-S2)
- Abdominal Reflexes
(Upper T8-T10)(Lower T10-T12)
- Crematic Reflex (L1-L2)

Documenting Reflex Findings

Use these grading scales to rate the strength of each reflex in a deep tendon and superficial reflex assessment.

Deep tendon reflex grades

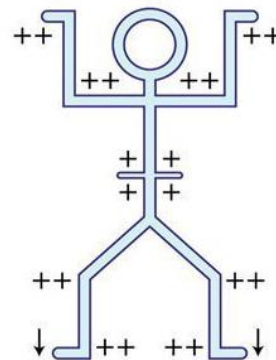
0 absent
 + present but diminished
 ++ normal
 +++ increased but not necessarily pathologic
 ++++ hyperactive or clonic (involuntary contraction and relaxation of skeletal muscle)

Superficial reflex grades

0 absent
 + present

Use the patient's reflex ratings on a drawing of a stick figure. The figures here show documentation of normal and abnormal reflex responses.

Normal



8.2 Cranial nerves:

Lastly, the nurse assesses the twelve cranial nerves. Some of these twelve cranial nerves are only sensory or motor nerves, and others have both sensory and motor functions.

The twelve cranial nerves can be easily remembered using this mnemonic: On Old Olympus Tippy Top, A Fat Armed German View A Hop, as below:

1. Olfactory
2. Optic
3. Oculomotor
4. Trochlear
5. Trigeminal
6. Abducens
7. Facial
8. Acoustic
9. Glossopharyngeal
10. Vagus
11. Spinal accessory
12. Hypoglossal

Each of these twelve cranial nerves, their function and their classification as sensory, motor or both sensory and motor are shown in the table below.

Cranial Nerve I (Olfactory Nerve)

- To test the adequacy of function of the olfactory nerve:
 - The client is asked to close his eyes and occlude.
 - The examiner places aromatic and easily distinguished items nose (e.g. alcohol, vinegar, coffee).
 - Ask the client to identify the odor.
 - Each side is tested separately (**There is no need to use two different substances**)

Cranial Nerve II (Optic Nerve)

The optic nerve is assessed by testing for visual acuity and peripheral vision. (**Details shown in examination of eyes**)

Cranial Nerve III, IV & VI (Oculomotor, Trochlear, Abducens)

- All the 3 Cranial nerves are tested at the same time by assessing the Extra Ocular Movement (EOM) or the six cardinal position of gaze.

Follow the given steps:

- Stand directly in front of the client and hold a finger or a penlight about 1 ft from the client's eyes.
- Instruct the client to follow the direction the object hold by the examiner by eye movements only; that is without moving the neck.
- The nurse moves the object in a clockwise direction hexagonally.
- Instruct the client to fix his gaze momentarily on the extreme position in each of the six cardinal gazes.
- The examiner should watch for any jerky movements of the eye (nystagmus).
- Normally the client can hold the position and there should be no nystagmus.

Cranial Nerve V (Trigeminal) - While performing the cranial nerves assessment, the respective cranial nerve assessment can be incorporated in the respective systems.

1. Sensory Function

- Ask the patient to close the eyes.
- Run cotton wisp over the forehead, cheek and jaw on both sides of the face.
- Ask the patient if he/she feel it, and where it is felt.
- Check for corneal reflex using cotton wisp.
- The normal response is blinking.

2. Motor function

- Ask the patient to chew or clench the jaw. Palpate the jaw and feel for movement.
- The patient should be able to clench or chew with strength and force.

Cranial Nerve VII (Facial)

1. Sensory function (This nerve innervates the anterior 2/3 of the tongue).

- Place a sweet, sour, salty, or bitter substance near the tip of the tongue.
- Normally, the client can identify the taste.

2. Motor function

- Ask the patient to smile, frown, raise eye brow, close eye lids, whistle, or puff the cheeks.

Normal Findings

- Shape maybe oval or rounded.
- Face is symmetrical.
- No involuntary muscle movements.
- Can move facial muscles at will.
- Intact cranial nerve V and VII.

The summary table is given below:

Cranial Nerve		Major Functions		Assessment
Cranial Nerve I	Olfactory	Sensory	Smell	Smell—coffee, cloves, peppermint
Cranial Nerve II	Optic	Sensory	Vision	Visual acuity—Snellen chart (cover eye not being examined) Test for visual fields Examine with ophthalmoscope
Cranial Nerve III	Oculomotor	Sensory and Motor – Primarily Motor	Eyelid and eyeball movement	Move eye up, down, and peripherally Test for accommodation Pupillary constriction Observe for ptosis of upper eyelid
Cranial Nerve IV	Trochlear	Sensory and Motor – Primarily Motor	Innervates superior oblique eye muscle Turns eye downward and laterally	Inferior lateral movement of the eye
Cranial Nerve V	Trigeminal	Sensory and Motor	Chewing Face and mouth touch and pain	Corneal reflex Sensation of skin of the face (eyebrow, cheeks and chin) by using a wisp of cotton Chewing, biting, lateral jaw movements (move jaw side to side)
Cranial Nerve VI	Abducens	Sensory and Motor – Primarily Motor	Turns eye laterally Proprioception (sensory awareness of part of the body)	Inferior lateral eye movements
Cranial Nerve VII	Facial	Sensory and Motor	Controls most facial expressions Secretion of ears and saliva	Taste—anterior two thirds of tongue; sweet—sugar; salty; sour—lemon; bitter (rinse mouth between applications) Movement of forehead and mouth Raise eyebrows, show teeth, smile, and puff out cheeks
Cranial Nerve VIII	Vestibulocochlear (auditory)	Sensory	Hearing Equilibrium sensation	Hearing, balance Weber and Rinne tests Otoscope
Cranial Nerve IX	Glossopharyngeal	Sensory and Motor	Taste Senses carotid blood pressure Muscle sense – proprioception, sensory awareness of the body	Swallowing and phonation Taste—posterior one third of tongue; see cranial nerve VII
Cranial Nerve X	Vagus	Sensory and Motor	Senses aortic blood pressure Slows heart rate Stimulates digestive organs Taste	Sensations of posterior one third of tongue, throat. Gag reflex (stimulate back of pharynx with a tongue blade) Swallowing and phonation
Cranial Nerve XI	Spinal Accessory	Sensory and Motor – Primarily Motor	Controls trapezius and sternocleidomastoid controls swallowing movements Muscle sense - proprioception	Shoulder movement, shoulder shrug, head rotation—push against examiner's hand
Cranial Nerve XII	Hypoglossal	Sensory and Motor – Primarily Motor	Controls tongue movements Muscle sense - proprioception	Tongue movement—protrude tongue, push tongue into the cheek

(Berman, Snyder, Kozier & Erb, 2008; Jarvis, 2008).

Glasgow Coma Scale:

The **Glasgow Coma Scale (GCS)** allows healthcare professionals to consistently evaluate the consciousness level of a patient. There are three aspects of behaviour that are independently measured as part of an **assessment** of a patient's **GCS** – motor responsiveness, verbal response and eye-opening.

Feature	Response	Score
Best eye response	Open spontaneously	4
	Open to verbal command	3
	Open to pain	2
	No eye opening	1
Best verbal response	Orientated	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No verbal response	1
Best motor response	Obeys commands	6
	Localising pain	5
	Withdrawal from pain	4
	Flexion to pain	3
	Extension to pain	2
	No motor response	1

ANNEXURE 1

Terms and terminology relating to the neurological system and neurological system disorders

Acalculia: Acalculia is the client's loss of ability to perform relatively simple mathematical calculations like addition and subtraction.

Agnosia: Agnosia is defined as the loss of a client's ability to recognize and identify familiar objects using the senses despite the fact that the senses are intact and normally functioning. The different types of agnosia, as based on each of the five senses, are auditory agnosia, visual agnosia, gustatory agnosia, olfactory agnosia, and tactile agnosia.

Agraphia: Agraphia, simply defined, is the Inability of the client to write. Agraphia is one of the four hallmark symptoms of Gerstmann's syndrome. The other symptoms of Gerstmann's syndrome are acalculia, finger agnosia, and an inability to differentiate between right and left.

Alexia: Alexia, which is a type of receptive aphasia, occurs when the client is unable to process, understand and read the written word. This neurological disorder is also referred to as word blindness and optical alexia.

Anhedonia: Anhedonia is a loss of interest in life experiences and life itself as the result of the neurological deficit.

Anomia: Anomia is a lack of ability of the client to name a familiar object or item.

Anosagnosia: Anosagnosia is characterized with the client's inability to perceive and have an awareness of an affected body part such as a paralyzed or missing leg. Anosagnosia is closely similar to hemineglect and hemiattention

Anosdiaphoria: Anosdiaphoria is an indifference to one's illness and disability

Aphasia: Aphasia includes expressive aphasia and receptive aphasia. Expressive aphasia is characterized by the client's inability to express their feelings and wishes to others with the spoken word; and receptive aphasia is the client's inability to understand the spoken words of others.

Asomatognosi: Asomatognosia is the inability of the client to recognize one or more of their own bodily parts.

Astereognosia: Astereognosia is the client's inability to differentiate among different textures with their sense of touch and also the inability of the client to identify a familiar object, like a button, with their tactile sensation.

Asymbolia: Asymbolia is the loss of the client's inability to respond to pain even though they have the sensory function to feel and perceive the pain. Asymbolia is also referred to as pain dissociation and pain asymbolia.

Autotopagnosia: Autotopagnosia is the inability of the client to locate their own body parts, the body parts of another person, or the body parts of a medical model.

Balint's syndrome: Balint's syndrome includes ocular apraxia, optic ataxia and simultanagnosia, which consist of impaired visual scanning, visuospatial ability and attention.

Boston Diagnostic Aphasia Examination: The Boston Diagnostic Aphasia Examination is a standardized comprehensive assessment tool that assess and measures the client's degree of aphasia in terms of the client's perceptions, processing of these perceptions and responses to these perceptions while using problem solving and comprehension skills.

Broca's aphasia: Broca's aphasia entails the client's lack of ability to form and express words even though the client's level of comprehension is intact.

Color agnosia: Color agnosia reflects the client's lack of ability to recognize and name different colors.

Conduction aphasia: Conduction aphasia is the client's lack of ability to repeat phrases and/or write brief dictated passages despite the fact that the client has intact speech abilities, comprehension abilities, and the ability to name familiar objects.

Constructional apraxia: Constructional apraxia is the inability of the client to draw and copy simple shapes on paper.

Dressing apraxia: Dressing apraxia occurs when the person is not able to appropriately dress oneself because of some neurological dysfunction.

Dysgraphaesthesia: Dysgraphaesthesia impairs the client's ability to sense and identify a letter or number that is tactilely drawn on the client's palm.

Dysgraphia: Dysgraphia is similar to agraphia; however, dysgraphia is difficulty in terms of writing and agraphia is the client's complete inability to write.

Environmental agnosia: Environmental agnosia is the lack of ability of the client to recognize familiar places, like the US Supreme Court, by looking at a photograph of it.

Finger agnosia: Finger agnosia occurs when the person is not able to identify what finger is being touched by the person performing the neurological assessment.

Geographic agnosia: Geographic agnosia is the lack of ability of the client to recognize familiar counties, like Canada or Mexico, when viewing a world map.

Gerstmann's Syndrome: Gerstmann's Syndrome consists of dyscalculia or acalculia, finger agnosia, one sided disorientation and dysgraphia or agraphia.

Hemiasomatognosia: Hemiasomatognosia is the neurological disorder that occurs when the client does not perceive one half of their body and they act in a manner as if that half of the body does not even exist.

Homonymous hemianopsia: Homonymous hemianopsia occurs when the person has neurological blindness in the same visual field of both eyes bilaterally.

Ideomotor apraxia: Ideomotor apraxia is a neurological deficit that affects the client's ability to pretend doing simple tasks of everyday living like brushing one's teeth.

Misoplegia: Misoplegia is a hatred and distaste for an adversely affected limb.

Motor alexia: Motor alexia occurs when the client is not able to comprehend the written word despite the fact that the client can read it aloud.

Musical alexia: Musical alexia is a client's inability to recognize a familiar tune like "The National Anthem" or "Silent Night".

Movement agnosia: Movement agnosia is a neurological deficit that is characterized with a client's lack of ability to recognize an object's movement.

Ocular apraxia: Ocular apraxia is the neurological deficit that occurs when the person is no longer able to rapidly move their eyes to observe a moving object.

Optic ataxia: Optic ataxia is characterized with the client's inability to reach for and grab an object.

Phonagnosia: Phonagnosia is the client's lack of ability to recognize familiar voices such as those of a child or spouse.

Prosopagnosia: Prosopagnosia is a lack of ability to recognize familiar faces, like the face of a spouse or child.

Simultanagnosia: Simultanagnosia is a neurological disorder that occurs when the client is not able to perceive and process the perception of more than object at a time that is in the client's visual field.

Somatophrenia: Somatophrenia occurs when the client denies the fact that their body parts are not even theirs, but instead, these body parts belong to another.

The Two-Point Discrimination Test: This test measures and assesses the client's ability to recognize more than one sensory perception, such as pain and touch, at one time.

Visual agnosia: Visual agnosia is the client's lack of ability to recognize and attach meaning to familiar objects.

Wechsler Memory Scale IV: Wechsler Memory Scale IV: This measurement tool is a standardized comprehensive method to assess verbal and visual memory, including immediate memory, delayed memory, auditory memory, visual memory and visual working memory.

ANNEXURE 2
SAMPLE HEALTH ASSESSMENT FORMAT (Adult)

Date :

Place :

Patient's Name :

Hospital No. :

Age :

Sex :

Occupation :

Residence :

Chief Complaint :

History of present illness or problems:

History of Treatment :

Current Health status :

Nutrition :

Elimination :

Sleep :

Immunizations :

Screening tests :

Allergies :

Medications :

Daily activities :

High risk behaviors :

Alcohol

Drug

Cigarette usage

Sexual behaviours

Past medical history

Illness :

Injuries :

Hospitalization/Surgeries

Family History:

Family profile & genogram

Family medical history

Socio-economic background

Physical Examination:

Vital signs

Temperature

Pulse

Respiration

Blood Pressure

Height

Weight

BMI

General appearance

Skin and nails:

Head and face:

Eyes

Ears

Nose

Mouth

Neck

Lymph nodes

Chest

Heart and CVS

Breast exam

Abdomen

Musculo skeletal system:

Neurological system

Motor functions

Sensory

Cranial nerves

Reflexes

3. BLS/BCLS (Adult Health Nursing I)

PLACEMENT: III SEMESTER

Theory: 4 hours (Includes self-learning & lectures)

Practical: 6 hours (Includes demonstration, practice & OSCE)

Module Overview: The Indian CPR guidelines/AHA guidelines can be used to get certification. The required hours can be used from theory and practical hours. The hours may vary based on certification guidelines.

Competencies: The student will be able to

1. Perform Basic Cardiopulmonary Life Support (BCLS) using the evidence based national or international guidelines in the management of adult victims with cardiac arrest.

Learning Activities:

- Lectures and demonstration
- Self-study/Reading assignments
- Written assignments
- Practice in Skill/Simulation Lab

Assessment Methods:

- Test paper (Objective type/short answer/situation type) - 20 marks
 - Assignments - 10 marks
 - OSCE (BCLS/BLS competencies) - 20 marks
- OR
- As per certification guidelines

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

Learning Resource: (Latest version to be consulted as and when revised)

- Indian CPR/BCLS guidelines
- International guidelines and certification - AHA guidelines

4. FUNDAMENTALS OF PRESCRIBING (Pharmacology II)

PLACEMENT: IV SEMESTER

Theory: 20 hours (Few hours of practice can be planned in skill lab/simulation lab)

Module Overview: The module covers the prescriptive role of nurses particularly nurse practitioners, legal issues relevant to prescribing, and principles, process, and steps of prescribing. Further the students will be oriented to prescribing competencies.

Competencies (Learning Outcomes): The student will be able to

1. Identify the prescriptive role of nurses, midwives, and nurse practitioners at national and international levels.
2. Discuss professional, legal, and ethical issues relevant to prescribing practice.
3. Enumerate the principles of prescribing and factors influencing it.
4. Explain the process and steps of prescribing.
5. Identify the prescribing competencies.

Learning Activities:

- Lectures and demonstration
- Self-study/Reading assignments
- Written assignments
- Practice in Skill/Simulation Lab

Assessment Methods:

- Test paper (Objective type/short answer/situation type) - 20 marks
- Assignments - 10 marks
- OSCE (Prescribing competencies) - 20 marks

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

CONTENT OUTLINE T - Theory, P - Practical

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	T-4	Identify the prescriptive role of nurses, midwives, and nurse practitioners at national and international levels.	Introduction <ul style="list-style-type: none"> • Background • Prescriptive role of nurses and nurse practitioners • Prescribing terminology 	<ul style="list-style-type: none"> • Lecture • Discussion 	<ul style="list-style-type: none"> • MCQ • Short answers
II	T-6	Discuss professional, legal, and ethical issues relevant to prescribing practice.	Professional, legal, and ethical issues relevant to prescribing practice. <ul style="list-style-type: none"> • Professional issues • Legal issues • Ethical issues 	<ul style="list-style-type: none"> • Lecture • Discussion • Guided reading 	<ul style="list-style-type: none"> • Short answers • Written assignments
III	T-4	Enumerate the principles of prescribing and factors influencing it.	Principles of prescribing <ul style="list-style-type: none"> • Principles • Factors influencing prescribing 	<ul style="list-style-type: none"> • Lecture & discussion • Self-study & Guided reading 	<ul style="list-style-type: none"> • Short answers
IV	T-6	Explain the process and steps of prescribing.	Process of prescribing and competencies <ul style="list-style-type: none"> • Steps of prescribing • Prescribing competencies 	<ul style="list-style-type: none"> • Lecture & discussion • Review of Case studies 	<ul style="list-style-type: none"> • Short answers • Observation report • OSCE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		Identify the prescribing competencies and develop basic prescribing competencies.		<ul style="list-style-type: none"> Field Observation and skill lab practice 	

Learning Resource: Fundamentals of Prescribing Module prepared by INC, given below.

FUNDAMENTALS OF PRESCRIBING MODULE

S.No.	Contents	Page No.
1	Part I. Introduction and background	42
2	Part II. Prescriptive role of Nurse Practitioners (National & International)	42
3	Part III. Professional, legal and ethical issues relevant to prescribing practice	44
4	Part IV. Principles of prescribing and factors influencing it	45
5	Part V. Process and steps of prescribing	47
6	Part VI. Prescribing competencies	50
7	Part VII. Conclusion and references	52

PART I: Introduction and background

Prescribing is the main approach to the treatment and prevention of diseases in healthcare. Medicines are used more than any other intervention by patients to manage clinical conditions. The number and complexity of medicines are growing and prescribers are expected to develop and maintain prescribing competencies. When prescribed and used effectively, medicines have the potential to significantly improve patient outcomes. Doctors are the largest group of prescribers along with dentists who are able to prescribe on registration. The prescribing responsibilities have extended to other health professional groups who are able to prescribe within their scope of practice.

Countries such as USA, UK, and Australia utilize the non- medical prescribers namely nurses, pharmacists, podiatrists, and physiotherapists keeping the principle of effective use of resources, their skills and expertise maintaining safety and efficiency of prescribing. In these countries, nurse-prescribing courses with hands on experience by designated medical practitioner train nurses to perform independent and supplementary prescribing. Adequately trained nurse practitioners on completion of approved course/modules, prescribe from a limited nurse's drug formulary and function within the standards of proficiency for nurse prescribers.

In India, the current practice is that only medical practitioners and dentists prescribe drugs on registration. Prescribing is included as a component of their undergraduate program. Nursing roles are changing and with the introduction of nurse practitioner programs in critical care, midwifery and primary care, there is a need to move towards empowering these nurses in terms of quality, standards, monitoring and evaluation. Their clinical expertise is also highly valued by patients. With introduction of legal provision for nurse practitioners by INC standards, scope of practice and regulations alongside MOH&FW regulations, and support and acceptance by medical and pharmacy councils, NPs in India will be involved in prescribing within their scope soon. Currently INC in collaboration with MOH & FW have finalized Scope of Practice Document for Nurse Practitioners in midwifery and is placed in INC and Ministry's websites. This will enable NPMs to prescribe within their scope as indicated.

PART II: The Prescriptive the role of nurses and nurse Practitioners

The need for prescribing has emerged alongside introduction of Nurse Practitioner Critical Care (NPCC) and Nurse Practitioner Midwifery (NPM) programs. The prescriptive role, rights and legal provision by Indian Nursing Council (INC) and MOH&FW, GoI have been deliberated in depth with the finalization of the Scope of Practice for NPMs.

This learning module on fundamental principles of prescribing is being integrated as part of Pharmacology course.

The nurse practitioners in midwifery will be able to prescribe from a limited list of approved drugs as per the scope of practice while providing midwifery services in Midwife led Care Units (MLCUs). Restrictions may be set for the type of practitioners as per their qualification and registration as per INC standards and regulations. Nurse

practitioners in critical care will be able to follow protocol driven drug administration integrating collaborative and shared care with medical practitioners.

Standards of proficiency (Nursing & Midwifery Council - NMC, UK)

Nurse prescribers must have sufficient knowledge and competence to

1. Assess a patient's clinical condition
2. Undertake a thorough health history that includes medication history
3. Diagnose and decide on management of the presenting condition and whether or not to prescribe where necessary
4. Identify appropriate products if medication is required
5. Advise the patient on effects and risks
6. Prescribe if patient agrees and as per legal provision
7. Monitor response to medication and lifestyle advice

Scope:

The legal provision, policy, rules and regulations of INC and Government policy, codes of professional conduct and practice and standards of proficiency by INC will guide the prescriptive practice of nurses, nurse midwives, and practitioners.

Aims of nurse prescribing: The proposed prescriptive role of nurse practitioners

- Enables nurse practitioners to provide high clinical standards and meet the patients' needs
- Provides the prescribers with legal constraints around prescribing with sound principles and policies of prescribing
- Assists them in maintaining and improving their prescribing competencies
- Empowers nurse prescribers with personal accountability for the prescribed medication

Definition of terms

1. **Nurse practitioner:** Is one who has successfully completed the educational program prescribed by INC and is registered with the appropriate nursing council.
2. **Prescriptive rights:** The prescriptive rights bestowed on the nurse practitioner by way of regulation and standards set by GOI/INC alongside other related agencies of India for drug control.
3. **Independent prescribing:** Involves prescribing independently by the one who is responsible and accountable for patients that includes assessment of undiagnosed or diagnosed conditions and for decisions about the clinical management required including prescribing particularly by the primary care practitioner.
4. **Shared/collaborative prescribing:** Prescribing limited to protocols of specific clinical settings in consultation/collaboration with medical practitioners
5. **Administration of medicines:** The act of giving a medicine to a person, which may include some activity to prepare the medicine to be administered
6. **Competencies:** The knowledge, skill, and behaviors needed to adequately perform the function.
7. **Medicines:** Therapeutic goods that are represented to achieve, or are likely to achieve their principal intended action by pharmacological, chemical, immunological or metabolic means in or on the body of a human.

Schedule medicines (e.g. controlled drugs, prescription - only medicines, pharmacist - only medicines. Pharmacy - only medicines)

Unscheduled medicines such as OTC medicines such as medicines on open sale that do not require prescription (e.g. small packets of analgesics, and complementary medicines also called herbal, natural, and alternative medicines. Complementary medicines include products containing herbs, vitamins, minerals, nutritional supplements, homoeopathic medicines and bush and traditional medicines). Medicines are also known as 'medications'

8. **Prescribing:** An iterative process involving steps of information gathering, clinical decision making, communication and evaluation that results in the initiation, continuation or cessation of a medicine

9. **Nurse prescriber:** Nurse Practitioners authorized to undertake prescribing within the scope of their practice.
10. **Scope of practice:** The areas and extent of practice by NPs defined by a regulatory body after taking into consideration their training, experience, expertise and demonstrated competencies

Assignments/Self-directed reading (SDL):

1. Review of literature - International trends of non-medical prescribing particularly nurse prescribing
2. Prescriptive role of Nurse Practitioner in UK, USA, Australia, Singapore and Thailand

PART III: Professional, legal and ethical issues relevant to prescribing

A comprehensive understanding of professional, legal and ethical issues is a fundamental component of safe prescribing practice. Changes with regard to education and training, professional regulations and country's legislations related to drugs and prescribing, supply and administration of medicines influence the prescribing practice and the professional accountability.

Professional Issues

Professional regulatory bodies guide the nonmedical prescribing by setting regulations for practice. Regulators of nurse prescribers are required to set standards of education, training, conduct and performance and approve educational programs that prepare nurse practitioner to prescribe. The professional regulators are Indian Nursing Council and State Nursing Council.

Nurse practitioners must work within the boundaries of professional codes of conduct by INC with the intention of providing high quality standards of healthcare, safeguarding the public and promoting professional credibility. Additional qualification and training are required for prescribing. NPs must be able to assume personal accountability and responsibility. Safe prescription standards by regulatory body should guide the NPs in their decision-making and writing prescription.

Legal issues

Knowledge about India's legislation is essential for NPs in their practice. The law sets the standards of behavior and can be defined as a rule or body of rules. The Drugs and Cosmetics Act (1940) and Rules (1945) with latest amendments provides rules and regulations related to drugs, control, license, governance, and import. Regulatory councils/Commissions for Nursing, Medical and pharmacy are also regulators. Central Drugs Standard Control Organization (CDSCO) is a central drug authority for discharging functions assigned to central government under the Drugs and Cosmetics Act. CDSCO serves as a regulatory control over import of drugs, approval of new drugs and clinical trials, approval of licenses as central license approving authority and consists of a technical advisory board to advise on amendments to rules and regulations.

National Formulary of India, FDA and Acts of professional organizations guide prescribers in their safe and competent practice.

Ethical Issues

As prescribers, ethical dilemmas occur in their daily practice. They must draw combination of personal, group and philosophical ethics to assist in the decision- making. Ethical decisions must be guided by personal beliefs and values, professional code of conduct and the knowledge and analysis of ethical theories. The most essential ethical theories that guide decision-making are consequentialism, deontology and virtue ethics. Decisions made considering the consequences are guided by the theory of consequentialism. Deontologists follow fundamental rules and consider duty and obligation are central to their decisions. Virtue ethics that involve compassion, honesty, loyalty, kindness and benevolence guide the prescribers to prescribe safely and effectively. Ethical principles such as autonomy, beneficence, non-maleficence and justice should also guide ethical decision-making. Professional integrity is an important element to be integrated in making ethical decisions.

Nurse practitioners must work within their professional codes of conduct and reflect on professional responsibility and accountability. Legal knowledge is essential for safe practice. They must apply moral and ethical theories in making ethical decisions while prescribing for their patients.

Assignments/SDL:

1. Laws and regulations relevant to drugs, prescribing and governance by GoI and professional regulatory bodies
2. International trends on legislation related to non-medical prescribing

PART IV: Principles and process of prescribing

Prescribing is one of the main approaches to treating and preventing diseases. In India, only medical practitioners perform it. It is also extended to other health professionals to use the resources maximally and thus it is extended to nurses particularly nurse practitioners in developed countries along with other health professionals (Eg. pharmacists, podiatrists, physiotherapists) who are also permitted to prescribe within restricted scope and limited formulary. All medicines have the capacity to enhance health however they also have the potential to cause harm if used inappropriately. For these reasons, all prescribers should follow principles of good prescribing. Bad prescribing can lead to ineffective and unsafe treatment, exacerbation or prolongation of illness, distress and harm to the patient and higher costs. They can also make the prescriber vulnerable to influences which can cause irrational prescribing such as patient pressure, bad example of colleagues and high powered salesmanship.

British pharmacological society recommends the following ten principles of prescribing

1. Be clear about the reasons for prescribing
 - Establish an accurate diagnosis whenever possible (although this may often be difficult)
 - Be clear in what the patient is likely to gain from the prescribed medicines.
2. Take into account the patient's medication history before prescribing
 - Obtain an accurate list of current and recent medications (including over-the counter and alternative medicines), prior adverse drug reactions, and drug allergies from the patient, their carers, or colleagues
3. Take into account other factors that might alter the benefits and risks of treatment
 - Consider other individual factors that might influence the prescription (e.g. physiological changes with age and pregnancy, or impaired kidney, liver or heart function)
4. Take into account the patient's ideas, concerns, and expectations
 - Seek to form a partnership with the patient when selecting treatments, making sure that they understand and agree with the reasons for taking the medicine
5. Select effective, safe and cost effective medicines individualized for the patient
 - The likely beneficial effect of the medicine should outweigh the extent of any potential harms, and whenever possible this judgement should be based on published evidence
 - Prescribe medicines that are unlicensed, off-label or outside standard practice only if satisfied that an alternative medicine would not meet the patient's needs (this decision will be based on evidence and/or experience of their safety and efficacy)
 - Choose the best formulation, dose, frequency, route of administration, and duration of treatment
6. Adhere to national guidelines and local formularies where appropriate
 - Be aware of guidance produced by respected bodies (increasingly available via decision support systems), but always consider the individual needs of the patient
 - Select medicines with regard to costs and needs of other patients (health-care resources are finite)
 - Be able to identify, access, and use reliable and validate sources of information (e.g. National Formulary), and evaluate potentially less reliable information critically
7. Write unambiguous legal prescription using the correct documentation
 - Be aware of common factors that cause medication errors and know how to avoid them
8. Monitor the beneficial and adverse effects of medicines
 - Identify how the beneficial and adverse effects of treatment can be assessed
 - Understand how to alter the prescription as a result of this information
 - Know how to report adverse drug reactions
9. Communicate and document prescribing decisions and the reasons for them
 - Communicate clearly with patients, their carers, and colleagues
 - Give patients important information about how to take the medicine, what benefits might arise, adverse effects (especially those that will require urgent review), and any monitoring that is required
 - Use the health record and other means to document prescribing decisions accurately
10. Prescribe within the limitations of your knowledge, skill and experience
 - Always seek to keep the knowledge and skills that are relevant to your practice up to date
 - Be prepared to seek the advice and support of suitably qualified professional colleagues
 - Make sure that, where appropriate prescriptions are checked (e.g. calculations of intravenous doses)

Factors influencing prescribing

Prescribing is complex and every consultation is unique. To ensure safety and cost effective prescribing, the practitioners need to be aware of various factors that can influence prescribing. Adhering to principles of good prescribing is the first and foremost essential component that significantly influences prescribing practice. The other factors are discussed below. The major factors include prescriber related factors, patient related factors, product related factors and other professionals.

Prescriber related factors

The personal characteristics of the prescriber have a significant impact on the prescribing. Personal beliefs and values are important influences in selection of treatment and products. The confidence of the practitioner is enhanced by additional qualification, training, and experience. The practitioner's role change and responsibility can be influencing factors. Appropriate remuneration also positively influences their performance. Organizational resources, culture and support are other factors. Professional codes of conduct protect the practitioner and public. Government guidelines, INC standards and guidelines and legal provision in the act guide the practitioners to perform safe and effective prescribing.

Patient related factors

Consultation process is vital in making decisions for safe and effective prescribing. A structured approach to history taking with well-developed history-taking skills by the practitioners is required. Access to appropriate records indicating past health history and treatment history along with comprehensive history will provide sufficient information required to make decisions related to prescribing. A therapeutic relationship with the patient and communication is sure to enhance the success of prescribing. It is important to know the expectations of patients before generating the prescription. The practitioner needs to know the various options available before choosing the drug treatment. The patient's emotions, distress and anxiety can influence the prescribing consultation and their ability to convey accurate information or receive instructions and information about taking medication and observing for drug side effects. The patient is a consumer and practitioners should be vigilant to provide maximum patient safety by ensuring adequate knowledge about drugs, their side effects, potential drug interactions and adverse reactions. The skills of pharmaco-vigilance is highly important for practitioners. Patient's culture is another influencing factor. The awareness of the dynamics that result from cultural differences such as value preferences, perception of illness, health beliefs and communication style will help practitioners adapt treatment plans that meet the culturally unique needs.

Product related factors

The choice of the product, availability and access to formularies, external influences such as pharmaceutical companies and media are some of the major influencing factors. Every practitioner needs to ensure adequate knowledge about relevant national guidelines with evidence and local prescribing protocols. The choice of the product should be based on the formulary designed for nurse practitioner's use. Effectiveness and cost need to be considered first. National Formulary of India serves as a guideline for prescribers in India. Pharmaceutical companies are growing tremendously. The practitioners need to be aware of approved and licensed companies by the drug controlling authority of India. The advertisements and media about various products and companies also attempt to influence the prescribing decisions. Practitioners need to be aware of the fact and maintain healthy and professional relationship if required and utilize ethical principles and evidence base for making prescribing decisions.

Other professionals

Multidisciplinary team working and collaboration are emphasized greatly in healthcare. The success of prescribing by practitioners depends largely by cultivating sound and effective relationship with medical practitioners and hospital managers. The role of nurse practitioners in prescribing needs to be communicated to doctors and other healthcare professionals and is to be well understood. Communication and transfer of information are cornerstones for safe prescribing practice. The above-mentioned factors related to prescriber, patient, product and other professionals are discussed briefly as to how they influence the prescribing practice. The successful implementation of prescribing by nurse practitioners depends largely upon their knowledge about these factors. Identifying strategies to minimize potential negative influences can enhance the implementation and effectiveness of the prescribing practice by nurse practitioners.

Reading assignments

1. Ten Principles of Good Prescribing, British Pharmacological Society, retrieved from www.bps.ac.uk

PART V: Process of prescribing

The national formulary of India 2016 is a published updated document available in India. The formulary provides general advice to prescribers in India. The process and steps of prescribing are discussed in the WHO guide to good prescribing (1994) and this is followed by India that is reflected in the formulary.

Process of rational prescribing

This involves selection of a drug treatment using the stepwise approach that includes the following.

1. Define the patients problem carefully (diagnosis)
2. Specify the therapeutic objective
3. Choose a treatment of proven efficiency and safety from different alternatives (refer national formulary of Indian, WHO List of essential drugs)
4. Start the treatment by writing an accurate prescription
5. Providing the patient with clear information and instructions
6. Monitor the results of the treatment
7. Stop the treatment if the problem has been solved.
8. If not re-examine all the steps.

Box 1. The process of rational treatment

- Step 1. Define the patients problem**
- Step 2. Specify the therapeutic objective**
- Step 3. Select the therapeutic strategies**
- Step 4. Start the treatment and write the prescription**
- Step 5. Give information, instructions and warnings**
- Step 6. Monitor the treatment**

Step 1. Define the patient's problem

When defining the patient's problem, the knowledge of health assessment must be revised and skills are utilized. Whenever possible, making the right diagnosis is based on integrating many pieces of information such as the complaint as described by the patient, a detailed history, physical examination, laboratory tests, X-rays and other investigations. This helps in rational prescribing.

Step 2. Specify the therapeutic objective

After examining the holistic needs of the patient ask the following questions.

Is the diagnosis established?

Is information or advice sufficient?

Is there a need to prescribe?

What does the patient expect?

What is your objective for treating the patient? Define what you want to achieve from the drug. (e.g.) to suppress chronic dry cough to prevent heart attack in angina

The therapeutic objectives should be based on the pathophysiology underlying the clinical condition. More than one objective may be selected sometimes.

Step 3. Select the therapeutic strategies

Making a choice involves the following consideration

- Appropriate
- Effective
- Safe
- Cost
- Acceptable

Refer the following:

1. Nurse prescriber's formulary
2. National Formulary of India and national list of essential medicines
3. WHO list of essential drugs
4. Other relevant documents
5. Existing standard treatment protocols and guidelines

Select the strategy based on the knowledge of pathophysiology and the findings from history, examination, lab tests and other investigations. Medication or drug history and allergies are vital in the history that includes the following

- List of medications the patient is on with the repeat prescription of the medication
- Record from the history the name, dose, frequency and route of medication
- Prescribed or not
- Enquiry about OTC drugs (over the counter) or any other herbal preparations
- Any allergies reaction to medication, foods or environment factors and treatment given
- Recording of the above

History related to age, sex, hereditary factors, lifestyle factors, social and community networks living and working conditions, socio economic cultural and environmental conditions.

The selected strategy should be agreed with the patient that is known as concordance.

Non-pharmacological treatment:

Not all patients require a medicine for the treatment. Very often many health problems can be resolved by a change in lifestyle, diet, use of physiotherapy or exercise, and providing psychological support. These have the same effect as a drug and instructions must be written, explained and monitored in the same way.

Pharmacological treatment:

This involves selecting the correct group of drugs, selecting the medicine from the chosen group, and verifying the suitability of the chosen drug for each patient.

Knowledge about the pathophysiology of the clinical condition, pharmacokinetics and pharmacodynamics of the chosen drug are fundamental principles for rational therapeutics.

The selection process must consider the efficacy and safety of the drug.

For safety, the potential benefits of the treatment must always be balanced against known safety concerns.

How to avoid adverse drug reaction?

1. Use as few concurrent drugs as possible.
2. Use the lowest effective dose.
3. Check if patient is pregnant or breast feeding
4. Is the patient at extremes of life?
5. Do you know all the drugs that the patient is taking
6. Check for over the counter medicines
7. Drug allergies or previous reaction to medications

Make an inventory of effective groups of drugs. Once you have compared various treatment alternatives and considered the four criteria such as efficacy, safety, suitability and cost, choose the drug.

In selection of the drug, choose an active substance and a dosage form, choose a standard dosage schedule, and choose a standard duration of treatment

Advice to be given to patient first with an explanation of why it is important, use words that patient can understand and be brief.

Step 4. Start the treatment

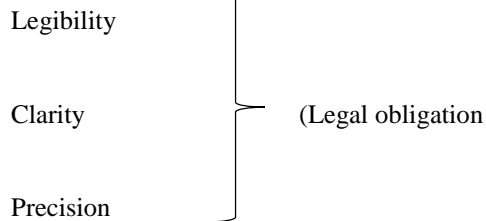
Prescribe the (treatment) drugs

Writing a prescription

A Prescription is an instruction from a prescriber to a pharmacist/dispenser. Prescriber is not always a doctor, it could be a nurse, medical assistant etc. The dispenser is not always the pharmacist it could be an assistant nurse. Every country has its own standards, laws and regulations as to who should prescribe, dispense and the required information in a prescription form, drugs that require prescription or not, special laws regarding narcotics etc.

Information on a prescription

Based on individual country's regulations.



Information

- Name & address of the prescriber with telephone no (if possible)
- Date of prescription
- Name (Generic Name) and strength of drug
- Dosage form (only use standard abbreviations) Tab paracetamol 500 mg (10 tablets) BDx5 days.
- Label: how much, how often, special instruction,
- Name, address, age of patient.
- Prescriber's initials signature, License no.

Step 5. Give Information, Instruction and warnings

50% of patients do not take prescribed drugs correctly take irregularly or not at all. The most common reasons are that the symptoms have stopped, side effects have occurred, or the drug is not perceived as effective, or the dosage schedule is complex to understand. Giving information, instruction and warnings is important to ensure patient compliance/adherence

Adherence to drug treatment can be improved if

- Drug is well chosen and prescribed
- A Good prescriber patient relationship is created
- Time is taken to give necessary information, instructions and warnings.

How to improve patient adherence to drug treatment

- Prescribe a well-chosen treatment
- Create a good doctor-patient relationship
- Take the time to give information, instruction and warnings

Other aids to improve adherence could be patient leaflets, pictorials, day calendar, drug passport and dosage box.

Information to include:

- Effects of the drug
- Side effects
- Instructions
- Warnings
- Future consultation
- Confirmation of understanding

Step 6. Monitor the treatment (Stop or continue)

Monitoring enables you to determine whether the treatment has been successful or additional action is required. This allows stopping or reformulating if necessary or continuation of treatment.

Passive monitoring (self-monitoring)

Active monitoring (Future appointment & consultation)

- Was the treatment effective?
- a. Yes, and disease cured/stop the treatment
 - b. Yes, but not yet completed - Any serious side effects
 - No: treatment can be continued
 - Yes: Reconsider dosage or drug choice
 - c. No, disease not cured - verify all steps:
 - Diagnosis correct
 - Therapeutic objective correct?
 - Drug prescribed correctly?
 - Effect monitored correctly?

Keep up to date about drugs

Knowledge is constantly changing. New drugs come to the market. Every prescriber is expected to know about the side effects and also developments in drug therapy.

Choosing sources of information

1. Make an inventory of available sources of information.
 - Reference books & Medical journals
 - Drug compendia - hand books for desk reference national formulary
 - National lists of essential drugs and treatment guidelines
 - Drug formularies
 - Drug bulletins, drug information centers
 - Verbal information
 - Drug industry sources of information
2. Choose between sources of information credible and accessible.

E.g. Medical journals, drug bulletins, pharmacology or clinical reference books, national formulary revisions
3. Effective reading- Read useful resources, clinical trials.

It is important to develop a strategy to maximize your access to key information you need for optimal benefit of the drugs you prescribe.

Assignments/Learning Activities - Case study discussion

Learning different steps of prescribing from case studies

Refer - The guide to good prescribing - Practice Manual, WHO, Geneva, 1994

PART VI: Prescribing Competencies

Every practitioner who prescribes must possess various competencies required by respective regulatory bodies.

The prescribing competency framework recommended by NPC consists of three domains:

National Prescribing Centre (NPC, NICE -UK), 2014

1. The consultation
2. Prescribing efficiency
3. Prescribing in context

I Domain - The consultation

Competencies

1. **Knowledge**
Has up-to-date clinical, pharmacological and pharmaceutical knowledge relevant to own area of practice.
2. **Options**
Makes or reviews a diagnosis, generates management options for the patient and follows up management.
3. **Shared Decision Making** (with parents, care-givers or advocates where appropriate)
Establishes a relationship based on trust and mutual respect. Recognizes patients in the consultation.

II Domain - Prescribing Effectively

Competencies

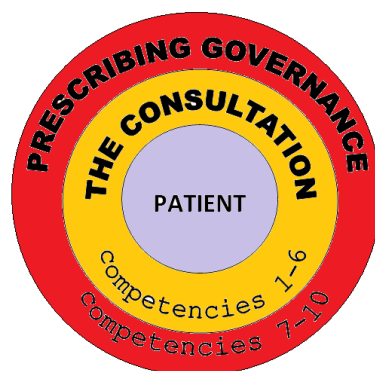
4. **Safe**
Is aware of own limitation. Does not compromise patient safely.
5. **Professional**
Ensures prescribing practice is consistent with scope of practice, organizational, professional and regulatory standards, guidance and codes of conduct.
6. **Always improving**
Actively participates in the review and development of prescribing practice to optimize patient outcomes.

III Domain - Prescribing in context

Competencies

7. **The health care system**
Understands and works within local and national policies, process and systems that impact on prescribing practice. Sees how own prescribing impacts on the wider healthcare community.
8. **Information**
Knows how to access relevant information. Can use and apply information in practice.
9. **Self and others**
Works in partnership with colleagues for the benefit of patients, is self-aware and confident in own ability as a prescriber.

Royal Pharmaceutical Society's (UK) Prescribing Competency Framework- Comprises of ten competencies within two domains.



THE CONSULTATION

1. Assess the patient
2. Consider the options
3. Reach a shared decision
4. Prescribe
5. Provide information
6. Monitor and review

PRESCRIBING GOVERNANCE

7. Prescribe safely
8. Prescribe professionally
9. Improve prescribing practice
10. Prescribe as part of a team

Reading assignments:

1. A Single Competency Framework for all prescribers NPC (National Prescribing Centre) (Provided by NICE), 2012
2. Royal Pharmaceutical Society, A Competency Framework for all prescribers (2016)

PART VII: Conclusion

Nurse prescribing is not a practice in India. With the introduction of Nurse practitioner program in Critical Care and midwifery, the need for granting prescriptive rights to NPs is being recognized. Legal provision for NPs to be involved in prescribing is being explored and INC is working towards developing regulations and legal provision along with MOH&FW. It is hoped that this will become a reality soon similar to the practice in UK, USA and Australia.

This learning and teaching module on Fundamentals of Prescribing is divided into 5 parts and can be offered to orient the students in prescribing practice, its principles and legislation required and the needed competencies for prescribers. Both theory and practical are planned with the assessment plan for the course module. This module will enhance the understanding of BSc nursing students on prescribing principles and assist them to develop the prescribing competency when called to use it as community health officer in Health and wellness centres/primary care settings.

References:

- Nuttal, D & Rutt- Howard, J (editors) (2011). The Text Book of Non- Medical Prescribing
- Royal Pharmaceutical Society, A Competency Framework for all prescribers (2016)
- Ten Principles of Good Prescribing, British Pharmacological Society, retrieved from www.bps.ac.uk
- A Single Competency Framework for all prescribers, National Prescribing Centre-NPC (Provided by NICE), 2012, NPC is part of NICE (National Institute for Health and Clinical Excellence, NICE) Ref. NICE (2012) A Single Competency Framework for all Prescribers NPC.
- Non- Medical Prescribing Policy, Surrey with Sussex (NHS) NMPSS- prescribing principles, 2004
- National Formulary of India, 2016
- Drug & Cosmetics Act, 1940 & 1945
- The guide to good prescribing, WHO, Geneva, 1994

(NB: Latest edition must be consulted as and when revised)

5. PALLIATIVE CARE (Adult Health Nursing II)

PLACEMENT: IV SEMESTER

Theory & Practical: 20 hours

Theory: 15 hours

Practical: 5 hours

Module Overview: This module is designed to help students to develop in-depth knowledge, competencies, and a positive approach in providing quality palliative care to persons suffering from chronic illnesses and resultant health problems in variety of settings, collaborating supportive services.

Competencies (Learning Outcomes): The student will be able to

1. Explain the concept and significance of palliative care.
2. Identify the need for palliative care.
3. Discuss the importance and techniques of effective communication in palliative care
4. Demonstrate skill in assessment, management and evaluation of pain and common symptoms
5. Provide optimum nursing care to relieve symptoms and promote comfort.
6. Demonstrate competency in performing nursing procedures related to palliative care
7. Assist the patient to experience maximum Quality of Life.
8. Support patient and family for home care and to cope with the terminal phase of illness
9. Observe ethical and legal principles binding palliative care.

Learning Activities:

- Lectures and demonstration
- Self-study/Reading assignments
- Written assignments
- Practice in Skill/Simulation Lab

Assessment Methods:

- Test paper (Objective type/short answer/situation type) - 20 marks
- Assignments - 10 marks
- OSCE (Health assessment & Symptom management competencies) - 20 marks

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

CONTENT OUTLINE T - Theory, P - Practical

Unit	Time (Hours)	Learning Outcome	Content	Teaching/Learning Activities	Assessment Methods
I	2	Explain the concept significance of palliative care. Identify the need for palliative care.	Palliative Care <ul style="list-style-type: none"> • Evolution, and History • Concept of palliative care • Significance • Components • Differences between conventional and palliative care approaches • Ethical aspects • Need for palliative care 	<ul style="list-style-type: none"> • Lecture cum discussion 	<ul style="list-style-type: none"> • MCQ • Short answers

Unit	Time (Hours)	Learning Outcome	Content	Teaching/Learning Activities	Assessment Methods
II	2	Discuss different aspects of effective communication. Describe how to deal with extremes of emotions	Communication Skills <ul style="list-style-type: none"> • Effective communication - needs and barriers • Non-verbal communication • Learning to communicate patients with advanced and progressive diseases • Communicating bad news • Managing collusion • Managing anger and denial 	<ul style="list-style-type: none"> • Review • Discussion • Simulation • Case Scenario 	<ul style="list-style-type: none"> • MCQ • Short answers • Role play
III	8 (T) 2 (P)	Demonstrate skill in assessment, management and evaluation of pain and other common symptoms Apply non-pharmacological and pharmacological Nursing interventions for pain relief. Render optimum nursing care to relieve symptoms and to promote comfort. Prepare the patient and caregiver for continued care.	Nursing Management of Symptoms <ul style="list-style-type: none"> • Holistic approach in symptom assessment and management, • Pain - concept, assessment and evaluation of pain, pathophysiology of chronic pain, • WHO ladder for pain management, Morphine –steps in calculating dose for oral morphine, management of opioid overdose and side effects, • Nursing interventions for management of pain • Management of dyspnoea, Nausea and vomiting, Constipation, Diarrhoea • Nutrition and Hydration • Fatigue and Powerlessness • Anxiety, Social isolation • Spiritual distress • Impaired physical mobility • Self-care deficit • Delirium • Caregiver role strain 	<ul style="list-style-type: none"> • Review • Discussions • Demonstration 	<ul style="list-style-type: none"> • Case study • Written assignment • Essay
IV	1 (T) 3 (P)	Demonstrate competency in performing nursing procedures related to palliative care.	Nursing Procedures <ul style="list-style-type: none"> • Wound care • Colostomy care • Subcutaneous injection • Oral hygiene • Naso-gastric tube management • Tracheotomy care • Assisting in thoracocentesis • Assisting in indwelling ascitic catheter placement • Lymphoedema management • Bladder care 	<ul style="list-style-type: none"> • Review and discussions • Simulation 	<ul style="list-style-type: none"> • OSCE
V	2 (T)	Discuss measures to improve Quality of Life. Explain care in the terminal phase, loss and grieving process.	Optimization of care <ul style="list-style-type: none"> • Quality of Life • Essential care • Anticipatory prescription • Dying with dignity • Care during the terminal phase • Ethics based decision making 	<ul style="list-style-type: none"> • Review and discussion • Case scenario • Observation visit to a palliative care facility 	<ul style="list-style-type: none"> • Short answers • Observation Visit Report

Unit	Time (Hours)	Learning Outcome	Content	Teaching/Learning Activities	Assessment Methods
		Observe ethical and legal principles applied to palliative care.	<ul style="list-style-type: none"> • Death and dying, end of life • Support to the care giver and family 		

References:

- Rajagopal, M. R. (2015). An Indian Primer of Palliative care for medical students and doctors. Kerala: Trivandrum Institute of palliative science publication.
- Palliative care module prepared by WHO CC of Trivandrum and Calicut (Latest version to be used as and when available)

6. FACILITY BASED NEWBORN CARE (FBNBC) AND ESSENTIAL NEWBORN CARE (ENBC) (Child Health Nursing I)

PLACEMENT: V SEMESTER

THEORY & SKILL LAB: 18 hours

Theory: 10 Hours

Skill Lab: 8 hours

MODULE OVERVIEW: This course is designed to help students to demonstrate the cognitive and psychomotor skills necessary for ensuring healthy survival of neonates.

COMPETENCIES (Learning outcomes): The student will be able to

1. Describe evidence based routine care of newborn baby at birth and everyday care of the newborn baby
2. Enlist the factors which contribute to heat loss in newborn
3. Demonstrate methods to keep the baby warm after birth and at home
4. Discuss Kangaroo mother care and develop skill in assisting for Kangaroo Mother Care
5. Recognize different methods to feed normal and low birth weight babies
6. Demonstrate skill in assisting the mother for breastfeeding the newborn baby
7. Identify and manage at-risk and sick neonates
8. Perform resuscitation of newborn baby and provide aftercare
9. Demonstrate skill in using and maintaining neonatal equipment, doing common procedures, emergency triaging and preparing common medications
10. Enumerate key points in prevention of infection in hospitals and waste disposal

CONTENT OUTLINE T - Theory, L - Lab/Skill lab

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
1	1 (T) 1 (L)	Describe evidence based routine care of newborn baby at birth and everyday care of the newborn baby	Evidence based care of newborn <ul style="list-style-type: none"> • Basic needs of a normal baby at birth • Immediate care of the normal newborn at the time of birth • Monitoring the baby in the first hour after birth • Care of the baby in special situations • Postnatal care of normal baby 	<ul style="list-style-type: none"> • Lecture • Discussion 	<ul style="list-style-type: none"> • Questioning • Tests
2	1 (T) 1(L)	Enlist the factors which contribute to heat loss in newborn Demonstrate methods to keep the baby warm after birth and at home	Temperature regulation in newborn <ul style="list-style-type: none"> • Handicaps of newborn in temperature regulation • Warm chain • Assessment of temperature and management of hypothermia • Hyperthermia 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • OSCE
3	1 (T) 1 (L)	Discuss Kangaroo mother care and develop skill in assisting for	Kangaroo mother care <ul style="list-style-type: none"> • KMC - Components and benefits • Requirements and eligibility 	<ul style="list-style-type: none"> • Discussion 	<ul style="list-style-type: none"> • OSCE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
		Kangaroo Mother Care	<ul style="list-style-type: none"> • Procedure 		
4	1 (T) 1 (L)	<p>Recognize different methods to feed normal and low birth weight babies</p> <p>Demonstrate skill in assisting the mother for breastfeeding the newborn baby</p>	<p>Feeding the newborn</p> <ul style="list-style-type: none"> • Breast feeding • Feeding of low birth weight and sick newborns 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Tests • Questioning • OSCE
5	2 (T) 1 (L)	Identify and manage at-risk and sick neonates	<p>Care of sick neonates</p> <ul style="list-style-type: none"> • Care of at-risk neonates • Care of sick neonates 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Tests • Questioning
6	1 (T) 2 (L)	Perform resuscitation of newborn baby and provide aftercare	<p>Newborn Resuscitation</p> <ul style="list-style-type: none"> • Preparation for resuscitation • Assessing the need for resuscitation • Steps of resuscitation • Follow up care after successful resuscitation 	<ul style="list-style-type: none"> • Demonstration and return demonstration 	<ul style="list-style-type: none"> • Questioning • OSCE
7	2 (T) 1 (L)	Demonstrate skill in using and maintaining neonatal equipments, doing common procedures, preparing Common medications and emergency triaging	<p>Common nursing procedures</p> <ul style="list-style-type: none"> • Use and maintenance of neonatal equipments • Common procedures done in newborn • Preparation of common medications • Emergency triage assessment and treatment 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Tests • Questioning • OSCE
8	1 (T)	Enumerate key points in prevention of infection in hospitals and waste disposal	<p>Infection prevention and control</p> <ul style="list-style-type: none"> • Principles of asepsis and universal precautions • Handwashing • Skin preparation for venipuncture and other procedures • Surveillance • Safe disposal of hospital waste 		<ul style="list-style-type: none"> • Tests • Questioning • OSCE

CLINICAL: 25 hours

Clinical Practice Competencies: On completion of the course, the students will be able to:

1. Demonstrate immediate care of a newborn at the time of birth
2. Demonstrate methods to keep the baby warm after birth and at home
3. Encourage Kangaroo mother care
4. Recognize and practice different methods to feed normal and low birth weight babies
5. Identify and manage at-risk and sick neonates
6. Perform resuscitation of newborn baby and provide aftercare
7. Demonstrate skill in using and maintaining neonatal equipment, doing common procedures, emergency triaging and preparing common medications

8. Practice key points in prevention of infection in hospitals and waste disposal

Learning Resources: (Latest version must be consulted as and when revised)

National guidelines-MOH&FW

7. IMNCI (Child Health Nursing I)

PLACEMENT: IV SEMESTER

THEORY: 10 hours

SKILL LAB: 5 hours

CLINICAL: 25 hours

DESCRIPTION: This course is designed to help students to develop knowledge and competencies required for assessment, diagnosis, treatment, nursing care of infants and children with various diseases using guidelines as per IMNCI in the hospital and home settings.

COMPETENCIES (Learning outcomes): The student will be able to

1. Trace the history and developments in the field of integrated management of child health and child health nursing
2. Apply the concepts of IMNCI in providing care to the pediatric clients and their families
3. Identify effective management of young infants up to 2 months
4. Demonstrate skill in case management of young infants up to 2 months
5. Recognize effective management of children age 2 months to 5 years
6. Demonstrate skill in case management of children age 2 months to 5 years
7. Demonstrate skill in treatment procedures and referral of sick children
8. Demonstrate skill in counseling of the care takers

CONTENT OUTLINE T - Theory, L - Lab/Skill Lab

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
1	2 (T)	Trace the history and developments in the field of integrated management of child health and child health nursing	IMNCI - Introduction <ul style="list-style-type: none"> • Background and Objectives • Components and principles • Rationale for an integrated evidence based syndromic approach to case management 	<ul style="list-style-type: none"> • Lecture • Discussion 	<ul style="list-style-type: none"> • Written assignment • Tests
2	2 (T) 1 (L)	Apply the concepts of IMNCI in providing care to the pediatric clients and their families	Steps of case management process <ul style="list-style-type: none"> • Assess the young infant/child • Classify the illness • Identify treatment • Treat the young infant/ child • Counsel the mother • Provide follow up care 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • OSCE
3	2 (T) 1 (L)	Identify effective management of young infants up to 2 months Demonstrate skill in case management of young infants up to 2 months	Assessment of sick young infants <ul style="list-style-type: none"> • History taking • Checking for possible bacterial infection/ jaundice • Diarrhea • Feeding problem/ malnutrition • Immunization status • Other problems 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • OSCE
4	2 (T) 1 (L)	Recognize effective management of	Assessment of sick children <ul style="list-style-type: none"> • History taking • Checking for general danger signs 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • OSCE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		children age 2 months to 5 years Demonstrate skill in case management of children age 2 months to 5 years	<ul style="list-style-type: none"> • Checking main symptoms • Checking for malnutrition • Checking for anaemia • Assessment of feeding • Checking immunization • Assessing other problems 		
5	2 (L)	Demonstrate skill in treatment procedures and referral of sick children	Treatment procedures <ul style="list-style-type: none"> • Identify treatment • Inpatient and outpatient treatment • Home management • Referral 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • OSCE
6	2 (T)	Demonstrate skill in counseling of parents and care takers	Parental counseling <ul style="list-style-type: none"> • Advice regarding feeding and fluid intake, and solving of feeding problems • Administration of oral drugs • Advise when to return 	<ul style="list-style-type: none"> • Discussion • Role play 	<ul style="list-style-type: none"> • OSCE

Clinical: 25 hours

Practice Competencies: On completion of the course, the students will be able to:

1. Demonstrate skill in case management of young infants up to 2 months
2. Demonstrate skill in case management of children age 2 months to 5 years
3. Demonstrate skill in treatment procedures and referral of sick children
4. Demonstrate skill in counseling of the care takers and follow up care

Learning Resources: (Latest version must be consulted as and when revised)

National guidelines-MOH&FW

8. PLS (Child Health Nursing I)

PLACEMENT: V SEMESTER

Theory: 3 hours

Skill Lab: 4 Hours

Clinical: 10 Hours

COMPETENCIES (Learning outcomes): The student will be able to

1. Recognize early signs of critical illness in children
2. Identify early signs of cardiopulmonary arrest
3. Demonstrate the use of the various airway and oxygen adjuncts and methods for optimum ventilation & airway control.
4. Differentiate between respiratory distress and failure
5. Intervene respiratory distress and failure at the earliest
6. State the indications & dosages of medications used in cardiopulmonary arrest and the effects on the cardiovascular system.
7. Demonstrate skill in CPR
8. Provide Post-cardiac arrest management

CONTENT OUTLINE T - Theory, L - Lab/Skill lab

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
1	2 (T)	Recognize early signs of critical illness in children Identify early signs of cardiopulmonary arrest	Identification of critical illness in children <ul style="list-style-type: none"> • Early signs of critical illness in children • Early signs of cardiopulmonary arrest • Assessment of appearance based on AVPU scale 	<ul style="list-style-type: none"> • Lecture • Discussion 	<ul style="list-style-type: none"> • Questioning • Tests
2	1 (T)	Differentiate between respiratory distress and failure	<ul style="list-style-type: none"> • Respiratory distress • Respiratory failure 	<ul style="list-style-type: none"> • Discussion 	<ul style="list-style-type: none"> • OSCE
3	1 (L)	Intervene respiratory distress and failure at the earliest	<ul style="list-style-type: none"> • Prompt Interventions for Respiratory distress and Respiratory failure 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • OSCE
4	1 (L)	State the indications & dosages of medications used in cardiopulmonary arrest and the effects on the cardiovascular system	Medications used in cardiopulmonary arrest <ul style="list-style-type: none"> • Indications & dosages of medications used in cardiopulmonary arrest and the effects on the cardiovascular system 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • OSCE
5	1 (L)	Demonstrate skill in CPR	CPR <ul style="list-style-type: none"> • Steps in carrying out Child CPR 	<ul style="list-style-type: none"> • Demonstration and return demonstration 	<ul style="list-style-type: none"> • OSCE
6	1 (L)	Provide Post-cardiac arrest management	Post-cardiac arrest management	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • OSCE

Clinical Practice Competencies: 10 hours

On completion of the course, the students will be able to:

1. Recognize early signs of critical illness in children
2. Demonstrate the use of the various airway and oxygen adjuncts and methods for optimum ventilation & airway control.
3. Differentiate between respiratory distress and failure
4. Intervene respiratory distress and failure at the earliest
5. State the indications & dosages of medications used in cardiopulmonary arrest and the effects on the cardiovascular system.
6. Demonstrate skill in CPR
7. Provide Post-cardiac arrest management

LEARNING ACTIVITIES: Specified in the above table.

ASSESSMENT METHODS:

- Test paper (Objective type/short answers) - 20 marks
- Assignments - 10 marks
- OSCE - 20 marks

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

Learning Resources: (Latest version must be consulted as and when revised)

1. National guidelines - MOH&FW
2. AHA guidelines

9. SBA & SAFE DELIVERY APP (Midwifery/Obstetrics & Gynecology Nursing I&II)

PLACEMENT: VI & VII SEMESTER

Theory, skill lab and clinical hours are integrated in MIDWIFERY/OBS & GYNEC I & II Courses.

Module Overview:

SBA module is prepared by MOH&FW, GoI and can be used in MIDWIFERY/OBS & GYNEC I & II Courses. **Safe delivery app** is available in INC website prepared by Maternity Foundation of India and INC

Competencies (Learning Outcomes): The student will be able to

1. Demonstrate knowledge and competencies to provide respectful maternity care to woman during antenatal, intranatal and postnatal periods in hospitals and community settings.
2. Provide safe and competent care to normal neonate and neonate with complications.
3. Identify complications in women during antenatal, intranatal, and postnatal periods.

Learning Activities:

- Lectures and Demonstration
- Self-study/Reading assignments
- Written assignments
- Practice in Skill/Simulation Lab

Assessment Methods:

SBA module

- Test paper - 20 marks
- Assignments - 10 marks
- OSCE - 20 marks

Safe Delivery App

Completion of Safe delivery app as champion.

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

Learning Resources:

1. **SBA-A handbook for ANM, LHV & Staff nurses (2010)**, MoH&FW document
2. **Dakshata (2015) national guidelines**
3. **SAFE DELIVERY APP**
(Maternity foundation of India and INC)

NB.

- Completion of both Modules is mandatory before the end of VII Semester.
- Latest Versions of National Guidelines must be consulted.

II. ELECTIVE MODULES

BSc Nursing Program

(Modular content outline)

LIST OF ELECTIVE MODULES

III & IV Semesters: *To complete any one elective by end of 4th semester across 1st to 4th semesters*

1. Human values
2. Diabetes care
3. Soft skills

V & VI Semesters: *To complete any one of the following before end of 6th semester*

4. CBT
5. Personality development
6. Addiction psychiatry
7. Adolescent health
8. Sports health
9. Accreditation and practice standards
10. Developmental psychology
11. Menopausal health
12. Health Economics

VII & VIII Semesters: *To complete any one of the following before end of 8th semester*

13. Scientific writing skills
14. Lactation management
15. Sexuality & Health
16. Stress management
17. Job readiness and employability in health care setting

Number of electives to be completed: 3 (Every module = 1 credit = 20 hours)

1. HUMAN VALUES

PLACEMENT: III & IV SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students to develop knowledge and attitude towards inculcating human values.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

10. Understand the concept and importance of human values.
11. Analyze the impact of human values in family, society and profession.
12. Apply human values in education and clinical practice.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	4	Explain the concept of human values, nature and types	Introduction <ul style="list-style-type: none"> • Introduction to human values - Definition and nature of human values • Types of human values - Different categorization • Instrumental and extrinsic values • Personal and professional values • Examples of human values - cooperation, honesty, caring, compassion, love, respect, sharing, loyalty, appreciation, integrity, discipline, justice, solidarity, civility, non-violence 	<ul style="list-style-type: none"> • Lecture cum discussion • Discuss some of the human values having universal relevance • Value clarification exercise • Role play 	<ul style="list-style-type: none"> • Quiz
II	4	Understand the significance of human values and in nursing Identify the difference between human, ethical and moral values	Importance of human values <ul style="list-style-type: none"> • Need and importance of human values • Functions of values • Reflection on individual values • Human values, ethical values and moral values - differences and similarities 	<ul style="list-style-type: none"> • Reflective exercises and report • Sharing in groups • Discuss lessons from the lives and teachings of great leaders, reformers and administrators 	<ul style="list-style-type: none"> • Evaluation of reflective report/group work report
III	2	Explore the role of human values in family and society	Role of human values in family and society <ul style="list-style-type: none"> • Family values • Social standards • Influence of family and society 	<ul style="list-style-type: none"> • Lecture cum discussion 	<ul style="list-style-type: none"> • Short answers
IV	4	Discuss the role of educational institutions in inculcating human values	Role of education and human values <ul style="list-style-type: none"> • Teachers as role model • Development of accountability, appreciation and helping nature • Discipline as a human value • Value education strategies 	<ul style="list-style-type: none"> • Lecture cum discussion • Case scenario and discussion 	<ul style="list-style-type: none"> • MCQ • Short answers

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
V	4	Explain the core values at workplace and apply in clinical settings	Professional Values <ul style="list-style-type: none"> Professional values - examples Professional values and Value development in nursing Core values at workplace, application in clinical settings and implications 	<ul style="list-style-type: none"> Case scenario and discussion Application in clinical practice - Reflection 	<ul style="list-style-type: none"> Evaluation of assignment
VI	2	Explain the influence of culture on values	Values and cross cultural influence <ul style="list-style-type: none"> Cultural values Universal application Universal declaration of human values and human rights 	<ul style="list-style-type: none"> Lecture cum discussion Case scenario and discussion 	<ul style="list-style-type: none"> Short answers

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

2. DIABETES CARE

PLACEMENT: III & IV SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students to develop knowledge, skill and attitude regarding Diabetes and care.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Understand the concept of NCDs and relevant national programs.
2. Review the pathophysiology and clinical diagnostic criteria for diabetes.
3. Analyze the diabetes treatment options such as medication, diet, exercise and life style modifications.
4. Apply the principles and demonstrate self-management skills to achieve diabetes control .
5. Identify onset of complications and provide means of seeking appropriate and timely help.
6. Demonstrate understanding of recent updates in diabetes.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2	Explain the concept of NCDs and national NCD programs	Introduction <ul style="list-style-type: none"> • Introduction to Diabetes as Non communicable disease burden - global & national - Review • Diabetes risk factors, preventive measures & risk reduction measures • Role of nurse in national programs relevant to Diabetes prevention, control and care 	<ul style="list-style-type: none"> • Lecture cum discussion • Directed reading and assignments 	<ul style="list-style-type: none"> • Quiz
II	4	Recall and discuss the pathophysiology of Diabetes, its clinical characteristics and diagnostic criteria	Pathophysiology and diagnosis of Diabetes <ul style="list-style-type: none"> • Review - structure & functions involved in key organs relating to diabetes (pancreas, liver, muscle, adipose tissue & kidney) • Relationship between blood glucose and insulin • Prediabetes condition • Types of Diabetes - Type I & II • Screening • Symptoms • Diagnostic Criteria 	<ul style="list-style-type: none"> • Review • Case scenario and discussion • Sharing in groups 	<ul style="list-style-type: none"> • Evaluation of group work report
III	4	Discuss the available treatment options	Diabetes treatment options <ul style="list-style-type: none"> • <i>Life style modifications</i> • <i>Diet therapy</i> • <i>Exercise</i> • <i>Medical therapy</i> <ul style="list-style-type: none"> ○ Oral antidiabetic agents used to treat diabetes ○ types, actions, side effects and contraindications 	<ul style="list-style-type: none"> • Drug study • Written assignments 	<ul style="list-style-type: none"> • Quiz • Test paper • Evaluation of written assignments

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			<ul style="list-style-type: none"> ○ Combination treatment regimen ○ Medication considerations in elderly ○ Insulin therapy - Types, regimen, preparation and administration ○ Recent advances in medication therapy 		
IV	3	Identify complications and provide timely support in management of complications	<p>Complications of diabetes <i>Diagnosis and management of</i></p> <ul style="list-style-type: none"> • Hypoglycemia • Hyperglycemia • Diabetic ketoacidosis • Macrovascular complications • Diabetic retinopathy • Diabetic nephropathy • Neuropathy • Gestational diabetes in pregnancy 	<ul style="list-style-type: none"> • Lecture cum discussion • Case study 	<ul style="list-style-type: none"> • Short answers • Essay • Case study reports
V	5	Identify the challenges of living with diabetes Achieve effective self-management skills	<p>Self-Management</p> <ul style="list-style-type: none"> • Challenges of living with diabetes • Role of self-care in diabetes management • Effective self-management skills to attain and maintain diabetes control • Monitoring blood glucose levels -methods to monitor diabetes control and analysis of blood glucose patterns <p>Nutrition therapy</p> <ul style="list-style-type: none"> • Nutritional needs of patients with diabetes • Nutritional assessment • Determination of body mass index (BMI), waist-to-hip ratio • Meal planning methods • Problems associated with diet therapy <p>Physical activity</p> <ul style="list-style-type: none"> • Role of exercise in diabetes management • Components of exercise prescription • Exercise needs assessment • Types of exercises • Benefits of yoga for people with diabetes • Strategies to prevent hypoglycemia during or after exercise <p>Medication therapy</p>	<ul style="list-style-type: none"> • Lecture cum discussion • Demonstration • Practice • Meal planning • Role play 	<ul style="list-style-type: none"> • Short answers • OSCE • Assessment of meal plan

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			<ul style="list-style-type: none"> • Understanding action, side effects and contraindications • Insulin therapy - preparation and administration • Role of diabetes educator in education and counseling <p>Complication identification and seeking appropriate help</p>		
VI	2	<p>Update the knowledge on diabetes, its management and care</p> <p>Discuss the role of diabetes educator</p> <p>Identify the role of complementary therapies</p>	<p>Recent updates in diabetes</p> <ul style="list-style-type: none"> • Oral health and diabetes • Managing diabetes during disasters • Recent update on treatment and care modalities <ul style="list-style-type: none"> • Role of diabetes educator in diabetes care, education, counseling and management • Complementary therapies 	<ul style="list-style-type: none"> • Lecture cum discussion • Directed reading 	<ul style="list-style-type: none"> • MCQ • Short answers

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Meal planning) - 10 marks

LEARNING RESOURCES:

- Facilitator manual for training nursing staff on “**Prevention and Management of Non-Communicable Diseases**” developed by People to People Health Foundation (PPHF), 2019

3. SOFT SKILLS

PLACEMENT: III & IV SEMESTER

TOTAL HOURS: 1 Credit (20 hours)

DDESCRIPTION: This module is designed to improve the soft skills of the students and covers important skills required for personal and professional lives such as etiquette, presentation, time management, motivation, decision making and team work.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Identify & perform personal, professional & Social Etiquette
2. Illustrate Telephone Etiquette
3. Learn & apply Presentation skills.
4. Be empowered in Public Speaking
5. Practice appropriate time management and use planning tools
6. Incorporate Motivational skills in practice
7. Develop Decision making skills
8. Demonstrate Teamwork in workplace

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	4	Identify & perform personal, professional & Social Etiquette	<p>Personal Etiquette:</p> <ul style="list-style-type: none"> • Grooming and personal hygiene • Body language-Postures & facial expressions • Punctuality and respectfulness • Manners <p>Professional Etiquette:</p> <ul style="list-style-type: none"> • Meeting etiquette • Workplace etiquette • communication etiquette-Oral & written <p>Social Etiquette:</p> <ul style="list-style-type: none"> • What is Social Etiquette? • Why are social skills important? • Types of social skills • Conversational skills - Greetings, listening, interacting • Common courtesies - Thank you, No thank you, Excuse me, May I • Social skill defects <p>Other types:</p> <ul style="list-style-type: none"> • Classroom etiquette-respectful and punctual, use of cell phone, engagement in the class • Virtual classroom etiquette • Social media etiquette 	<ul style="list-style-type: none"> • Demonstration • return demonstration 	<ul style="list-style-type: none"> • Feedback from faculty and co-students

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
II	2	Illustrate Telephone Etiquette	Telephone etiquette: <ul style="list-style-type: none"> • Introduce yourself first • Clarity of speech • Active listening and take notes • Use appropriate language • Remain cheerful 	<ul style="list-style-type: none"> • Demonstration return Demonstration 	<ul style="list-style-type: none"> • Anonymous Assessment
III	3	Learn & apply Presentation skills.	Presentation Skills: <ul style="list-style-type: none"> • Introduction • Types of Presentation Skills • Structure • Importance of Presentation skills • Making a Presentation • Delivering a Presentation 	<ul style="list-style-type: none"> • Lecture with discussion 	<ul style="list-style-type: none"> • Sample presentations
IV	2	Empowered in Public Speaking	Public Speaking: <ul style="list-style-type: none"> • Elements of Public Speaking • Types of Public Speaking • How do you begin a speech • How do you make your speech good • Factors of Public Speaking 	<ul style="list-style-type: none"> • Lecture & Demonstration return Demonstration 	<ul style="list-style-type: none"> • Health talk
V	2	Practice appropriate time management and use planning tools	Time management: <ul style="list-style-type: none"> • Know how to spend time • Set priorities • Using a Planning Tool • Getting Organised/Schedule time appropriately 	<ul style="list-style-type: none"> • Roleplay 	<ul style="list-style-type: none"> • Adherence to Timeline
VI	2	Incorporate Motivational skills in practice	Motivational skills: <ul style="list-style-type: none"> • Forming and Changing Habit • Gratitude • Positivity • Mindfulness 	<ul style="list-style-type: none"> • Lecture with discussion 	<ul style="list-style-type: none"> • 360 degree Feedback
VII	2	Develop Decision making skills	Decision making skills: <ul style="list-style-type: none"> • What is Decision making skills • The 5 Decision making skills • Styles of Decision making • How to develop decision making 	<ul style="list-style-type: none"> • Role play 	<ul style="list-style-type: none"> • Critical thinking Competencies
VIII	2	Demonstrate Teamwork in workplace	Team work: <ul style="list-style-type: none"> • Differentiate team/teamwork • Examples of team work skills • Working with different teams • Build a team in your workplace environment 	<ul style="list-style-type: none"> • Lecture with discussion 	<ul style="list-style-type: none"> • Feedback from colleagues

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Time management/presentation/etiquette) - 10 marks

4. COGNITIVE BEHAVIOURAL THERAPY (CBT)

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students acquire comprehensive knowledge regarding the basics of Cognitive Behavioural Therapy and develop an insight into behaviour of self and others. Further it is aimed at helping them to practice the principles of CBT for promoting Mental Health in Nursing Practice.

LEARNING OUTCOMES:

On completion of the module, the student will be able to:

1. Explain the concept and techniques of CBT
2. Use techniques to develop a therapeutic alliance based on CBT
3. Discuss cognitive conceptualization-automatic thoughts and alternative explanations based on cognitive model
4. Describe strategies to identify and respond to cognitions including dysfunctional cognitions
5. Formulate thought records and action plans

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	6	Explain the concept and techniques of CBT Use techniques to develop a therapeutic alliance based on CBT	Concepts and Techniques of CBT <ul style="list-style-type: none"> • Concept - Definition • Techniques and applications of CBT • Factors influencing effective delivery of CBT • CBT Model • The therapeutic relationship and setting goals with clients 	<ul style="list-style-type: none"> • Lecture and Discussion • Role play • Demonstration 	<ul style="list-style-type: none"> • Skills check: Mastery demonstration of establishing a therapeutic relationship with the client in CBT and setting goals
II	4	Discuss cognitive conceptualization - automatic thoughts and alternative explanations based on cognitive model	The Cognitive Model <ul style="list-style-type: none"> • Three levels of thoughts • Automatic thoughts - development and tracking • Designing and implementing experiments to test automatic thoughts • Biofeedback in CBT 	<ul style="list-style-type: none"> • Lecture cum discussion • Assignment on automatic thoughts and its testing 	<ul style="list-style-type: none"> • Evaluation of assignment
III	5	Describe strategies to identify and respond to cognitions including dysfunctional cognitions	Identifying, Evaluating and Responding to Cognitions <ul style="list-style-type: none"> • Socratic questioning - Technique of questioning • Behaviour experiments - Relaxation, mindfulness, distraction techniques, graded task assignments, task scheduling etc. 	<ul style="list-style-type: none"> • Lecture cum discussion • Role play • Assignment on identifying and responding to dysfunctional cognitions 	<ul style="list-style-type: none"> • Evaluation of assignment
IV	5	Formulate thought records and action plans	Designing Effective Action Plans and Thought Records <ul style="list-style-type: none"> • Thought records components • Action plan components • Identifying underlying and new core beliefs and assumptions • Facilitating completion of the action plan and reviewing the action plan at the next session 	<ul style="list-style-type: none"> • Lecture cum discussion • Role play 	<ul style="list-style-type: none"> • Skills check: Formulate thought records and action plans and prepare worksheets

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Establishment of therapeutic relationship with client on CBT/Formulating thought records or action plans) - 10 marks

LEARNING RESOURCES:

1. Greenberger D, Padesky CA. Mind over Mood: Change How You Feel By Changing the Way You Think. The Guilford Press; 2016
2. Beck JS, Beck AT. Cognitive Therapy: Basics and Beyond. Guilford Publications; 2011

Websites:

- <http://focus.psychiatryonline.org/cgi/content/full/4/2/173>
- http://www.learncognitivetherapy.com/cognitive_therapy.htm

NB:

- Brief notes on the content is attached below.

CORSE CONTENT (Brief notes below)

UNIT I (6 Hours): CONCEPTS AND TECHNIQUES OF CBT

Concept: CBT is based on the concept that mental disorders are associated with characteristic alterations in cognitive and behavioral functioning and that this pathology can be modified with pragmatic problem-focused techniques, interaction of thoughts, feelings and behaviour.

Techniques and Applications of CBT

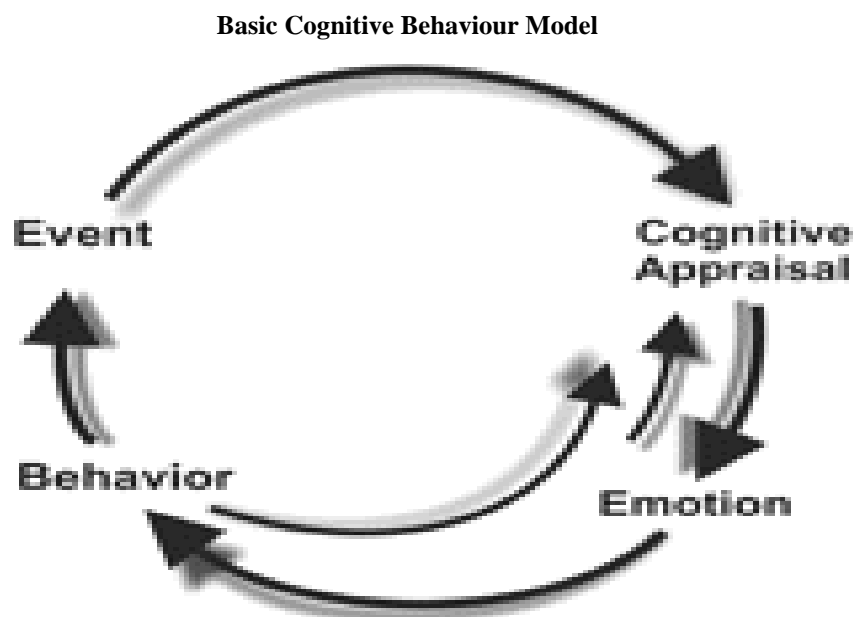
CBT is a cognitive technique and behavioural technique.

Application – wide applications: Psychiatric (Depression, Anxiety etc.) and non-psychiatric (sleep, fatigue, pain etc.)

Factors influencing effective delivery of CBT

Collaboration, formulation, homework etc.

The CBT model



Source: From Wright JH, Basco MR, Thase ME: Learning Cognitive-Behavior Therapy: An Illustrated Guide. Washington, DC, American Psychiatric Publishing, 2006, p 5

The therapeutic relationship and setting goals with clients

- Assessment, person education, goal setting, practice of strategies, homework
- Collaborative therapy relationship

Skills check: Mastery demonstration of establishing a therapeutic relationship with the client in CBT and setting goals (Role play)

UNIT II (4 Hours): THE COGNITIVE MODEL

Three levels of thoughts: automatic thoughts, underlying assumptions and schemas

Understanding interplay between levels of thought and moods, behaviour, physical functions and practice

Automatic thoughts - development and tracking

- Moment to moment unplanned thoughts
- Explain and clarify identification of automatic thoughts with examples from thought records/worksheets

E.g: questions that include

- a. What was going through your mind before you started to feel this way? Any other thoughts? Images?
- b. Circle hot thought

Designing and implementing experiments to test automatic thoughts

- Using scale or rating for automatic thoughts

Biofeedback in CBT

- Role and significance of Biofeedback in CBT

Skills Check: Assignment on automatic thoughts and its testing

UNIT III (5 Hours): IDENTIFYING, EVALUATING, AND RESPONDING TO COGNITIONS

- Gathering evidence that supports and do not support the hot thoughts
- Actively search for information that contradicts the hot thoughts
- Writing all evidence for supporting that hot thoughts are not 100% true
- Identifying alternative or balanced thinking

Socratic questioning

- Technique of questioning

Behaviour experiments

Relaxation, mindfulness, distraction techniques, graded task assignments, task scheduling etc.

Skills check: Assignment on identifying and responding to dysfunctional cognitions

UNIT IV (5 Hours): DESIGNING EFFECTIVE ACTION PLANS AND THOUGHT RECORDS

Thought records components: situation, moods, automatic thoughts, evidence that supports hot thought, evidence that does not support hot thoughts, alternative or balanced thoughts, rate moods now

Action plan components: Goal, action plan, time to begin, possible problems, strategies to overcome problems, progress

Identifying a problem in life that a person would like to change and writing an action plan

Identifying underlying and new core beliefs and assumptions

- Identify core beliefs by looking for themes in thought record
- Test by looking for evidence
- Strengthen new core beliefs by recording experiences that are consistent, and rate the confidence

Facilitating completion of the action plan and reviewing the action plan at the next session

- Motivating the clients to complete the plans

Skills check: Assignment on Formulate thought records and action plans

5. PERSONALITY DEVELOPMENT

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students acquire an in-depth knowledge in factors influencing personality development, theories of personality development, personality traits, and personality disorders and further acquire skill in knowing one's own personality, understand others in their surroundings and bring positive change in life.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Describe how personality develops
2. Define various stages of personality development
3. Describe basic personality traits and personality types
4. Analyze how personality affects career choices
5. Describe methods for changing personality
6. Enumerate personality disorders
7. Demonstrate skills in identifying personality disorders
8. Utilize knowledge in knowing self and others and improve relationship with others
9. Provide care to patients with personality disorders by emphasizing on respecting individual culture and spiritual needs

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2	Describe how personality develops Explain factors contributing to personality development	Introduction to personality development <ul style="list-style-type: none"> • Definitions • Components of personality • Importance of personality in achieving goals and success in life • Factors influencing personality development <ul style="list-style-type: none"> ○ Biological factors ○ Environmental factors • Nature vs Nurture concept in personality development 	<ul style="list-style-type: none"> • Lecture and Discussion method • Guest lecture 	<ul style="list-style-type: none"> • Test paper • Quiz
II	5	Enumerate stages of personality development from infancy to late adulthood Explain various theories of personality development	Stages and theories of personality development <ul style="list-style-type: none"> • Development of personality from infancy to late adulthood • Theories of personality development <ul style="list-style-type: none"> ○ Psychoanalytic theory ○ Psychosocial theory ○ Trait and type theories of personality ○ Humanistic approaches to personality ○ Learning theories of personality 	<ul style="list-style-type: none"> • Lecture and Discussion method 	<ul style="list-style-type: none"> • Test paper
III	3	List various types of personalities	Assessment of personality <ul style="list-style-type: none"> • Types of personalities 	<ul style="list-style-type: none"> • Lecture and Discussion method 	<ul style="list-style-type: none"> • Visit report • Written exam

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		Describe effects of illness on personality change Describe various personality assessments	<ul style="list-style-type: none"> • Personality changes due to illness • Personality assessment 	<ul style="list-style-type: none"> • Visit to clinical psychology department • Guest lecture 	<ul style="list-style-type: none"> • Case discussion
IV	5	Discuss personality and career success Explain various methods of changing personality traits Explain nursing implications of personality	Personality and career success <ul style="list-style-type: none"> • Role of personality and career success • Methods of changing personality traits <ul style="list-style-type: none"> ○ Personal growth and self-efficacy • Personality characteristics required for a nurse • Nursing implications of personality 	<ul style="list-style-type: none"> • Lecture and Discussion method 	<ul style="list-style-type: none"> • Written exam
V	5	Explain various personality disorders	Personality disorders <ul style="list-style-type: none"> • Definition • Types • Signs and symptoms • Medical management • Nursing management • Psycho-social therapies 	<ul style="list-style-type: none"> • Lecture and Discussion method 	<ul style="list-style-type: none"> • Perform assessment of personality disorder patient and write assessment report

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

6. ADDICTION PSYCHIATRY

PLACEMENT: V & VI SEMESTER

THEORY & CLINICAL: 1 Credit (20 hours)

THEORY: 06 hours

CLINICAL: 14 hours

DESCRIPTION: This module is designed to help students to develop knowledge and competencies required for assessment, diagnosis, treatment and nursing management of individuals with various disorders related to addiction.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Describe the Terminologies such as Substance Use Disorders, addictive behaviours, addiction etc
2. Describe the classification of Psychoactive Substances
3. Describe various etiological factors of substance related disorders
4. Identify the psycho social issues of the individuals with substance use disorders.
5. Identify treatment related adverse effects and emergencies and manage them effectively
6. Demonstrate skill in managing patients with substance use disorders.
7. Apply nursing process in caring for patients with substance related disorders.
8. Utilize available support to rehabilitate needy individuals.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	6 (T) 14 (P)	Explain and demonstrate skill in assessment of individuals with substance use disorders Explain and demonstrate skill in management and nursing management of individuals with substance use disorders	Substance use disorders, assessment and management <ul style="list-style-type: none"> • Terminologies: Substance related Disorders, addictive behaviour, intoxication, tolerance, withdrawal etc. • Classification of Psychoactive Substances • Factors associated with substance related disorders • Psychosocial problems associated with substance use • Treatment Modalities for Substance - Related Disorders – Multi-Disciplinary Team Approach • Treatment related adverse effects and emergencies • Introduction to technology addiction and its management • Nursing Management of patients with substance use disorders • Rehabilitation issues 	<ul style="list-style-type: none"> • Lecture cum discussion • Counseling Techniques • Disease model of addiction - Assignment • 2 day posting/visit to a de-addiction centre 	<ul style="list-style-type: none"> • Perform assessment of individuals in in-patient or out-patient and write assessment report • Assessment of assignment • Performing health education at schools, colleges and other selected working areas - evaluation of education

CLINICAL: 14 hours

Clinical Practice Competencies:

On completion of the module, the student will be able to:

1. Assess individuals with substance use disorders
2. Identify risk factors of an individual and plan measures of management and relapse prevention
3. Inform, teach, and guide patients and their families

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Assessment of individuals with substance use disorders/health education) - 10 marks

7. ADOLESCENT HEALTH

PLACEMENT: V & VI SEMESTER

THEORY & PRACTICAL: 1 Credit (20 hours)

THEORY: 10 hours

LAB: 2 hours

CLINICAL: 8 hours

DESCRIPTION: This module is designed to help students to develop knowledge about developmental changes during adolescence and special psychosocial, reproductive and sexual health issues, needs and challenges of adolescents and competencies required for promoting their development and handling their health issues

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Describe the normal growth and development during adolescence
2. Assess the physical, reproductive and sexual changes during adolescence
3. Promoting the development of life skills among adolescents
4. Identify the developmental needs of adolescents
5. Demonstrate skills in Identifying the developmental and Psychosocial issues and challenges during adolescence
6. Discuss the nutritional requirements of adolescents, food habits and food fads prevalent in the adolescents
7. Demonstrate skills in communicating with adolescents
8. Develop competency in providing the Guidance and Counselling to adolescents
9. Identify, and manage common health problems among adolescents including Adjustment & conduct disorders, mental disorders, eating disorders, substance use disorders
10. Describe the reproductive and sexual health issues of adolescents including Sexual harassment, early marriage, teenage pregnancy, unsafe abortion and contraception, sexually transmitted disorders, HIV/AIDS

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2 (T) 2 (CL)	Describe the normal growth and development during adolescence Assess the physical, reproductive and sexual changes during adolescence Promoting the development of life skills among adolescents	Growth and development of of adolescents <ul style="list-style-type: none"> • Review of Principles of Growth and Development • Assessment of Growth and Development of Adolescents, including physical, reproductive and sexual changes • Promoting Growth and Development of Adolescents • Development of life skills among adolescents 	<ul style="list-style-type: none"> • Discussion & Demonstration • Visit to the School or Family with Adolescent 	<ul style="list-style-type: none"> • Perform assessment of Adolescent in School or Family and write assessment report
II	1 (T) 1 (Lab)	Discuss the nutritional requirements of adolescents, food habits and food	Nutritional needs of adolescents <ul style="list-style-type: none"> • Nutritional requirements of adolescents Food habits and food fads prevalent in the adolescent	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Plan a One day Menu for an adolescent •

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		fads prevalent in the adolescents			
III	2 (T) 2 (CL)	Identify the developmental needs of adolescents Demonstrate skills in identifying the developmental and psychosocial issues and challenges during adolescence	Developmental needs of Adolescents <ul style="list-style-type: none"> • Developmental needs of Adolescents • Developmental issues during Adolescence • Psychosocial issues during Adolescence • Challenges during Adolescence • Guiding Parents on meeting the developmental needs of Adolescents and handling their issues and Challenges 	<ul style="list-style-type: none"> • Discussion • Demonstration • Visit to the Family with Adolescent 	<ul style="list-style-type: none"> • Visit report
IV	1 (T) 1 (Lab) 2 (CL)	Demonstrate skills in communicating with adolescents Develop competency in providing the Guidance and Counselling to adolescents	Communication, guidance and counseling <ul style="list-style-type: none"> • Communicating with adolescents • Guidance and Counselling • Role of Parents 	<ul style="list-style-type: none"> • Discussion • Demonstration • Role Play 	<ul style="list-style-type: none"> • Assessment of role play
V	2 (T) 2 (CL)	Identify, and manage common health problems among adolescents including adjustment & conduct disorders, mental disorders, eating disorders, and substance use disorders	Common health problems including mental health problems <ul style="list-style-type: none"> • Common health problems among adolescents • Adjustment & conduct disorders • Mental disorders • Eating disorders • Substance use disorders 	<ul style="list-style-type: none"> • Lecture cum discussion • Visit to the Adolescent Clinic 	<ul style="list-style-type: none"> • Visit report
VI	2 (T)	Describe the reproductive and sexual health issues of adolescents including Sexual harassment, early marriage, teenage pregnancy, unsafe abortion and contraception, sexually transmitted	Reproductive and sexual health issues <ul style="list-style-type: none"> • Reproductive and sexual health issues during adolescence • Sexual harassment, early marriage, teenage pregnancy, unsafe abortion and contraception • Sexually transmitted disorders, HIV/AIDS 	<ul style="list-style-type: none"> • Lecture cum discussion 	<ul style="list-style-type: none"> • Short answers

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		disorders, HIV/AIDS			

CLINICAL: 8 hours

Clinical Practice Competencies:

On completion of the module, the students will be able to:

1. Assesses the growth and development of adolescent
2. Assess the physical, reproductive and sexual changes during adolescence
3. Promote the development of life skills among adolescents
4. Identify and guide the parents to meet the developmental needs of adolescents
5. Demonstrate skills in communicating with adolescents
6. Identify the developmental and Psychosocial issues and challenges during adolescence
7. Identify the nutritional requirements of adolescents, food habits and food fads prevalent in the adolescents
8. Demonstrate skills in providing the Guidance and Counselling to adolescents
9. Identify, and manage common health problems among adolescents
10. Identify selected reproductive and sexual health issues of adolescents

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Assessment of adolescent/One day menu planning for adolescent) - 10 marks

8. SPORTS HEALTH

PLACEMENT: V & VI SEMESTER

THEORY & PRACTICAL: 1 Credit (20 hours)

THEORY: 15 hours

PRACTICAL: 5 hours

DESCRIPTION: This Elective module is designed to enable students to gain knowledge about Sports Health, and role of Nursing in Sports Health, training, and management of sports injuries.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Demonstrate understanding of sports health.
2. Should be able to assess the severity of injury, recognize life threatening condition provide emergency care and initiate emergency procedures if any to avoid delay in care.
3. Participate effectively as a member of sports health team.
4. Understanding the importance of conditioning and sports injuries Rehabilitation.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	15 (T)	Demonstrate understanding of sports health and Fitness pre-requisite for sports. Assess the severity of injury, recognize life threatening condition provide emergency care and initiate emergency procedures if any to avoid delay in care. Participate effectively as a member of sports health team. Understanding the importance of conditioning and sports injuries Rehabilitation.	<ol style="list-style-type: none"> 1. Definition and scope of Sports Health and Physical Fitness 2. Pre-Participation exam for sports 3. On-field & Off-field evaluation of athlete 4. The Emergency Medical services System 5. Physiological Principle of strength Training/Conditioning, Deconditioning 6. Exercises and Environmental concern (Heat/Temperature Regulation, Acclimatization) 7. Common sports injuries & musculoskeletal assessment. 8. Therapeutic/Rehabilitation modalities overview. 9. On field management of sports injuries: Cryotherapy, sports taping etc. 10. Protective Equipment: protective wrapping, protective eye wear, Helmets, face mask. 11. Energy demands of Sports. 12. Nutritional supplements, 13. Ergogenic aids (Performance enhancing agents) and Doping. 	<ul style="list-style-type: none"> • Guest lectures • Reading assignment by providing resources • Written assignment 	<ul style="list-style-type: none"> • Short answers • Objective test • Viva voce
II	5 (P)	To assess the sports injury and provide emergency care		<ul style="list-style-type: none"> • Field work 	<ul style="list-style-type: none"> • Evaluation of written field work

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

9. ACCREDITATION AND PRACTICE STANDARDS

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students to develop an understanding of quality assurance mechanism, the accreditation process and the accreditation and practice standards in nursing.

LEARNING OUTOMES:

On completion of the module, the student will be able to

1. Describe the Quality assurance mechanism in nursing
2. Explain the process of accreditation
3. Describe the accreditation standards for nursing institutions
4. Explain about the nursing practice standards and their rationale

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	5	Describe the Quality assurance mechanism in nursing	Quality assurance in Nursing <ul style="list-style-type: none"> • Review the current trends and practices of quality assurance in nursing • Definition and significance of quality assurance • Process of quality assurance • Components of quality assurance model • Methods of quality assurance evaluation • Quality assurance models of nursing in India • Roles and responsibilities of National and state nursing professional and regulatory bodies in quality assurance 	<ul style="list-style-type: none"> • Lecture cum discussion 	<ul style="list-style-type: none"> • MCQ • Short answers • Essay
II	5	Explain the process of accreditation	Accreditation <ul style="list-style-type: none"> • Definition of accreditation • The concepts of accreditation • Objectives of accreditation • Significance of accreditation • Types of accreditation • Accreditation process • Criteria for accreditations/Principal areas to be assessed • National and International accreditation agencies (education and health care organizations) ISO, UGC, NAAC, QCI, IIEEA, JCI, NABH etc. 	<ul style="list-style-type: none"> • Lecture cum discussion 	<ul style="list-style-type: none"> • MCQ • Short answers • Essay
III	5	Describe the accreditation standards for nursing institutions	Accreditation Standards for nursing institutions <ul style="list-style-type: none"> • Definition of standards 	<ul style="list-style-type: none"> • Lecture cum discussion 	<ul style="list-style-type: none"> • MCQ • Short answers • Essay

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			<ul style="list-style-type: none"> • Indian Nursing Council (INC) Standards - college/school and hospital/health facility • Standards for Quality Improvement in nursing: Standards Based Management and Recognition (SBM-R) approach • INC's Performance standards for various nursing institutions • International Council of Nurses (ICN) global standards for education and accreditation • International Confederation of Midwives (ICM) standards for professional Midwifery Education • WHO standards for educators 		
IV	5	Explain about the nursing practice standards and their rationale	<p>Nursing Practice standards</p> <ul style="list-style-type: none"> • Code of ethics and professional conduct for nurses in India • ICN - Code of ethics • Definition of practice standards • National and international standards for nursing practice <ul style="list-style-type: none"> ○ INC standards for practice ○ National Nursing Commission Bill (Indian Nursing and Midwifery Council ACT (proposed) ○ ICM standards for professional Midwifery Practice ○ ICN global standards for practice • International nursing excellence - Magnet Recognition program, JCI standards • India - NABH nursing excellence standards 	<ul style="list-style-type: none"> • Lecture cum discussion • Visit to NAAC or NABH accredited nursing institutions and health care facility 	<ul style="list-style-type: none"> • MCQ • Short answers • Essay • Visit report

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

LEARNING RESOURCES:

- UGC guidelines
- NACC guidelines
- NABH manual
- JCI manual
- INC, ICN, ICM & WHO websites - For education and practice standards

10.DEVELOPMENTAL PSYCHOLOGY

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: The module is designed to assist the students to acquire knowledge regarding the various dimensions of development and special concerns related to various age groups and to develop an insight into the problems of various age groups. Further it is aimed at helping the students to recognise the deviated behaviours of various age groups and apply the principles and strategies of mental hygiene for the promotion of mental health and prevention, diagnosis and management of mental illness

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Explain the theories related to the development of an individual
2. Describe prenatal development and special concerns related to the prenatal development
3. Explain the dimensions of development and special concerns related to infancy
4. Explain the dimensions of development and special concerns related to early childhood
5. Discuss the characteristics, dimensions of development and special concerns related to adolescence
6. Explain the characteristics, dimensions of development and special concerns related to adulthood
7. Describe the dimensions of development and special concerns related to elderly

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2	Describe growth and development	Introduction <ul style="list-style-type: none"> • Definition - Growth and development • Definition - Developmental psychology • Difference between growth and development • Dimensions of growth and development • Stages of development • Principles of development • Characteristics of development • Factors influencing the growth and development • Scope of developmental psychology 	<ul style="list-style-type: none"> • Review • Lecture cum discussion 	<ul style="list-style-type: none"> • Long Essay • Short Essay
II	2	Explain the theories related to the development of an individual	Theories related to development <ul style="list-style-type: none"> • Sigmund Freud Psychosexual development • Erik Erikson Psychosocial development • Piaget theory of cognitive development • Kohlberg's theory of moral development 	<ul style="list-style-type: none"> • Lecture cum discussion 	<ul style="list-style-type: none"> • Long Essay • Short Essay
III	3	Describe prenatal development and special concerns related to the prenatal development	Prenatal development <ul style="list-style-type: none"> • Term: Prenatal development • Stages of prenatal development • Principles of hereditary and twins mechanism 	<ul style="list-style-type: none"> • Lecture cum discussion 	<ul style="list-style-type: none"> • Long Essay • Short Essay

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			<ul style="list-style-type: none"> • Factors affecting the prenatal development • Process of labour • Complications during labour that affects the transition period • Postnatal period • Complications in postnatal period that affects the transition period • Measures to reduce the risk during prenatal development, process of labour and postnatal period • Genetic counselling • Rooming in or KMC 		
IV	2	Explain the dimensions of development and special concerns related to infancy	<p>Infancy</p> <ul style="list-style-type: none"> • Definition - Newborn and infancy • Normal characteristics of infancy • <i>Dimensions of growth and development in infancy:</i> <ul style="list-style-type: none"> ○ Physical, physiological and motor development ○ Cognitive development or intellectual development ○ Emotional development ○ Social development ○ Moral or character development ○ Language development • Special concerns in infancy • Remedial measures: Prevention and management • Newborn care and its significance • Breastfeeding and weaning and its significance • Parenthood • Low birth weight and its developmental consequences • Early infant stimulating programme 	<ul style="list-style-type: none"> • Lecture cum discussion • Symposium 	<ul style="list-style-type: none"> • Long Essay • Short Essay
V	2	Explain the dimensions of development and special concerns related to early childhood	<p>Early childhood</p> <ul style="list-style-type: none"> • Definition - Toddler and preschooler • Normal characteristics of toddler and preschooler • <i>Dimensions of growth and development in toddler and preschooler:</i> <ul style="list-style-type: none"> ○ Physical and motor development ○ Cognitive development or intellectual development ○ Emotional development ○ Social development ○ Moral or character development ○ Language development • Special concerns in toddler and preschooler • Remedial measure: Prevention and management 	<ul style="list-style-type: none"> • Lecture cum discussion • Panel discussion 	<ul style="list-style-type: none"> • Long Essay • Short Essay

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			<ul style="list-style-type: none"> • Lower order basic needs according to Maslow and its significance • Parent child bonding and its significance • Toilet training and its significance 		
VI	2	Explain the characteristics, dimensions of development and special concerns related to middle and late adulthood	<p>Middle and late childhood</p> <ul style="list-style-type: none"> • Definition - School going children • Normal characteristics of School going children • <i>Dimensions of growth and development in middle and late childhood:</i> <ul style="list-style-type: none"> ○ Physical and motor development ○ Cognitive development or intellectual development ○ Emotional development ○ Social development ○ Language development ○ Moral or character development • Special concerns in school going children • Remedial measure: Prevention and management • Role of discipline in moral development • Role of play in the process of development • Effect of parental employment in the process of development • Effect of mass media in the process of development • Role of peer group in the process of development • Role of behavioural technique in the process of development • Parenting style and its significance • School based mental health programme and services • Teacher student relationship and its significance 	<ul style="list-style-type: none"> • Lecture cum discussion • Role play 	<ul style="list-style-type: none"> • Long Essay • Short Essay
VII	3	Discuss the characteristics, dimensions of development and special concerns related to adolescence	<p>Adolescence</p> <ul style="list-style-type: none"> • Definition - Adolescence and puberty • <i>Review:</i> <ul style="list-style-type: none"> ○ Physiological and hormonal changes ○ Sexual maturation: primary and secondary characteristics ○ Psychological impact of puberty • Need for understanding the adolescence • Normal characteristics of adolescence • Misunderstanding about adolescence 	<ul style="list-style-type: none"> • Lecture cum discussion • Debate 	<ul style="list-style-type: none"> • Long Essay • Short Essay

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			<ul style="list-style-type: none"> • Adjustment and adolescence • <i>Dimensions of development in adolescence:</i> <ul style="list-style-type: none"> ○ Cognitive development or intellectual and mental development ○ Personality development ○ Emotional development ○ Social development ○ Moral development • Special concerns in adolescence • Remedial measure: Prevention and management • Role of peer group or gang in the process of development • Role of parent, family and its relationship in the process of development 		
VIII	2	Explain the characteristics, dimensions of development and special concerns related to adulthood	Adulthood <ul style="list-style-type: none"> • Definition - Early adulthood and middle adulthood • Physical changes in adulthood • Cognitive changes in adulthood • Personality development in adulthood • Emotional development in adulthood • Social development in adulthood • Unique issues in adulthood: career, marriage, parenthood • Special concerns in adulthood • Remedial measure: Prevention and management 	<ul style="list-style-type: none"> • Lecture cum discussion • Panel discussion 	<ul style="list-style-type: none"> • Short Essay
IX	2	Describe the dimensions of development and special concerns related to elderly	Elderly <ul style="list-style-type: none"> • Definition - Geriatric, Elderly • Theories of elderly • Physiological changes in elderly • Psychosocial changes in elderly • Special concerns in elderly • Remedial measure: Prevention and management • Terminal illness and elderly • Death and dying: Grief, palliative and hospice care 	<ul style="list-style-type: none"> • Lecture cum discussion • Panel discussion • Case study • Visit to the old age home 	<ul style="list-style-type: none"> • Essay • Short answers • Evaluation of Visit report/case study report

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

11.MENOPAUSAL HEALTH

PLACEMENT: V &VI SEMESTER

THEORY & CLINICAL: 1 credit (20 hours)

THEORY: 10 hours

CLINICAL: 10 hours

DESCRIPTION: The module is designed to develop in-depth knowledge and understanding in menopausal health. It further helps the students to develop competency in providing quality care to the menopausal women and her families.

LEARNING OUTCOMES: On completion of the module, the student will be able to

1. Understand the concept of menopausal health in women.
2. Review and analyze the anatomy and physiology of menopause.
3. Develop competencies in providing quality care to these women.
4. Educate women and families about the problems faced by them.
5. Discuss the importance of hormone replacement therapy.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	1 (T)	Understand the concept and types of menopause	Introduction <ul style="list-style-type: none"> • Definition - menopausal health • Concept and types of menopause 	<ul style="list-style-type: none"> • Lecture 	<ul style="list-style-type: none"> • Objective test
II	2 (T)	Analyze the endocrinal changes during menopause	Role of hormones in menopause <ul style="list-style-type: none"> • Effect of hormones such as estrogen, androgen • Progesterone and gonadotrophin 	<ul style="list-style-type: none"> • Lecture 	<ul style="list-style-type: none"> • Short answers • Objective test
III	2 (T)	Describe Organ changes	Organ changes during menopause <ul style="list-style-type: none"> • Changes in the organs • Ovaries fallopian tubes, uterus, vagina, breast, bladder and urethra • Loss of muscle tone 	<ul style="list-style-type: none"> • Lecture • Written assignment 	<ul style="list-style-type: none"> • Short answers
IV	2 (T) 4 (CL)	Assess women to identify menopausal signs and symptoms	Assessment of menopausal women <ul style="list-style-type: none"> • History and physical examination • Diagnostic tests • Documentation 	<ul style="list-style-type: none"> • Lecture • Assessment of women 	<ul style="list-style-type: none"> • Short answers • Evaluation of assessment
V	3 (T) 6 (CL)	Describe management	Management of menopause <ul style="list-style-type: none"> • Identification of menopause • Management of the symptoms • Education and counseling of women and families • Hormone replacement therapy 	<ul style="list-style-type: none"> • Lecture cum discussion • Case presentation 	<ul style="list-style-type: none"> • Short answers • Evaluation of Case report

CLINICAL: 10 hours

Clinical Practice Competencies:

On completion of the course, the students will be able to

1. Counsel the women and her families
2. Understand the endocrinology of menopause
3. Perform the assessment and diagnose the women and plan proper nursing care
4. Educate the women about self care
5. Prepare the women for hormone replacement therapy

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

12. HEALTH ECONOMICS

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students to understand the basic concept of economics, health economics, the relationship between health and economic development, demand and supply, concept of cost and financing systems of health care services in India. This will enable them to appreciate financial aspects of health care services.

LEARNING OUTCOMES: On completion of the module, the student will be able to

1. Explain the meaning of economics and health economics.
2. Analyse the relationship between health and economic development.
3. Explain the concept of demand and supply.
4. Describe the structure of health care industry and characteristics of market for health care services.
5. Analyze the concept of cost in health care.
6. Discuss financing system of health care services in India.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2	Understand the meaning and purpose of Economics and Health Economics	Introduction to Economics <ul style="list-style-type: none"> • Definition and meaning • Dimensions of economics Micro and Macro-economics • Positive and Normative economics 	<ul style="list-style-type: none"> • Lecture cum discussion 	<ul style="list-style-type: none"> • MCQ • Short answers
II	4	Explain the basic concepts, focus and areas of health economics Discuss the Implications of economic development to the health care services Describe the factors that contribute to health problems in India and their solution	Introduction to Health Economics <ul style="list-style-type: none"> • Concept of health economics • Scope of Health economics • Focus of health economics • Areas of health economics • The economics of health and health care service, health and economic development. • Implications of economic development to the health care services • Mechanism and sources of health financing in the country. • Causes of health problems in India. • Solutions to health problems 	<ul style="list-style-type: none"> • Lecture cum discussion • Case study 	<ul style="list-style-type: none"> • MCQ • Short answers • Essay
III	4	Explain the concept and types of cost Describe Cost benefit analysis and Cost-effectiveness analysis in health care	Cost of Health Care <ul style="list-style-type: none"> • Concept of cost, types of costs • Opportunity cost, total fixed and variable cost, average marginal and sunk cost • cost benefit analysis and cost effectiveness analysis 	<ul style="list-style-type: none"> • Lecture cum discussion • Case study 	<ul style="list-style-type: none"> • Short answers

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
IV	4	Understand the basic concept of financial management Explain the characteristics of health care industry	Demand and Supply in Health Care <ul style="list-style-type: none"> • Concept of demand, need, supply, input, output, production function, industry and market • Structure of health care industry • Characteristics of health care services market • Demand side and supply side • Factors affecting demand • Factors influencing demand for medical care • Factors affecting supply 	<ul style="list-style-type: none"> • Lecture cum discussion • Assignment on Demand for medical care 	<ul style="list-style-type: none"> • MCQ • Evaluation of Assignment
V	6	Describe the sources of financing of health care services Discuss various health insurance schemes Explain the role of state and central government on financing of health care services.	Financing of Health Care in India <ul style="list-style-type: none"> • Financing system and allocation • Sources of financing of health care services • Health plans and outlays, the relative role of state and central government on financing of health care services • Factors influencing the state's ability to finance health care services • Role of voluntary organizations in health care • Public Private Partnership in providing services in health care 	<ul style="list-style-type: none"> • Lecture cum discussion • Assignment - role of voluntary organizations in health care 	<ul style="list-style-type: none"> • Short answers • Evaluation of assignment

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

13.SCIENTIFIC WRITING SKILLS

PLACEMENT: VII & VIII SEMESTER

Credit & Hours: 1 Credit (20 hours)

THEORY: 12 hours

PRACTICAL/LAB: 8 hours

DESCRIPTION: This module is designed to provide the students with the necessary knowledge base to succeed in publishing scientific papers in indexed national/international journals or to prepare a grant application.

LEARNING OUTCOMES: On completion of this module, the student will be able to

1. Get inspiration and motivation to write effectively, concisely and clearly.
2. Understand the process and basics of scientific writing and publishing.
3. Equip them with skills to cite and manage references.
4. Write scientific manuscript for publication in indexed national/international journals.
5. Apply the principles in grant writing.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2 (T)	Get motivated to write	Basics of good writing <ul style="list-style-type: none"> • What makes good writing - choice of words, components of sentences and sentence structure, using tenses • Clarity, brevity and fitness - punctuation, paragraphs, logic and organization • Motivation for writing 	<ul style="list-style-type: none"> • Discussion • Review of news article 	<ul style="list-style-type: none"> • Quiz
II	2 (T) 2 (L)	Explain the basics and principles writing a scientific manuscript Develop skills to cite and manage references	Basics of writing a scientific manuscript <ul style="list-style-type: none"> • Definition and types • Characteristics - clear, simple and impartial • Reading scientific literature • <i>General Principles:</i> <ul style="list-style-type: none"> ○ Ask right questions ○ Avoid jargon where possible ○ Focus on your reader ○ Don't show off ○ Create a compelling opening paragraph ○ Be confident ○ Learn how to KISS (Keep it short and simple) ○ Get active - Use the active voice rather than the passive one. ○ Check for errors ○ Use a style guide - writing style, referencing style ○ Tools for reference management 	<ul style="list-style-type: none"> • Lecture cum discussion • Reading scientific literature-Exercise 	<ul style="list-style-type: none"> • Quiz • Test paper
III	2 (T)	Develop skills in preparing conference	Writing for conferences and publications <ul style="list-style-type: none"> • <i>Conferences</i> 	<ul style="list-style-type: none"> • Discussion 	<ul style="list-style-type: none"> • Test paper

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		materials and presentation skills. Describe the publishing process and ethics	<ul style="list-style-type: none"> ○ Developing conference materials: abstracts, posters and oral presentation. ○ Conference presentation skills ● <i>Publications:</i> <ul style="list-style-type: none"> ○ Phases for writing-planning, writing and publishing phase ○ Reporting guidelines - CONSORT, STROBE etc ○ Journals - choosing the right type of journal ○ Publication ethics ○ Author's responsibility ○ Editorial process ○ Plagiarism check tools 	<ul style="list-style-type: none"> ● Preparation of a conference paper/poster ● Guided reading ● Written assignment - reporting guidelines 	<ul style="list-style-type: none"> ● Assessment of the written assignment
I	4 (T) 4 (L)	Develop skills in writing a research paper	Writing a research paper <ul style="list-style-type: none"> ● General principles ● Writing an Abstract ● IMRAD format - <ul style="list-style-type: none"> ○ Introduction ○ Methods ○ Results ○ And ○ Discussion 	<ul style="list-style-type: none"> ● Lecture cum discussion/ Workshop on writing ● Exercise on writing an abstract ● Exercise on writing an effective discussion ● Writing exercise for preparation of research paper for publication 	<ul style="list-style-type: none"> ● Evaluation of the prepared research manuscript for publication
IV	2 (T) 2 (L)	Develop beginning skills of preparing a grant proposal with basic understanding	Overview of grant writing <ul style="list-style-type: none"> ● Purposes ● Funding opportunities ● Principles ● Writing a grant proposal 	<ul style="list-style-type: none"> ● Exercise: Identify grant opportunities ● Exercise: write a grant proposal 	<ul style="list-style-type: none"> ● Evaluation of the exercise

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

14. LACTATION MANAGEMENT

PLACEMENT: VII & VIII SEMESTER

THEORY: 0.5 Credit (10 hours)

CLINICAL: 0.5 Credit (10 hours)

DESCRIPTION: The module is designed to develop in-depth knowledge and understanding in lactation management . It also help the students to develop competency in providing quality care to the lactating women and her families.

LEARNING OUTCOMES: On completion of the module, the student will be able to:

1. Understand the concept of lactation and anatomy of breast in postpartum women.
2. Discuss the physiology of lactation and composition of breast milk.
3. Develop competencies in providing quality nursing care to these women based on nursing process.
4. Educate women and families about the lactation problems faced by them and improve in breast feeding.
5. Dicuss the advantages of breast feeding and bonding.
6. Explain the importance of taking well balanced diet to facilitate lactation.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2 (T)	Review the anatomy of breast	Anatomy of breast-Review • Concept and anatomy of breast	• Use of models • Discussion	• Objective test • Short answers
II	2 (T)	Explain the Physiology of lactation	Physiology of lactation • Physiology of lactation • Benefits of breast feeding	• Discussion	• Short answers • Objective test
III	4 (T) 8 (CL)	Provide quality nursing care	Management of lactation • Quality nursing care to patient for lactating women • Well balanced diet • Technique of breast feeding • Prevention of breast engorgement	• Demonstration • Discussion • Case presentation	• Short answers • Objective test • Case report
IV	2 (T) 2 (L)	Provide health education	Health education on • Diet during lactation • Breast care • Clothing • Personal hygiene etc.	• Case method • Demonstration	• Case report

CLINICAL PRACTICE COMPETENCIES:

On completion of the program student will be able to:

1. Provide quality nursing care to lactating women
2. Devlop competency in supporting breast feeding
3. Educate lactating women regarding self care and well balanced diet, personal care etc.
4. Develop competency in records and reports
5. Encourage mother child bonding
6. Develop competency in preventing breast complications

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

15. SEXUALITY AND HEALTH

PLACEMENT: VII & VIII SEMESTER

THEORY & PRACTICAL: 1 Credit (20 hours)

THEORY: 16 hours

PRACTICAL: 4 hours

DESCRIPTION: Sexuality and Health is an elective module for nursing students who wish to make a future in sexual Health clinics/counseling. This module intends to train the nurses to help people to maintain sexual health.

LEARNING OUTCOMES: On completion of the module, the student will be able to

1. Identify the basic components of the human reproductive system and describe the basic functions of the various reproductive organs.
2. Describe the changes that occur during puberty and secondary sexual characteristics.
3. Examine and evaluate the risk factors associated with exposure to blood-borne diseases.
4. Determine 'safer' sex practices.
5. Develop strategies to reduce sexual risk.
6. Explain the role of trust and ways to establish trust in a relationship.
7. Evaluate implications and consequences of sexual assault on a victim.
8. Explain the legislations related to sexual assaults in India.
9. Provide health education on safer sex practices and prevent the sexually transmitted diseases/blood borne diseases.
10. Assess a victim of sexual abuse/assault/harassment/child abuse.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	3	Identify the basic components of the human reproductive system, and describe the basic functions of the various reproductive organs Describe the changes that occur during puberty; secondary sexual characteristics	Introduction to Sexuality - <ul style="list-style-type: none"> • Anatomy of the human reproductive system and the basic functions; fertilization, conception. • Changes during puberty (physical, emotional and social) • Secondary sexual characteristics 	<ul style="list-style-type: none"> • Lecture cum discussion 	<ul style="list-style-type: none"> • Short answers • Objective test
II	3	Examine and evaluate the risk factors associated with exposure to blood-borne diseases	Risk factors associated with exposure to blood-borne diseases - HIV, AIDS, Hepatitis <ul style="list-style-type: none"> • Sharing needles • Body piercing • Tattooing • Helping someone who is bleeding etc. 	<ul style="list-style-type: none"> • Lecture cum discussion • Role play • Group Discussion 	<ul style="list-style-type: none"> • Short answers • Objective test

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
III	3	Determine 'safer' sex practices Develop strategies to reduce sexual risk Explain the role of trust and ways to establish trust in a relationship	'Safer' sex practices: <ul style="list-style-type: none"> • Communicate with partner • Maintain abstinence • Limit partners • Access/use condoms/ contraceptives properly <i>Strategies to reduce sexual risk:</i> <ul style="list-style-type: none"> • Abstain from drugs and alcohol, date in groups, use assertive behavior • Expectations & commitments in a relationship <ul style="list-style-type: none"> • Role of trust and ways to establish trust in a relationship 	<ul style="list-style-type: none"> • Lecture cum discussion 	<ul style="list-style-type: none"> • Short answers • Objective test
IV	5	Analyze the implications and consequences of sexual assault on a victim Explain the legislations related to sexual assaults in India	Sexual assault/abuse <i>Implications and consequences of sexual assault on a victim</i> <ul style="list-style-type: none"> • Child sexual abuse • Sexual assault of boys • Incest • Intimate partner sexual abuse • Rapes <i>Legislation related to sexual assault in India</i> <ul style="list-style-type: none"> • Criminal Law amendment Act -2013 • Sexual Harassment at workplace • Protection of children against sexual offences 	<ul style="list-style-type: none"> • Lecture cum discussion • Case discussion • Guest lecture • Reading/written assignments 	<ul style="list-style-type: none"> • Short answers • Objective test
V	2	Develop understanding and skills on sexual health education	Sexual Health Education <ul style="list-style-type: none"> • Health education - principles and application • Health education on safer sex practices • Counselling the sexually assaulted/abused child/ adolescent/adults 	<ul style="list-style-type: none"> • Observe/practice at the education/ counseling clinic/ centre 	<ul style="list-style-type: none"> • Evaluation of the report
VI	4 (P)	Develop skills in assessment of sexually abused victim and provide sexual health education	<ul style="list-style-type: none"> • Sexual health education - adolescents and young adults • Assessment of sexually abused victim - child/adolescent/adult 	<ul style="list-style-type: none"> • Clinical field 	<ul style="list-style-type: none"> • Assessment of sexually abused victim • Sexual health education

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

16. STRESS MANAGEMENT

PLACEMENT: VII & VIII SEMESTER

THEORY & PRACTICAL: 1 Credit (20 hours)

THEORY: 15 hours

PRACTICAL: 5 hours

DESCRIPTION: This module is designed to enhance the understanding of students about stress and its effects on human behavior and physiology. Further it discusses the techniques and implementation of stress management in personal and professional life.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Describe stress and stressors.
2. Identify the causes of unwanted stress.
3. Understand how stress works and its effects on human behavior and physiology.
4. Develop techniques to avoid stress affect the personal and professional life.
5. Utilize effective stress reduction techniques.
6. Develop a Personal Action Plan for Stress Management.

CONTENT OUTLINE

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching Learning Activities	Assessment Methods
I	3 (T) 1 (P)	Describe stress and stressors. Identify the causes of unwanted stress.	Introduction <ul style="list-style-type: none"> • Concept of stress, definition • Types of stress: positive, negative • Various sources of stress: environmental, social, physiological, psychological • Types of stressors: internal and external 	<ul style="list-style-type: none"> • Lecture cum discussion • Practice session on identifying own stressors 	<ul style="list-style-type: none"> • Short answers • Objective test • Assessment of practice sessions
II	5 (T) 1 (P)	Understand how stress works and its effects on human behavior and physiology	Stress and its effect on human physiology and behaviour <ul style="list-style-type: none"> • Body's response to stress: Hans Selye's General Adaptation Syndrome • Stress Cycles: distress and wellness cycle • Cognitive appraisal of stressors • Stress symptoms: emotional, behavioural, physical • Stress and diseases: cancer, Gastric ulcer, Bronchial asthma, effect on endocrine glands, Psycho-sexual disease, Anxiety Neurosis • Assessing stress levels Holmes - Rahe - life change index 	<ul style="list-style-type: none"> • Lecture cum discussion • Practice session assessment of stress level of self and peer group, scoring & classifying the risk. 	<ul style="list-style-type: none"> • Short answers • Essay types • Preparing stress assessment scale
III	5 (T) 1 (P)	Develop techniques to avoid stress affect the personal and professional life.	Stress avoidance techniques <ul style="list-style-type: none"> • Individual difference in resistance to stress: optimism & pessimism • Strategies of stress prevention 	<ul style="list-style-type: none"> • Lecture cum discussion • Practice session • Role play on Conflict 	<ul style="list-style-type: none"> • Assessment of the skills based on the check list • Short answers

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching Learning Activities	Assessment Methods
			& management ○ Challenging stressful thinking/resilience and stress ○ Problem solving and time management ○ Physical methods of stress reduction ○ Preparing for occupational stress ○ Care of self: Nutrition & other lifestyle issues ○ Conflict management in relationship	Management/ Use of problem - solving approach for professional problem	<ul style="list-style-type: none"> • Essay types
IV	2 (T) 2 (P)	Utilize effective stress reduction techniques Develop a Personal Action Plan for Stress Management	Stress reduction strategies <ul style="list-style-type: none"> • Utilizing stress reduction techniques • Relaxation techniques: <ul style="list-style-type: none"> • abdominal breathing • progressive relaxation, • massage • biofeedback • autogenic training-self hypnosis • visualization and mental imagery • Enhance self esteem • Support groups 	<ul style="list-style-type: none"> • Exercise on: Relaxation techniques: abdominal breathing, progressive relaxation. • Develop a Personal Action Plan for Stress Management 	<ul style="list-style-type: none"> • Assessment of the skills based on the check list

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

17. JOB READINESS/EMPLOYABILITY IN HEALTH CARE

PLACEMENT: VII & VIII SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to prepare the nursing students towards entering their profession in terms of clinical context, the complexity of care requirements, and utilization of resources available and in terms of soft skills.

LEARNING OUTCOMES: On completion of the module, the student will be able to

1. Demonstrate the employability skills required at different levels and in different roles across the health sector.
2. Identify the personal skills, qualities, values, attributes and behaviours needed at each career level.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2	Explain about the Nursing career and various roles in nursing	Introduction <ul style="list-style-type: none"> • Nursing - A Career in Life • Roles and responsibilities of an employee • Adaptation towards working environment • Career Guidance - Employment opportunities in Nursing 	<ul style="list-style-type: none"> • Lecture cum discussion 	<ul style="list-style-type: none"> • Essay on career opportunities
II	5	Describe the characteristics and values that an individual must have before they can do a job effectively.	Employability Skill <ul style="list-style-type: none"> • Job-readiness attributes <ul style="list-style-type: none"> ○ Communication skill ○ Technological skill ○ Teamwork skill ○ Interpersonal skill ○ Critical thinking and Problem-solving skill ○ Planning and organizing skill ○ Conceptual and analytical skill ○ Self confidence ○ Inter profession practice ○ Work psychology-positivity workplace attitude ○ Stress awareness and management • Soft skills 	<ul style="list-style-type: none"> • Lecture cum discussion • Role playing 	<ul style="list-style-type: none"> • Practical assessment
III	5	Describe the safe care and skills required to manage the workforce environment	Complexity of care <ul style="list-style-type: none"> • Safe Practice • Practice within scope of practice • Management of workload • Ability work effectively within the health care team • Legal and ethical boundaries 	<ul style="list-style-type: none"> • Lecture cum discussion • Written assignment on scope of practice 	<ul style="list-style-type: none"> • Assessment of assignment
IV	3	Explain the importance of employability towards meeting	Autonomy and Supervision <ul style="list-style-type: none"> • Autonomy - Accountability, Responsibility, Recognition of scope of practice • Supervision/Delegation 	<ul style="list-style-type: none"> • Lecture cum discussion 	<ul style="list-style-type: none"> • Quiz

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		the organization goal.			
V	5	Enumerate the subject knowledge required to provide quality care.	Application of Knowledge <ul style="list-style-type: none"> • Generalist Nursing Knowledge • Knowledge on Quality Care • Knowledge on Ethical aspects • Knowledge on Legal aspects • Critical Appraisal • Knowledge seeking behaviours 	<ul style="list-style-type: none"> • Lecture cum discussion 	<ul style="list-style-type: none"> • Self-discovery exercise

ASSESSMENT METHODS

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

STRUCTURE OF
CBCS COURSES

Ordinance Governing
**B.Sc. Hotel Management &
Catering Technology**
Degree Course
(Semester System)
Syllabus/Curriculum
2019-20



Accredited 'A' Grade by NAAC (2nd Cycle)
Placed in 'A' Category by Government of India (MHRD)

KLE Academy of Higher Education & Research
(Deemed-to-be-University)

[Declared as Deemed-to-be-University u/s 3 of the UGC Act, 1956 vide Government of India Notification
No. F.9 -19/2000-U.3 (A)]

J. N. Medical College Campus, Nehru Nagar, Belagavi-590 010, Karnataka, India.
Phone : +91-0831-2444444 Fax : 0831-2493777
web : <http://www.kledeemeduniversity.edu.in>
E-mail : coe@kledeemeduniversity.edu.in

Edition Year : 2018-19

© Registrar

Director, Academic Affairs

Email: diracademic@kledeemeduniversity.edu.in

KLE Academy of Higher Education & Research

JNMC Campus, Nehru Nagar, Belagavi-590 010.

Phone : 0831-2444444

e-mail:info@kledeemeduniversity.edu.in

Price Rs: 275/-only

Printed at:

Omega Offset

4574, Shetty Galli, Belagavi.

Ph: 0831-2424124 E-mail: customerservice@omegaoffset.com



VISION

To be an outstanding KAHER of excellence ever in pursuit of newer horizons to build self reliant global citizens through assured quality educational programs.

MISSION

- To promote sustainable development of higher education consistent with statutory and regulatory requirements.
- To plan continuously provide necessary infrastructure, learning resources required for quality education and innovations.
- To stimulate to extend the frontiers of knowledge, through faculty development and continuing education programs.
- To make research a significant activity involving staff, students and society.
- To promote industry / organization, interaction/collaborations with regional/national/international bodies.
- To establish healthy systems for communication among all stakeholders for vision oriented growth.
- To fulfill the national obligation through rural health missions.

OBJECTIVES

The objectives are to realize the following at KAHER and its constituent institutions:

- To implement effectively the programs through creativity and innovation in teaching, learning and evaluation.
- To make existing programs more careers oriented through effective system of review and redesign of curriculum.
- To impart spirit of enquiry and scientific temperament among students through research oriented activities.
- To enhance reading and learning capabilities among faculty and students and inculcate sense of life long learning.
- To promulgate process for effective, continuous, objective oriented student performance evaluation.
- To ordinate periodic performance evaluation of the faculty.
- To incorporate themes to build values, Civic responsibilities & sense of national integrity.
- To ensure that the academic, career and personal counseling are in-built into the system of curriculum delivery.
- To strengthen, develop and implement staff and student welfare programs.
- To adopt and implement principles of participation, transparency and accountability in governance of academic and administrative activities.
- To constantly display sensitivity and respond to changing educational, social, and community demands.
- To promote public-private partnership.

INSIGNIA



The Emblem of the **KAHER** is a Philosophical statement in Symbolic.

The Emblem...

A close look at the emblem unveils a pillar, a symbol of the "KAHER of Excellence" built on strong values & principles.

The Palm and the Seven Stars...

The Palm is the palm of the teacher- the hand that acts, promises & guides the students to reach for the Seven Stars...

The Seven Stars signify the 'Saptarishi Dnyanamandal', the Great Bear-a constellation made of Seven Stars in the sky, each signifying a particular Domain. Our culture says: The true objective of human birth is to master these Knowledge Domains.

The Seven Stars also represent the Saptarishis, the founders of KLE Society whose selfless service and intense desire for "Dnyana Dasoha" laid the foundation for creating the knowledge called KLE Society.

Hence another significance of the raised palm is our tribute to these great Souls for making this KAHER a possibility.

Empowering Professionals...

'Empowering Professionals', inscription at the base of the Emblem conveys that our Organization with its strength, maturity and wisdom forever strive to empower the student community to become globally competent professionals. It has been a guiding force for many student generations in the past, and will continue to inspire many forth coming generations.



KLE Academy of Higher Education & Research

(Deemed-to-be-University)

[Declared as Deemed-to-be-University u/s 3 of the UGC Act, 1956 vide Government of India Notification No. F.9 -19/2000-U.3 (A)]

Accredited 'A' Grade by NAAC (2nd Cycle)

Placed in Category 'A' by MHRD(GoI)

JNMC Campus, Nehru Nagar, Belagavi-590 010, Karnataka State, India

Phone : 0831-2444444 / 2493779 Fax : 0831-2493777

Web: [http:// www.kledeemeduniversity.edu.in](http://www.kledeemeduniversity.edu.in)
www.kleuniversity.edu.in

E-mail : info@kledeemeduniversity.edu.in
info@kleuniversity.edu.in

Ref. No. KAHER/AC/18-19/D-909 (6)

Dated : 26-11-2017

NOTIFICATION

**Sub : Ordinance governing the syllabus/curriculum for
B.Sc.**

By Order

REGISTRAR

To
The Dean
Faculty of Medicine,
J.N. Medical College, Belagavi.

CC to:

1. The Secretary, University Grants Commission, New Delhi,
2. The PA to Hon. Chancellor, KAHER, Belagavi.
3. The Special Officer to Hon. Vice- Chancellor, KAHER, Belagavi.
4. All Officers of the University- Academic Affairs/ Allied Course/ Examination Branch.

NOTE: All the grooming parameters including the Kit carry marks. In case of deficient grooming the marks leads to negative or may not allowed attend practical sessions or both.

The Kit which is prescribed by the Instructor/Professor is a must. This Kit is mandatory for each practical session which is to be maintained by every student.

Outline of Choice Based Credit System as per UGC norms

- 1. Core Course:** A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.
- 2. Elective Course:** Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course.
 - 2.1 Discipline Specific Elective (DSE) Course:** Elective courses may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective. The University/Institute may also offer discipline related Elective courses of interdisciplinary nature (to be offered by main discipline/subject of study).
 - 2.2 Dissertation/Project:** An elective course designed to acquire special/ advanced knowledge, such as supplement study/support study to a project work, and a candidate studies such a course on his own with an advisory support by a teacher/faculty member is called dissertation/project.
 - 2.3 Generic Elective (GE) Course:** An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is called a Generic Elective. P.S.: A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa and such electives may also be referred to as Generic Elective.
- 3. Ability Enhancement Courses (AEC):** The Ability Enhancement (AE) Courses may be of two kinds: Ability Enhancement Compulsory Courses (AECC) and Skill Enhancement Courses (SEC). "AECC" courses are the courses based upon the content that leads to Knowledge enhancement; i. Environmental Science and ii. English/MIL Communication. These are mandatory for all disciplines. SEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc. 3.1 Ability Enhancement Compulsory Courses (AECC): Environmental Science, English Communication/MIL Communication.

3.2 Skill Enhancement Courses (SEC): These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge.

Introducing Research Component in Under-Graduate Courses

Project work/Dissertation is considered as a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem. A Project/Dissertation work would be of 6 credits. A Project/Dissertation work may be given in lieu of a discipline specific elective paper.

Conversion of credit(s) into grade(s): The following illustrations could be taken as an example for computing SGPA and CGPA from credits for courses in all disciplines, degree Program courses in Science subjects and degree Program courses in Humanities, Social Sciences and Commerce subjects:

1. Grades and Grade Points

LETTER GRADE	GRADE POINT
O (Outstanding)	10
A+(Excellent)	9
A (Very Good)	8
B+(Good)	7
B (Above Average)	6
C (Average)	5
P (Pass)	4
F (Fail)	0
Ab (Absent)	0

1. A student obtaining **Grade F** shall be considered failed and will be required to reappear in the examination.
2. For non credit courses 'Satisfactory' or "Unsatisfactory' shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.
3. The Universities can decide on the grade or percentage of marks required to pass in a course and also the CGPA required to qualify for a degree taking into consideration the recommendations of the statutory professional councils such as AICTE, MCI, BCI, NCTE etc.,

Example of Illustration of Computation of SGPA and CGPA and Format for transcripts

SGPA (Semester Grade Point Average)

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit X Grade)	SGPA (Credit point/Credit)
Semester 1					
C1	06	A	8	48	
C2	06	B+	7	42	
AECC-1	02	B	6	12	
GE-1	06	B	6	36	
Total	20			138	6.9(138/20)

CGPA (Cumulative Grade Point Average)

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6
Credit: 20; SGPA: 6.0	Credit: 20; SGPA: 6.0	Credit: 20; SGPA: 8.3	Credit: 20; SGPA: 6.3	Credit: 20; SGPA: 7.5	Credit: 20; SGPA: 5.9

Thus, **CGPA = (20 x 6.0 + 20 x 6.0 + 20 x 8.3 + 20 x 6.3 + 20 x 7.5 + 20 x 5.9) / 120 = 6.67**

**Ordinance Governing
Bachelor of Public Health
Syllabus / Curriculum
2018-19**



Accredited 'A' Grade by NAAC (2nd Cycle)

Placed in Category 'A' by MHRD (GoI)

**KLE ACADEMY OF HIGHER EDUCATION AND
RESEARCH**

JNMC Campus, Nehru Nagar, Belagavi – Karnataka, India

Phone: +91 0831-2472777, 2493779, FAX: +91 0831 – 249377

E-mail: info@kledeemeduniversity.edu.in Website: kledeemeduniversity.com

CONTENT

S. NO.	TOPICS	Page No
1.	Section I Preamble	3
2.	Section II Vision, Mission & Objectives	4
3.	Section III Regulations Governing BPH Degree Semester Course	6-12
4.	Section IV Course Content	
	4.1 Semester I Theory	13-16
	BPH-I-1 T Human biology I	
	BPH-I-2 T Basics of Health Diseases	
	BPH-I-3 T Fundamentals of Demography, Sociology and Behavioral Health	
	BPH-I-4 T Introduction of Health Care Delivery System.	
	4.2 Semester II Theory	17-21
	BPH-II-1 T Human Biology II	
	BPH-II-2 T Fundamentals of Environmental Health	
	BPH-II-3 T Introduction to Communicable and Non-Communicable Diseases	
	BPH-II-4 T Fundamentals of Data Processing and Analysis – Basic Statistics	
	4.3 Semester III Theory	22-24
	BPH-III-1 T Introduction to Public Health Nutrition	
	BPH-III-2 T Fundamentals of Health Education & Communication	
	BPH-III-3 T Rural, Urban & Tribal Health	
	4.4 Semester IV Theory	25-28
	BPH-IV-1 T Health of Child, Adolescent and Ageing of Population	
	BPH-IV-2 T Basics of Health Informatics & Economics	
	BPH-IV-3 T Disaster and Emergency Management	
	4.5 Semester V Theory	29-32
	BPH-V-1 T National Health Programmes and Public Health Laws	
	BPH-V-2 T Introduction to Organizational Development & Occupational Health	
	BPH-V-3 T Basic of Health Planning and Management	
	4.6 Semester VI Theory	33-34
	BPH-VI-1 T Preventive Obstetrics and Family Planning	
	BPH-VI-2 T Public Leadership, Managing Health Organization and Quality and Safety in Health Care	
5	SECTION-V Recommended Books (Latest Editions)	34-37

SECTION – I

PREAMBLE

There is a dearth of core Public Health Professionals in the government health machinery. It is estimated that more than 10,000 Public Health Professionals would be required on an annual basis to equip the government machinery with an appropriately trained and qualified public health workforce. With a rapid health transition taking place, India faces two threats, one being the rising disease burden and the other is the poor allocation of government funds; both can be effectively managed by personnel trained in public health through appropriate public health training, i.e. ability to involve communities, work in multidisciplinary teams, and lobbying with government and community leaders with a deep understanding of social, economic and environmental determinants of health, Public Health Professionals are well armed to face these challenges.

Why Bachelor of Public Health (BPH)?

The most widely recognized professional credential for leadership in public health is the BPH degree. This program prepares candidates to be competitive on a National level in the vast area of community health. It emphasizes on acquisition of skills essential to the practice of public health through techniques like student-directed learning, problem solving and field postings. Public Health Professionals can function as health inspectors, health educators, counselors, social and behavioral scientists.

SECTION – II

VISION :

“To be a Premier Public Health Department for Quality Education, Research and Leadership.”

MISSION :

- Train and Create a Cadre for Public Health Leadership.
- Promote Positive Health Across the Population
- Ensure Collective Commitment to Quality Research

OBJECTIVES:

The program is designed to focus on the acquisition of knowledge and skills applicable to a career in Public Health, for catalyzing the “Health for all revolution”. Upon completion of the programme, the undergraduate will be:

- Aware of the origin and evolution of the field of public health
- Able to use concepts and principles associated with health and development problems;
- Able to understand epidemiological principles and statistical techniques;
- Able to apply these methods in the measurement and assessment of needs of a community
- Able to plan, implement and evaluate health and development programme.
- Able to apply the principles of health promotion in health and development strategies.
- Able to conduct empirical studies, by formulation of a question of social relevance, collection of reliable and valid data, documentation of the findings, preparing project proposals and its management.

SECTION-III

Regulations Governing BPH Degree Semester Course

3.1. Eligibility for Admission:

3.1 Candidate for admission to BPH course should have completed higher secondary level or Pre University College (10+2) in any stream with as basic courses or equivalent course established under law considered equivalent thereto by KAHER, a candidate who has scored a minimum of 45% of the marks.

3.2. Proposed Intake of Candidates: 40

3.3. Duration of the Course:

Duration of Course

BPH: 3 years

Medium of Instruction and Examination shall be English

3.4. Requirement to Complete the Course:

BPH: 3 years,

Sem I	+	Sem II	+	Sem III	+	Sem IV	+	Sem V	+	Sem VI	+	Mini project	=	BPH Degree
--------------	---	---------------	---	----------------	---	---------------	---	--------------	---	---------------	---	---------------------	---	-------------------

3.5. Training, Teaching and Learning Activities:

A candidate pursuing the course shall work in the Department as a full time candidate. No candidate shall join any other course of study or appear for any other examination conducted by this university or any other university in India or abroad during the period of study.

Every candidate shall take part in seminars, group discussions etc. Every candidate shall attend teaching and learning activities during each semester as prescribed by the Department and not absent himself /herself without valid reasons.

A list of teaching and learning activities designed to facilitate acquiring of essential knowledge and skills outlined is given below:

Books are the best teachers but experience makes man perfect. The proficient and lively theory classes shall be equally blended with various practical applications and group activities such as:

1. Assignment
2. Group Discussions
3. Role Plays
4. Workshops
5. Field Visit (Studies)

All these are aimed for the overall development of the emerging health workers, critical analysis and assessment of situations, creative thinking and proactive measures towards system management

Lectures: For all subjects lectures shall be conducted by the faculty.

Field Visit : PHC, sub center, anganwadi, DHO office, KLE Hospital, Sewage treatment plant, Water purification plant, milk dairy, HLL Industry, Campbell factory, Pollution Control Board, CDPO office, IDSP, and other institutions of Public Health importance.

3.6. Attendance and Monitoring Progress:

3.6.1 Attendance:

3.6.1.1 A candidate pursuing BPH Course shall study for the entire period as full time candidate. No candidate shall join any other course of study or appear for any other examination conducted by this University or any other University in India or abroad during the period of registration.

3.6.1.2 Each semester shall be considered as a unit for the purpose of calculating attendance.

3.6.1.3 Every candidate shall attend symposia, seminars, conferences, project review meetings and lectures during each year as prescribed by the Department/College/University and not absent himself / herself without valid reasons.

3.6.1.4 Candidate who has put in a minimum of 75% of attendance in the theory and practical assignments separately shall be permitted to appear for University examination at the end of each semester. They should also complete Internship (mini project) report submission.

3.6.1.5 Any candidate who fails to complete the course in the manner stated above will not be eligible for university Degree.

3.6.2 Monitoring Progress of Studies

3.6.2.1 *Log Book:* Every candidate shall maintain a log diary and record his/her participation in the training programs conducted by the Department such as workshop, field visits etc. Special mention shall be made of the scientific presentations in conference by the candidate as well as

details of assessment works like essay writing, etc. submitted by the candidate. The work diary shall be scrutinized and certified by the Head of the Department

3.6.2.2 Sessional Examination: Records and marks obtained in sessional test shall be maintained by the Head of the Department and sent to the University, when called for.

3.6.2.3 Records: Records and marks obtained in sessional tests, field activities and weekly written assignments which shall be maintained by the Head of the Department and shall be made available to the University.

3.7. Mini Project (Internship):

Every candidate shall undergo field training for a period of two months in sixth semester in which they will do mini project and submit the report duly signed by the Head of the Department.

3.8 Schedule of Examination

There shall be a University examination at the end of each semester for all six semesters at the end of semester II (subjects of semester I & II), semester IV (subjects of semester III & IV) & Semester VI (subjects of semester V & VI).

3.9. Scheme of Examination

3.9.1 Sessional Examination

There shall be a minimum of two sessional examinations in each subject conducted by the Department at midterms and before term end in theory and viva-voce.

The sessional marks shall be awarded out of a maximum of 80 for theory separately and shall be calculated out of 20 marks.

Theory

Written examination 80 marks

The total marks obtained have to be calculated out of 10.

Reports of field visits 10 marks

Models/Essay writing/Project work 10 marks

Camps/ Group activities 10 marks

Assignments 10 marks

The total marks obtained have to be calculated out of 10.

A cumulative total will be calculated out of 20 as “Internal Assessment” (IA) marks

3.9.2 University Examinations

3.2.2.1 Theory:

There shall be six University examinations for the entire course namely I, II, III, IV, V, VI semester examination. The examination will be conducted at the end of each semester. There shall be four core subjects in first and second semester and three core theory papers for all other semesters. All core subjects will have University exam. Each theory paper shall be of 3 hours duration carrying 80 marks each. There will elective subject from semester III till Semester VI and have college examination.

SCHEME OF EXAMINATION FOR THEORY

Question	Number of Questions	Marks	Maximum Marks	Total Marks
Long Essay Questions	2	10	20	80
Short Essay Questions	8	5	40	
Short Answer Questions	10	2	20	

(A) BPH Semester I Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum Marks to pass
BPH-I-1 T	Human Biology I	20	80(60+20)	100	50
BPH-I-2 T	Basics of Health, Diseases	20	80	100	50
BPH-I-3 T	Fundamentals of Demography, Sociology and Behavioral health	20	80(50+30)	100	50
BPH-I-4 T	Introduction to Health Care Delivery System	20	80	100	50

(B) BPH Semester II Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to pass
BPH-II-1 T	Human Biology II	20	80	100	50
BPH-II-2 T	Fundamentals of Environmental Studies	20	80	100	50
BPH-II-3 T	Introduction to Communicable & Non Communicable diseases	20	80	100	50
BPH-II-4 T	Fundamentals of Data Processing and Analysis – Basic Bio Statistics	20	80	100	50

(C) BPH Semester III Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
BPH-III-1 T	Introduction to Public Health Nutrition	20	80	100	50
BPH-III-2 T	Fundamentals of Health Education & Communication	20	80	100	50
BPH-III-3 T	Rural, Urban & Tribal Health	20	80	100	50

(D) BPH Semester IV Theory

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
BPH-IV-1 T	Health of Child, Adolescent and Ageing of Population	20	80	100	50
BPH-IV-2 T	Basics of Health Informatics and Health Economics	20	80	100	50
BPH-IV-3 T	Disaster & Emergency Management	20	80	100	50

(E) BPH Semester V Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
BPH-V-1 T	National Health Programs & Health laws	20	80	100	50
BPH-V-2 T	Introduction to Organizational development, Medical Entomology & Occupational Health	20	80	100	50
BPH-V-3 T	Basics of Health Planning & Management	20	80	100	50

(F) BPH Semester VI Theory

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
BPH-VI-1 T	Preventive Obstetrics and Family Planning	20	80	100	50
BPH-VI-2 T	Public Leadership and Managing Health Organizations Quality and Safety in Healthcare	20	80	100	50
BPH-VI- E T	Elective(s) NSS	20	80	100	50

3.11. Criteria for Declaring Pass

3.11.1 A candidate shall be declared to have passed BPH if all the conditions below are fulfilled:

BPH-Semester I:

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together

BPH -Semester II

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together
- Candidate shall further obtain Grade B

BPH -Semester III

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together

BPH -Semester IV

- Candidate who secures Grade B or above in each subject in theory University & Sessional examinations considered together
- Candidate shall further obtain Grade B

BPH -Semester V

- Candidate who secures Grade B or above in each subject in theory University & Sessional examinations considered together
- Candidate shall further obtain Grade B

BPH -Semester VI

- Candidate who secures Grade B or above in each subject in theory University & Sessional examinations considered together
- Candidate shall further obtain Grade B

3.11.2 Carry over:

At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he is appearing for. e.g:

- If the candidate has not passed semester I, he/she can appear for semester II and pending subjects of semester I simultaneously.
- Appearing for semester III he/she should have passed semester I and can appear for papers pending from semester II along with semester III subjects.
- Appearing for semester IV he/she should have passed semester II completely and can appear pending papers of semester III simultaneously.
- Appearing for semester V he/she should have passed semester III completely and can appear pending papers of semester IV simultaneously.
- Appearing for semester VI he/she should have passed semester IV completely and can appear pending papers of semester V simultaneously.

Cumulative Grade Point Average (CGPA)

Letter Grades and Grade Points equivalent to percentage of marks and performances

10 Point Grade Scale

Percentage of marks obtained	Letter Grade	Grade Point	Performance
90.00 - 100	O	10	Outstanding
80.00 -89.99	A+	9	Excellent
70.00-79.99	A	8	Good
60.00-69.99	B+	7	Fair
50.00-59.99	B	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

1. Conversion of Grades in to GPA:

GPA= Credits x Grade Points / Total Credits

2. Cumulative Grade Point Average (CGPA) of all 4 Semester will be calculated as:

Total No. GPA / No. of Semester

Ordinance Governing Bachelor of Public Health (Honor) Syllabus / Curriculum 2018-19



Accredited 'A' Grade by NAAC (2nd Cycle)

Placed in Category 'A' by MHRD (GoI)

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH

JNMC Campus, Nehru Nagar, Belagavi – Karnataka, India

Phone: +91 0831-2472777, 2493779, FAX: +91 0831 – 249377

E-mail: info@kledeemeduniversity.edu.in Website: kledeemeduniversity.com

CONTENT

S. NO.	TOPICS	Page No
1.	Section I Preamble	3
2.	Section II Vision, Mission & Objectives	4
3.	Section III Regulations Governing BPH Degree Semester Course	6-13
4.	Section IV Course Content	
	4.1 Semester I Theory	14-17
	BPH-I-1 T Human biology I	
	BPH-I-2 T Basics of Health Diseases	
	BPH-I-3 T Fundamentals of Demography, Sociology and Behavioral Health	
	BPH-I-4 T Introduction of Health Care Delivery System.	
	4.2 Semester II Theory	18-22
	BPH-II-1 T Human Biology II	
	BPH-II-2 T Fundamentals of Environmental Health	
	BPH-II-3 T Introduction to Communicable and Non-Communicable Diseases	
	BPH-II-4 T Fundamentals of Data Processing and Analysis – Basic Statistics	
	4.3 Semester III Theory	22-25
	BPH-III-1 T Introduction to Public Health Nutrition	
	BPH-III-2 T Fundamentals of Health Education & Communication	
	BPH-III-3 T Rural, Urban & Tribal Health	
	4.4 Semester IV Theory	26-28
	BPH-IV-1 T Health of Child, Adolescent and Ageing of Population	
	BPH-IV-2 T Basics of Health Informatics & Economics	
	BPH-IV-3 T Disaster and Emergency Management	
	4.5 Semester V Theory	29-33
	BPH-V-1 T National Health Programmes and Public Health Laws	
	BPH-V-2 T Introduction to Organizational Development, Medical Entomology & Occupational Health	
	BPH-V-3 T Basic of Health Planning and Management	
	4.6 Semester VI Theory	34-35
	BPH-VI-1 T Preventive Obstetrics and Family Planning	
	BPH-VI-2 T Public Leadership, managing health organizations and Quality and safety in healthcare	
	4.7 Semester VII Theory	36
	BPH-VII-1 T Research Methodology & Bioethics	
	BPH-VII-2 T Monitoring and Evaluation in Public Health	
	BPH-VII-2 P Project	
	4.8 Semester VIII Theory	37
	BPH- VIII- 1 P Project Submission	
5	SECTION-V Recommended Books (Latest Editions)	38-40

SECTION – I

PREAMBLE

There is a dearth of core Public Health Professionals in the government health machinery. It is estimated that more than 10,000 Public Health Professionals would be required on an annual basis to equip the government machinery with an appropriately trained and qualified public health workforce. With a rapid health transition taking place, India faces two threats, one being the rising disease burden and the other is the poor allocation of government funds; both can be effectively managed by personnel trained in public health through appropriate public health training, i.e. ability to involve communities, work in multidisciplinary teams, and lobbying with government and community leaders with a deep understanding of social, economic and environmental determinants of health, Public Health Professionals are well armed to face these challenges.

Why Bachelor of Public Health (BPH)?

The most widely recognized professional credential for leadership in public health is the BPH degree. This program prepares candidates to be competitive on a National level in the vast area of community health. It emphasizes on acquisition of skills essential to the practice of public health through techniques like student-directed learning, problem solving and field postings. Public Health Professionals can function as health inspectors, health educators, counselors, social and behavioral scientists.

SECTION – II

VISION :

“To be a Premier Public Health Department for Quality Education, Research and Leadership.”

MISSION :

- Train and Create a Cadre for Public Health Leadership.
- Promote Positive Health Across the Population
- Ensure Collective Commitment to Quality Research

OBJECTIVES:

The program is designed to focus on the acquisition of knowledge and skills applicable to a career in Public Health, for catalyzing the “Health for all revolution”. Upon completion of the programme, the undergraduate will be:

- Aware of the origin and evolution of the field of public health
- Able to use concepts and principles associated with health and development problems
- Able to understand epidemiological principles and statistical techniques
- Able to apply these methods in the measurement and assessment of needs of a community
- Able to plan, implement and evaluate health and development programme
- Able to apply the principles of health promotion in health and development strategies
- Able to conduct empirical studies, by formulation of a question of social relevance, collection of reliable and valid data, documentation of the findings, preparing project proposals and its management

SECTION-III

Regulations Governing BPH Degree Semester Course

3.1. Eligibility for Admission:

Candidate for admission to BPH course should have completed higher secondary level or Pre University College (10+2) in any stream with as basic courses or equivalent course established under law considered equivalent thereto by KAHER, a candidate who has scored a minimum of 45% marks.

3.2. Proposed Intake of Candidates: 40

3.3. Duration of the Course:

BPH Honors : 4 Years.

Medium of Instruction and Examination shall be English

3.4. Requirement to Complete the Course:

BPH Honors : 4 Years.

Sem I	+	Sem II	+	Sem III	+	Sem IV	+	Sem V	+	Sem VI	+	Project Sem (VII+VIII)	=	BPH with Honor Degree
--------------	---	---------------	---	----------------	---	---------------	---	--------------	---	---------------	---	-------------------------------	---	------------------------------

3.5. Training, Teaching and Learning Activities:

A candidate pursuing the course shall work in the Department as a full time candidate. No candidate shall join any other course of study or appear for any other examination conducted by this university or any other university in India or abroad during the period of study.

Every candidate shall take part in seminars, group discussions etc. Every candidate shall attend teaching and learning activities during each semester as prescribed by the Department and not absent himself /herself without valid reasons.

A list of teaching and learning activities designed to facilitate acquiring of essential knowledge and skills outlined is given below:

Books are the best teachers but experience makes man perfect. The proficient and lively theory classes shall be equally blended with various practical applications and group activities such as:

1. Assignment
2. Group Discussions
3. Role Plays
4. Workshops
5. Field Visit (Studies)

All these are aimed for the overall development of the emerging health workers, critical analysis and assessment of situations, creative thinking and proactive measures towards system management

Lectures: For all subjects lectures shall be conducted by the faculty.

Field Visit : PHC, Subcentre, Anganwadi, DHO office, KLE Hospital, Sewage treatment plant, Water purification plant, milk dairy, HLL Industry, Campbell factory, Pollution Control Board, CDPO office, IDSP, and other institutions of Public Health importance.

3.6. Attendance and Monitoring Progress:

3.6.1 Attendance:

3.6.1.1 A candidate pursuing BPH Course shall study for the entire period as full time candidate. No candidate shall join any other course of study or appear for any other examination conducted by this University or any other University in India or abroad during the period of registration.

3.6.1.2 Each semester shall be considered as a unit for the purpose of calculating attendance.

3.6.1.3 Every candidate shall attend symposia, seminars, conferences, project review meetings and lectures during each year as prescribed by the Department/College/University and not absent himself / herself without valid reasons.

3.6.1.4 Candidate who has put in a minimum of 75% of attendance in the theory and practical assignments separately shall be permitted to appear for University examination at the end of each semester. They should also complete Internship (mini project) report submission.

3.6.1.5 In BPH Honor, candidate will be declared pass only after **Project report** is completed and submitted.

3.6.1.6 Any candidate who fails to complete the course in the manner stated above will not be eligible for university Degree.

3.6.2 Monitoring Progress of Studies

3.6.2.1 *Log Book:* Every candidate shall maintain a log diary and record his/her participation in the training programs conducted by the Department such as workshop, field visits etc. Special

mention shall be made of the scientific presentations in conference by the candidate as well as details of assessment works like essay writing, etc. submitted by the candidate. The work diary shall be scrutinized and certified by the Head of the Department

3.6.2.2 Sessional Examination: Records and marks obtained in sessional test shall be maintained by the Head of the Department and sent to the University, when called for.

3.6.2.3 Records: Records and marks obtained in sessional tests, field activities and weekly written assignments which shall be maintained by the Head of the Department and shall be made available to the University.

3.7. Mini Project:

Every candidate shall undergo field training for a period of two months in sixth semester in which they will do mini project and submit the report duly signed by the Head of the Department.

3.7.1 Project for BPH (Honors)

Every candidate shall undergo field training for a period of one year in semester VII & VIII. Candidate should maintain a daily logbook in which day to day activities of the project will be noted. On completion of the project a report of the same should be submitted duly signed by the Head of the Department and the supervisor under whose guidance the project has been carried out.

3.8 Schedule of Examination

There shall be a University examination at the end of each semester for all six semesters at the end of semester II (subjects of semester I & II), semester IV (subjects of semester III & IV) & Semester VI (subjects of semester V & VI). There shall be Project Report presentation at the end of semester VIII (BPH Honor).

3.9. Scheme of Examination

3.9.1 Sessional Examination

There shall be a minimum of two sessional examinations in each subject conducted by the Department at midterms and before term end in theory.

The sessional marks shall be awarded out of a maximum of 80 for theory and shall be calculated out of 20 marks.

Theory

Written examination 80 marks

The total marks obtained have to be calculated out of 10.

Reports of field visits 10 marks

Models/Essay writing/Project work 10 marks

Camps/ Group activities 10 marks

Assignments 10 marks

The total marks obtained have to be calculated out of 10.

A cumulative total will be calculated out of 20 as “Internal Assessment” (IA) marks

3.9.2 University Examinations

3.2.2.1 Theory:

There shall be six University examinations for the entire course namely I, II, III, IV, V, VI semester examination. The examination will be conducted at the end of each semester. There shall be four core subjects in first and Second semester and three core theory papers for all other semesters. All core subjects will have University exam. Each theory paper shall be of 3 hours duration carrying 80 marks each. There will elective subject from semester III till Semester VI and have college examination.

SCHEME OF EXAMINATION FOR THEORY

Question	Number of Questions	Marks	Maximum Marks	Total Marks
Long Essay Questions	2	10	20	80
Short Essay Questions	8	5	40	
Short Answer Questions	10	2	20	

(A) BPH Semester I Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum Marks to pass
BPH-I-1 T	Human Biology I	20	80(60+20)	100	50
BPH-I-2 T	Basics of Health, Diseases	20	80	100	50
BPH-I-3 T	Fundamentals of Demography, Sociology and Behavioral health	20	80(50+30)	100	50
BPH-I-4 T	Introduction to Health Care Delivery System	20	80	100	50

(B) BPH Semester II Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to pass
BPH-II-1 T	Human Biology II	20	80	100	50
BPH-II-2 T	Fundamentals of Environmental Studies	20	80	100	50
BPH-II-3 T	Introduction to Communicable & Non Communicable diseases	20	80	100	50
BPH-II-4 T	Fundamentals of Data Processing and Analysis – Basic Bio Statistics	20	80	100	50

(C) BPH Semester III Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
BPH-III-1 T	Introduction to Public Health Nutrition	20	80	100	50
BPH-III-2 T	Fundamentals of Health Education and Communication	20	80	100	50
BPH-III-3 T	Rural, Urban & Tribal Health	20	80	100	50
BPH-III- E T	Elective(s) NSS	20	80	100	50

(D) BPH Semester IV Theory

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
BPH-IV-1 T	Health of Child, Adolescent and Ageing of Population	20	80	100	50
BPH-IV-2 T	Basics of Health Informatics and Health Economics	20	80	100	50
BPH-IV-3 T	Disaster & Emergency Management	20	80	100	50
BPH-IV- E T	Elective(s) NSS	20	80	100	50

(E) BPH Semester V Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
BPH-V-1 T	National Health Programs & Health laws	20	80	100	50
BPH-V-2 T	Introduction to Organizational Development, Medical Entomology & Occupational Health	20	80	100	50
BPH-V-3 T	Basics of Health Planning & Management	20	80	100	50
BPH-V- E T	Elective(s) NSS	20	80	100	50
BPH-V- E T	Elective(s) Indian Constitution	20	80	100	50

(F) BPH Semester VI Theory

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
BPH-VI-1 T	Preventive Obstetrics and Family Planning	20	80	100	50
BPH-VI-2 T	Public Leadership and Managing Health Organizations Quality and Safety in Healthcare	20	80	100	50
BPH-VI- E T	Elective(s) NSS	20	80	100	50

(G) BPH Semester VII Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
BPH-VII-1 T	Research Methodology & Bio-ethics	20	80	100	50
* BPH-VII-2 E	Monitoring and Evaluation in Public Health	20	80	100	50

(*College level exam will be conducted)

(H) BPH Semester VIII Theory

Paper No.	Paper	Total maximum marks
BPH-VIII-1 P	Project work	Accepted

3.11. Criteria for Declaring Pass

3.11.1 A candidate shall be declared to have passed BPH if all the conditions below are fulfilled:

BPH-Semester I:

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together.

BPH -Semester II

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together
- Candidate shall further obtain Grade B

BPH -Semester III

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together

BPH -Semester IV

- Candidate who secures Grade B or above in each subject in theory University & Sessional examinations considered together
- Candidate shall further obtain Grade B

BPH -Semester V

- Candidate who secures Grade B or above in each subject in theory University & Sessional examinations considered together
- Candidate shall further obtain Grade B

BPH -Semester VI

- Candidate who secures Grade B or above in each subject in theory University & Sessional examinations considered together.
- Candidate shall further obtain Grade B

BPH -Semester VII

- Candidate who secures Grade B or above in each subject in theory University & Sessional examinations considered together.
- Candidate shall further obtain Grade B

BPH- Semester VIII

Candidate has to submit the project report and should obtain minimum grade B to declare pass.

3.11.2 Carry over:

At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he is appearing for. e.g:

- If the candidate has not passed semester I, he/she can appear for semester II and pending subjects of semester I simultaneously.
- Appearing for semester III he/she should have passed semester I and can appear for papers pending from semester II along with semester III subjects.
- Appearing for semester IV he/she should have passed semester II completely and can appear pending papers of semester III simultaneously.
- Appearing for semester V he/she should have passed semester III completely and can appear pending papers of semester IV simultaneously.
- Appearing for semester VI he/she should have passed semester IV completely and can appear pending papers of semester V simultaneously.
- Appearing for semester VII he/she should have passed semester V completely and can appear pending papers of semester VI simultaneously.
- Appearing for semester VIII he/she should have passed semester VI completely and can appear pending papers of semester VII simultaneously.

Cumulative Grade Point Average (CGPA)

Letter Grades and Grade Points equivalent to percentage of marks and performances

10 Point Grade Scale

Percentage of marks obtained	Letter Grade	Grade Point	Performance
90.00 - 100	O	10	Outstanding
80.00 -89.99	A+	9	Excellent
70.00-79.99	A	8	Good
60.00-69.99	B+	7	Fair
50.00-59.99	B	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

1. Conversion of Grades in to GPA:

$$\text{GPA} = \text{Credits} \times \text{Grade Points} / \text{Total Credits}$$

2. Cumulative Grade Point Average (CGPA) of all 4 Semester will be calculated as:

$$\text{Total No. GPA} / \text{No. of Semester}$$

Ordinance Governing Master of Science Biotechnology Syllabus/Curriculum

* * *

2018-19



Accredited 'A' Grade by NAAC (2nd Cycle)
Placed in 'A' Category by Government of India (MHRD)

KLE Academy of Higher Education & Research (Deemed-to-be-University)

[Declared as Deemed-to-be-University u/s 3 of the UGC Act, 1956 vide Government of India Notification
No. F.9 -19/2000-U.3 (A)]

J. N. Medical College Campus, Nehru Nagar, Belagavi-590 010, Karnataka, India.
Phone : +91-0831-2444444 Fax : 0831-2493777
web : <http://www.kledeemeduniversity.edu.in>
E-mail : coe@kledeemeduniversity.edu.in

Edition Year : 2018-19

© Registrar

Director, Academic Affairs

Email: diracademic@kledeemeduniversity.edu.in

KLE Academy of Higher Education & Research

JNMC Campus, Nehru Nagar, Belagavi-590 010.

Phone : 0831-2444444

e-mail:info@kledeemeduniversity.edu.in

Price Rs: 260/-only

Printed at:

Omega Offset

4574, Shetty Galli, Belagavi.

Ph: 0831-2424124 E-mail: customerservice@omegaoffset.com



VISION

To be an outstanding KAHER of excellence ever in pursuit of newer horizons to build self reliant global citizens through assured quality educational programs.

MISSION

- To promote sustainable development of higher education consistent with statutory and regulatory requirements.
- To plan continuously provide necessary infrastructure, learning resources required for quality education and innovations.
- To stimulate to extend the frontiers of knowledge, through faculty development and continuing education programs.
- To make research a significant activity involving staff, students and society.
- To promote industry / organization, interaction/collaborations with regional/national/international bodies.
- To establish healthy systems for communication among all stakeholders for vision oriented growth.
- To fulfill the national obligation through rural health missions.

OBJECTIVES

The objectives are to realize the following at KAHER and its constituent institutions:

- To implement effectively the programs through creativity and innovation in teaching, learning and evaluation.
- To make existing programs more careers oriented through effective system of review and redesign of curriculum.
- To impart spirit of enquiry and scientific temperament among students through research oriented activities.
- To enhance reading and learning capabilities among faculty and students and inculcate sense of life long learning.
- To promulgate process for effective, continuous, objective oriented student performance evaluation.
- To ordinate periodic performance evaluation of the faculty.
- To incorporate themes to build values, Civic responsibilities & sense of national integrity.
- To ensure that the academic, career and personal counseling are in-built into the system of curriculum delivery.
- To strengthen, develop and implement staff and student welfare programs.
- To adopt and implement principles of participation, transparency and accountability in governance of academic and administrative activities.
- To constantly display sensitivity and respond to changing educational, social, and community demands.
- To promote public-private partnership.

INSIGNIA



The Emblem of the **KAHER** is a Philosophical statement in Symbolic.

The Emblem...

A close look at the emblem unveils a pillar, a symbol of the "KAHER of Excellence" built on strong values & principles.

The Palm and the Seven Stars...

The Palm is the palm of the teacher- the hand that acts, promises & guides the students to reach for the Seven Stars...

The Seven Stars signify the 'Saptarishi Dnyanamandal", the Great Bear-a constellation made of Seven Stars in the sky, each signifying a particular Domain. Our culture says: The true objective of human birth is to master these Knowledge Domains.

The Seven Stars also represent the Saptarishis, the founders of KLE Society whose selfless service and intense desire for "Dnyana Dasoha" laid the foundation for creating the knowledge called KLE Society.

Hence another significance of the raised palm is our tribute to these great Souls for making this KAHER a possibility.

Empowering Professionals...

'Empowering Professionals', inscription at the base of the Emblem conveys that our Organization with its strength, maturity and wisdom forever strive to empower the student community to become globally competent professionals. It has been a guiding force for many student generations in the past, and will continue to inspire many forth coming generations.



KLE Academy of Higher Education & Research

(Deemed-to-be-University)

[Declared as Deemed-to-be-University u/s 3 of the UGC Act, 1956 vide Government of India Notification No. F.9 -19/2000-U.3 (A)]

Accredited 'A' Grade by NAAC (2nd Cycle)

Placed in Category 'A' by MHRD(GoI)

JNMC Campus, Nehru Nagar, Belagavi-590 010, Karnataka State, India

Phone : 0831-2444444 / 2493779 Fax : 0831-2493777

Web: [http:// www.kledeemeduniversity.edu.in](http://www.kledeemeduniversity.edu.in)

E-mail : info@kledeemeduniversity.edu.in

www.kleuniversity.edu.in

info@kleuniversity.edu.in

Ref. No. KAHER/AC/18-19/D-216(10)

Dated : 20-03-2018

NOTIFICATION

**Sub : Ordinance governing the syllabus/curriculum for
M.Sc. Biotechnology.**

**Ref : Minutes of the 37th meeting of the Academic Council of
the KAHER held on 16-03-2018**

In exercise of the powers conferred under Rule A-04(i) of the Memorandum of Association of the KAHER, the Academic Council of the KAHER is pleased to approve the Ordinance governing the syllabus/curriculum for **M.Sc. Biotechnology**, in its meeting held on **16th March 2018**.

The Ordinance shall be effective for the students admitted to **M.Sc. Biotechnology** in the constituent unit of the KAHER viz. **Dr. Prabhakar Kore Basic Sciences and Research Center, Belagavi** from the academic session **2018-19** onwards.

By Order



REGISTRAR

To
The Director,
KAHER's Dr Prabhakar Kore BSRC
Belagavi.

CC to:

1. The Secretary, University Grants Commission, New Delhi,
2. The PA to Hon. Chancellor, KAHER, Belagavi.
3. The Special Officer to Hon. Vice- Chancellor, KAHER, Belagavi.
4. All Officers of the KAHER- Academic Affairs/ Allied Course/ Examination Branch.

SECTION-III

Regulations Governing M.Sc.- Biotechnology Degree Semester Course

3.1. Eligibility for Admission:

3.1.1 Graduate in Life Sciences from statutory University/Institute at graduation level. Candidates appearing for final year examinations can also apply, but their admission will be subject to obtaining a minimum of 50% marks (45% for SC/ST) in the qualifying examination.

3.1.2 The degree should have been obtained from any University/Institute recognized by UGC, established by law in India and the medium of instruction for the degree should be English. For international candidates their degree should be recognized by AIU and where medium of instruction may not be English they should have passed any International proficiency test like IELTS, TOEFL etc.

3.1.3 A Candidate who has scored a minimum of 50% of the marks (aggregate of three/four years for graduate degree holders) prescribed for the qualifying examination shall be eligible for the admission to the M.Sc.- Biotechnology Course.

3.2. Proposed Intake of Candidates: 10

3.3. Duration of the Course:

The course of study including submission of dissertation on the topic registered shall be semester based, that includes 4 semesters each extending for six months from the commencement of academic semester. At the end of each semester, there shall be a University examination. At the end of Semester IV, there shall be a Final University Examination. Candidate shall submit a dissertation on the topic approved by the University five months prior to Semester IV Examination.

Medium of Instruction and Examination shall be English

3.4. Requirement to Complete the Course:

Semester I	+	Semester II	+	Semester III	+	Semester IV [Dissertation+ Industrial Training]	=	M.Sc.- BT Degree
---------------	---	----------------	---	-----------------	---	--	---	---------------------

any other examination conducted by this University or any other University in India or abroad during the period of registration.

3.6.1.2 Each semester shall be considered as a unit for the purpose of calculating attendance.

3.6.1.3 Every candidate shall attend symposia, seminars, conferences, workshops, journal review meetings, dissertation/ Project work review meetings and lectures during each semester as prescribed by the Department/College/University and not absent himself / herself without valid reasons.

3.6.1.4 Candidate who has put in a minimum of 75% of attendance in the theory and practical assignments separately shall be permitted to appear for University examination at the end of each semester.

3.6.1.5 Candidate will be allowed to appear the Semester IV examination only if the dissertation submitted is accepted.

3.6.1.6 Any candidate who fails to complete the course in the manner stated above shall not be permitted to appear for the semester University examinations.

3.6.2 Monitoring Progress of Studies

3.6.2.1 Log Book: Every candidate shall maintain a log diary and record his/her participation in the seminars, workshops, training programs, journal reviews etc. conducted by the Department. The Practical laboratory note book shall be made separately to maintain the experimental details by the candidate as well as for internal and University assessment. The Practical laboratory note book shall be checked by subject in-charge and certified by the Department Head and presented in the University viva-voce examination.

3.6.2.2 Sessional Examination: Records and marks obtained in sessional test shall be maintained by the course co-ordinator under supervision of Head of the Department and sent to the University, when called for.

3.6.2.3 Records: Records and marks obtained in sessional tests, seminars, journal club, and weekly written assignments which shall be maintained by the course co-ordinator under supervision of Head of the Department and shall be made available to the University.

Summary

References

Annexures

3.7.7 The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, graphs, and other annexures. It should be neatly typed with double line spacing on one side of the bond paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding is not permitted. The dissertation shall be certified by the guide and co-guide if any, Head of the Department and Head of the Institution.

3.7.8 The dissertation shall be valued by examiners appointed by the KAHER.

3.7.9 A guide shall be a full time postgraduate teacher of a constituent college/department of KAHER and recognized by KAHER as a guide for supervision of dissertation work.

3.7.10: Change of Guide: Guide may be changed with prior permission from the KAHER.

3.7.11 Submission of Dissertation: Two copies of the dissertation duly certified by the Guide, the Head of Department of KAHER's Dr. Prabhakar Kore Basic Science Research Center, Belagavi shall be submitted to the Controller of Examinations, KLE Academy of Higher Education and Research, through the Head of the Department at least five months before University Examination of semester IV.

3.8 Industry/Research Center Training:

Every candidate shall undergo industrial / research center training for a period of two months in fourth semester at an organization of national recognition for industrial/laboratory experience.

Candidate should submit two copies of the training report duly certified by the authorities of the training center in which he/she has undergone training duly accepted and certified by the Head of the Department.

3.9. Schedule of Examination

There shall be a University examination at the end of each semester for all four semesters and viva-voce at the end of semester IV (dissertation work and industrial

3.10.2.2 Viva-voce:

Each candidate shall give viva-voce examination for semester IV (dissertation and industrial training).

SCHEME OF UNIVERSITY EXAMINATION: THEORY/ ELECTIVE (Semester I / II / III)

Question Type	Number of Questions	Marks for each	Maximum Marks	Total Marks
Long Essay Questions	2	15	30	80
Short Essay Questions	5	10	50	

SCHEME OF UNIVERSITY EXAMINATION: PRACTICAL (Semester I / II / III)

Question Type	Number of Questions	Marks for each	Maximum Marks	Total Marks
Synopsis/Practical Questionnaire	5	04	20	80
Experiment (includes Major & Minor)	2	15	30	
Viva-voce	-	-	30	

(A). M.Sc. - Biotechnology Semester I:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum Marks to pass
MBT-I-1 T	Microbiology	20	80	100	50
MBT-I-2 T	Genetics and Molecular Biology	20	80	100	50
MBT-I-3 T	Biochemistry	20	80	100	50
MBT-I-1 P	Microbiology, Biochemistry and Immunodiagnostics	20	80	100	50
MBT-I-2 P	Molecular Biology	20	80	100	50
MBT-I-E T	Elective(s) as per selection	20	80	100	50

VIVA VOCE

At the end of semester IV candidate will appear for KAHER viva-voce examination.

3.10.3. Dissertation Valuation:

The examiners appointed by the KAHER shall evaluate the dissertation. Approval of dissertation work is an essential prerequisite for a candidate to appear in the semester IV KAHER examination. The dissertation shall be valued by two evaluators (examiners) one within the KAHER and one outside. Any one-evaluator acceptance will be considered as a prerequisite for eligibility to take up the examination.

3.10.3.1 Viva-Voce and Defense Examination: The viva-voce and defense examination shall aim at assessing the depth of knowledge in submitted research work, study rationale and logical reasoning, confidence, findings of the study and oral communication skills.

The viva-voce and defense examination shall be held after the submission of dissertation. If a candidate fails to submit the dissertation on or before the date prescribed, his/her viva-voce and defense shall be conducted during the subsequent KAHER examination.

3.10.3.2 Examiners: There shall be at least two examiners, out of them one shall be external examiner and other the internal examiner.

3.11. Criteria for Declaring Pass

3.11.1 A candidate shall be declared to have passed M.Sc. –Biotechnology if all the conditions below are fulfilled:

M.Sc.-Biotechnology Semester I:

- Candidate who secures Grade B or above in each subject in theory / practical/ elective examinations of KAHER and Sessional considered together

M.Sc.-Biotechnology Semester II

- Candidate who secures Grade B or above in each subject in theory / practical/ elective examinations of KAHER and Sessional considered together.

Cumulative Grade Point Average (CGPA)

Letter Grades and Grade Points equivalent to percentage of Marks and performances

10 Point Grade Scale

Percentage of marks obtained	Letter Grade	Grade Point	Performance
91.00 - 100	O	10	Outstanding
80.00 -89.99	A+	9	Excellent
70.00-79.99	A	8	Good
60.00-69.99	B+	7	Fair
50.00-59.99	B	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

1. Conversion of Grades in to GPA:

$$\text{GPA} = \text{Credits} \times \text{Grade Points} / \text{Total Credits}$$

2. Cumulative Grade Point Average (CGPA) of all 4 Semester will be calculated as: Total No. GPA / No. of Semester

Ordinance Governing

Master of Science in Nutrition and Dietetics

(Post-graduate Degree course under Allied Health Science)

Syllabus / Curriculum

2018 – 19



Re- Accredited 'A' Grade by NAAC (2nd Cycle)

Placed in Category 'A' by MHRD (GOI)

CONTENT

S. NO.	TOPICS	PAGE NO.
1.	Section I Preamble	1
2.	Section II Vision, Mission & Objectives	2
3.	Section III Regulations Governing MSc. (Nutrition and Dietetics)	5
	Degree Semester Course	
4.	Section IV Course Content	16
	4.1 Semester I Theory	
	NADI-1T Human Physiology, & Nutrition science	16
	NADI-2T Research Methodology and Statistics	16
	NADI-3 T Applied Nutrition & sports nutrition	17
	NADI-4 PI Practical Applied nutrition	17
	NADI-5T Elective	18
	4.2 Semester II Theory	19
	NADII-1 T Nutritional Biochemistry	
	NADII-2T Principles of Food Science and Food Microbiology	
	NADIV-3T Nutraceuticals	20
	NADII PI Nutritional Biochemistry	20
	NADII PII Food science	20
	NADII-4 T Elective 2	20
	4.3 Semester III Theory	21
	NADIII-1T Food Service Management and Entrepreneurship	21
	NADIII-2 T Food Toxicology	21
	NADIII-3 T Therapeutic Nutrition	25
	NADIII-1 PI Practical: Food Service Management	
	NADIII- PII Therapeutic nutrition	22
	NADIII- 4T Elective 3	22
	4.4 Semester IV Theory	23
	NADIV-1T Clinical Nutrition and Dietetics	23
	NADIV-1P1 Clinical Nutrition and Dietetics	25
	NADIV-2T Nutrition in Emergencies	
		24
	NADIV-P2 Master Dissertation – Part II – Evaluation	24
	NADIV-3 Elective 2	

SECTION – I

PREAMBLE

- The Master's program of Nutrition and Dietetics provides professional education for those who wish to develop a career in Dietetics, Community Nutrition, Food industry or Nutrition research. The aim of the course is to impart a comprehensive knowledge, skills and to ensure that the students acquire competence including public health, medical nutrition therapy, food service management, communication, management, research and evaluation in nutrition. The candidate will be able to assist Medical and Allied Health Professionals to understand the principles of dietary management and apply, while providing Quality service in relation to nutrition in the Hospital and Community
- Why Master of Science in Nutrition and Dietetics?
- Many corporate laboratories industries and R & D centres are establishing branches in India. There is always increased demand, competition & urge to improve their own quality in nutrition. Hence there is lots of scope and opportunity for those who are willing to perceive this course. They can always utilize the skills for kitchen management and meal planning.

(A). MSc. Semester I Theory:

Paper No.	Paper		Max. Internal Assessment marks	Max. University marks	Total maximum marks	Minimum Marks to Pass
NADI-1	Paper 1	Human Physiology & Nutrition Science	20	80 (35 + 45)	100	50
NADI-2	Paper 2	Research Methodology and Statistics	20	80 (45+35)	100	50
NADI-3	Paper 3	Applied Nutrition & Sports nutrition	20	80 (45 +35)	100	50
NADI-5	Elective-1		10	40	50	25
	Elective-2		10	40	50	25

(B). MSc. Semester II Theory:

Paper No.	Paper	Subjects	Max. Internal Assessment marks	Max. University marks	Total maximum marks	Minimum Marks to pass
NADII-1	Paper 1T	Nutritional Biochemistry	20	80	100	50
NADII-2	Paper 2 T	Principles of Food Science and Food Microbiology	20	80 (50+30)	100	50
NADII-3	Paper 3 T	Nutraceuticals	20	80	100	50
NADII-4	Elective 2		10	40	50	25
	Elective 2		10	40	50	25

(C). MSc Semester III Theory:

Paper No.	Paper	Subjects	Max. Internal Assessment marks	Max. University marks	Total maximum marks	Minimum Marks to pass
NADIII-1T	Paper 1	Food Service Management and Entrepreneurship	20	80 (60+20)	100	50
NADIII-2 T	Paper 2	Food Toxicology	20	80	100	50
NADIII-3 T	Paper 3	Therapeutic Nutrition	20	80 (60+20)	100	50
NADIII-4 T	Elective 1		10	40	50	25
	Elective 2		10	40	50	25

(D). MSc Semester IV Theory

Paper No.	Paper	Subjects	Max. Internal Assessment marks	Max. University marks	Total maximum marks	Minimum Marks to pass
NADIV-1T	Paper 1	Clinical Nutrition and Dietetics	20	80	100	50
NADIV-2 T	Paper 2	Nutrition in Emergencies	20	80	100	50
NADIV-3 T	Elective 1		10	40	50	25
	Elective 2		10	40	50	25

(D). Practical Examination

All Practical will have University examinations.

Sr. no	Theory	Practical + IA + Viva	Grand Total
1	Practical (Major 40 + Minor 20)	60 + 20 + 20	100

3.10.3. Dissertation Valuation:

The examiners appointed by the University shall evaluate the dissertation. Approval of dissertation work is an essential prerequisite for a candidate to appear in the semester IV University examination. The dissertation shall be valued by two evaluators (examiners) one within the University and one outside. Any one-evaluator acceptance will be considered as a prerequisite for eligibility to take up the examination.

3.10.3.1 Viva-Voce and Defense Examination: The viva-voce and defense examination shall aim at assessing the depth of knowledge, logical reasoning, confidence and oral communication skills.

The viva – voce and defense examination shall be held after the submission of dissertation. If a candidate fails to submit the dissertation on or before the date prescribed, his/her viva-voce and defense shall be conducted during the subsequent University examination.

3.10.3.2 Examiners: There shall be at least two examiners, out of them one shall be external examiner and the other the internal examiner.

3.11. Criteria for Declaring Pass

3.11.1 A candidate shall be declared to have passed MSc if all the conditions below are fulfilled:

MSc. (Nutrition and Dietetics)-Semester I:

- Candidate who secures Grade B or above in each subject in theory
- Candidate shall further obtain grade B or above in practical of University examinations

MSc. (Nutrition and Dietetics)-Semester II

- Candidate who secures Grade B or above in each subject in theory
- Candidate shall further obtain grade B or above in practical of University examinations

MSc. (Nutrition and Dietetics)-Semester III

- Candidate who secures Grade B or above in each subject in theory
- Candidate shall further obtain grade B or above in practical of University examinations

MSc. (Nutrition and Dietetics)-Semester IV

- Candidate who secures Grade B or above in each subject in theory
- Candidate shall further obtain grade B or above in practical of University examinations
- Candidate shall further obtain Grade B or above in viva-voce.

3.11.2 Carry over:

At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he is appearing for. e.g:

- If the candidate has not cleared semester I, he can appear for semester II and pending subjects of semester I simultaneously.
- For appearing for semester III he should have cleared semester I and can appear for papers pending from semester II along with semester III subjects.
- For appearing for semester IV he/she should have cleared semester II completely and can appear pending papers of semester III simultaneously.

Cumulative Grade Point Average (CGPA)

Letter Grades and Grade Points equivalent to percentage of Marks and performances

10 Point Grade Scale

Percentage of marks obtained	Letter Grade	Grade Point	Performance
91.00 - 100	O	10	Outstanding
80.00 - 89.99	A+	9	Excellent
70.00-79.99	A	8	Good
60.00-69.99	B+	7	Fair
50.00-59.99	B	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

1. Conversion of Grades in to GPA:

$$\text{GPA} = \text{Credits} \times \text{Grade Points} / \text{Total Credits}$$

2. Cumulative Grade Point Average (CGPA) of all 4 Semester will be calculated as:

$$\text{Total No. GPA} / \text{No. of Semester}$$

**SECTION-IV
COURSE CONTENT**

4.1 SEMESTER I

Sr. no	Subject Code	Theory	Subjects	Credit Points
1	NADI-1T	Paper 1	Human Physiology & Nutrition Science	3+3 =6
2	NADI-2 T	Paper 2	Research Methodology and Statistics	3
3	NADI-3 T	Paper 3	Applied Nutrition & sports nutrition	3+3=6
4	NADI-PI	Paper 4	Practical	2
5	NADI-4	Electives		4
6	Dissertation(Synopsis development)		Practical	2
Total				23

**Note- Choose 2 electives (from List of Electives) amounting to total of 2 CREDITS*

THEORY

Semester I

PAPER I: NADI-1 Human Physiology & Nutrition Science:

Section A

Subject: Human Physiology

Theory 45 Hours

GENERAL PHYSIOLOGY (3 Hours): Structure of Cell membrane and Cell Organelles, intercellular junctions,

BLOOD (6 Hours) : Composition and functions of blood and plasma proteins, Erythropoiesis & its regulation, Anemia, Leucopoiesis and its regulation, Blood Groups: ABO and Rh blood group systems, Haemostasis, Immunity – Immune System, Classification, Specific and Non Specific Defense Mechanisms, Antibodies

CARDIOVASCULAR SYSTEM (6 Hours): Physiological Anatomy of Heart, Cardiac Cycle – Definition and Phases, Cardiac Output - Definition, factors and measurement of cardiac output, Blood

Ordinance Governing Syllabus/Curriculum
of
M.Sc. Course (CBCS) - Allied Health Sciences
In
Psychology
2017-18

M. Sc. in Psychology

Subjects	Paper	Instruction hrs/week	Duration of Exam (Hrs)	Marks			Credits
				IA	Exam	Total	
a) I Semester of the Postgraduate Program							
Hard Core Subjects	101 - Historical Perspectives of Psychology 102 - Cognitive Psychology 103 – Biopsychology	3x4	3x3	3x20	3x80	3x100	3x4
	104 – Experimental Psychology (Practical -1) 105 – Experimental Psychology(Practical II)	2x8	2x6	2x20	2x80	2x100	2x4
Soft Core	106 – Research Methods Or Psychometry	1x4	1x3	1x20	1x80	1x100	1x4
Bridge course	107- Introduction to Psychology	1x4	1x3	1x20	1x80	1x100	1x4
Semester Total Credits							28

b) II Semester of the Postgraduate Program							
Hard Core Subjects	201 – Psychological statistics 202 - Counselling and guidance 203 – Child Psychopathology	3x4	3x3	3x20	3x80	3x100	3x4
	204 – Child Assessment and intervention. (Practical-1) 205 – Computer Applications (Practical -II)	2x8	2x6	2x20	2x80	2x100	2x4
Soft Core	206 – Personality Psychology Or School Psychology	1x4	1x3	1x20	1x80	1x100	1x4
Semester Total Credits							24

c) III Semester of the Postgraduate Program							
Hard Core Subjects	301 – Organizational Behaviour 302 – Psychopathology 303 – Psychological Therapies	3x4	3x3	3x20	3x80	3x100	3x4
	304 – Clinical Assessment and intervention (Practical -1) 305 – Alternative healing techniques (Practical -2)	2x8	2x6	2x20	2x80	2x100	2x4
Soft Core	306 – Positive Psychology Or Theories of Learning	1x4	1x3	1x20	1x80	1x100	1x4
Semester Total Credits							24

d) IV Semester of the Postgraduate Program							
Hard Core Subjects	401 – Health Psychology 402 – Social and Community Psychology 403 – Rehabilitation Psychology	3x4	3x4	3x20	3x80	3x100	3x4
	404 – Internship			Report Evaluation -60 Viva-40		1x100	6
	405 – Dissertation			Dissertation-60 Viva-40		1x100	8
Semester Total Credits							26
Program Grand Total of Credits							102

***Bridge course paper is compulsory for the students who have not studied psychology at undergraduate level.**

Preamble

Psychology is the science or scientific study of the human mind and behaviour and as such plays a number of important roles in modern society. It emerged in Western countries and traveled to India approx 70 years back. Psychology is an upcoming field and is becoming one of the most popular courses. Master's Degree in psychology has been of great demand in the recent years, the need for psychological assistance and guidance has been recognized by all the sections of the society and there is a dearth of professionals in the field. Keeping this in mind the present curricular has been framed to provide theoretical as well as practical training in a wide range of specialization in the field of Psychology. As both an academic discipline and a professional practice, psychology is employed in many industries.

Vision:

To be an outstanding department in the pursuit of quality and excellence at National and International level in Postgraduate education in the field of psychology, where post graduate students and faculty establish close collaboration to learn the scientific principle of behavior and mental processes, to make significance contributions to the research and practice of psychology; and also to produce professionals who serve the local, national and global communities.

Mission:

To provide and promote quality education and innovations by providing the necessary infrastructure and learning resources.

To encourage and enhance the knowledge through continuing education programmes and significant research involving students, staff and community.

To provide wellness focused services that promote psycho emotional development and prevent and address the development of mental health challenges; and continue to strive for excellence in supporting mental health for the children, youths and families in the community.

Department values:

- Maintain high academic standards for post graduate students.
- Expect faculty to be dedicated to exceptional teaching and mentoring.
- Serve as scholarly role models who makes significant contributions to psychology.
- Encourage a balance between the theoretical and practical aspects of psychology.

Scope:

The Post-graduation in M. Sc. Psychology would help the students to be eligible to be employed in the field of Education, Clinical / hospital setup, Law, Defense, Sports, Social Services as well as in corporate sector/ organizations in the capacity of Counselor, Psychologist, Therapist, Teaching faculty, Psychometrician, Trainer and as a facilitator. Students would also be equipped to prepare and fare well in research, competitive exams conducted by UGC / ICSSR / State and Central Civil Services Boards, KSET etc.

Eligibility:

Candidates who have passed the Three Years BA (with Psychology) / B.Sc. or Graduates from Life Health Sciences from any recognized University.

Evaluation Pattern: CGPA

Proposed Intake of Students: 20

Duration of the Programme:

The programme of study for M.Sc. Degree in Psychology shall normally extend over a period of two consecutive academic years, each academic year comprising two semesters and each semester comprising 16 weeks of class work.

Teaching Course:

Each theory paper shall be taught for 4 hours per week, practicals shall be conducted 6 hours per week during the period of 16 weeks or minimum 90 working days in a given semester. However, the actual number of classes may not be 64 hours as per the above calculation. It may vary from paper to paper depending on the activities of the department, general holidays and the calendar of events prescribed by the University from time to time.

Medium of Instruction and examination shall be English**Scheme of Papers and Credits/Classes and Marks**

A) There shall be two categories of papers viz., Hard Core(Compulsory) papers, Soft core papers.

B) The Credits for each of the Hard core (Compulsory) paper and Soft Core paper are **4**.

Field Visits : UHC / PHC, Day Care centers, Industries Rehabilitation centers, Educational institutions, Hospitals and other institutions / organizations related to mental health.

Attendance:

- The student shall be considered to have satisfied the requirement of attendance if he/she has attended not less-than 75% of total number of classes held till the end of the semester inclusive of practical. Each student will have to sign his/her attendance for every hour of teaching in each paper.
- However, if a student represents the Department/ University/ State/ Nation in sports, NCC, NSS or Cultural or any other officially sponsored activities he/she shall be eligible to claim the Attendance for the actual number of days utilized in such activities (including travel days) subject to the production of certificate from the relevant authority within two/three weeks after the event.
- A student who does not satisfy the requirement of attendance of 75% in each paper shall not be permitted to appear the semester end examination.

Internship:

A candidate shall undergo field training for a period of two months at a Hospital /organization (Registered) in fourth semester for field experience.

Candidate should submit 2 copies of Internship / Training report duly certified by the Authorities of Hospital / Organization in which he / she has completed Internship duly accepted and certified by the Head of the Department.

Records:

Record and marks obtained in internal assessment, seminars, field and other related activities shall be maintained by the head of the department and shall be made available to the university.

Dissertation:

- **Synopsis:** Every candidate shall submit a synopsis of the intended dissertation work under the supervision of guide to the Director, Allied Health Sciences, KAHER through the HOD and Head of the Institution, before six months from the date of commencement of classes. The date will be notified by KAHER.
- Such synopsis will be reviewed and the Dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.
- The guide shall be a full time post graduate teacher of a constituent colleges of KAHER and recognized by KAHER as a guide for supervision of dissertation work.
- Candidate pursuing M.Sc. Psychology course is required to carry out a research project under the guidance of recognized guide. The results of such work shall be submitted in the form of a Dissertation.
- The Dissertation is aiming to train the candidate in Research Methodology, which includes identification of the problem, formulation of hypothesis (if any), objectives of the study, review of literature, getting acquainted with recent advances, research design, collection of data, statistical analysis, comparison and discussion of results and drawing conclusions.
- Dissertation shall require approval of the Institutional Ethics Committee (IEC) prior to initiation of any dissertation work. Candidate shall work under the supervisor to attain IEC approval. Student shall maintain regular contact with the guide during his/her dissertation work.
- The written text of Dissertation should be neatly typed and bound properly. Spiral binding is not permitted. The Dissertation shall be Certified by the guide and Co guide (if any), Head of the Department and Head of the Institution.
- The dissertation shall be evaluated by the Examiners appointed by the university.
- Submission of Dissertation: Three copies of the dissertation duly certified by the guide, Head of Department of Psychology shall be submitted to the controller of Examination, KAHER through the Head of the department on or before the date notified by the university (at least 3 months before university examination of semester IV).

Monitoring Progress of Dissertation and Internship Work:

Every candidate shall maintain a log dairy and Internship dairy related to his / her dissertation and Internship programme. These dairies shall be scrutinized and certified by the Head of the Department and shall be presented in university examination of semester IV (dissertation and internship report evaluation and viva voce examination).

Exams & Evaluation:

Evaluation of the papers will have two components-

I) Internal Assessment

II) Semester End examination

I) Two internal assessments will be made during each semester -

Written Tests of 20 marks each / Seminars

The average of total marks obtained in IA 1 & IA 2 will be taken into account for compilation of grades. The average marks statement of IA 1 & IA 2 will be submitted to the Controller of Examination at least 15 days prior to the commencement of semester end exam.

II) There shall be 4 University examinations for the entire course namely I, II, III, IV semester examination. The examination will be conducted at the end of each semester -of 3 hours duration for every theory paper & 6 hours duration for practical for **80** marks. The practical exams shall be conducted by two examiners, one external and one internal from the panel of examiners prepared by B.O.S and approved by the university.

The examination shall be conducted as per the rules, regulations, notifications, orders, instructions, procedures, formats and circulars issued by the University from time to time.

Scheme of Examination for Theory

Question	Number of Questions	Marks	Maximum Marks	Total Marks
Long Essay Questions	4	15	60	80
Short Essay Questions	4	05	20	

Scheme of Examination for Practicals

Writing Practicals	Administering practical	Viva - Voce	Total Marks
30	20	30	80

Dissertation & Internship Evaluation:

The examiners appointed by the university shall evaluate the dissertation. Approval of dissertation work is an essential prerequisite for a candidate to appear in the Semester IV University examination.

A Dissertation and Internship report shall be evaluated by two examiners, one external and one internal from the panel of examiners prepared by B.O.S and approved by the university along with this Viva - Voce shall be conducted.

Scheme of Examination for Internship and Dissertation

	Report & Dissertation Evaluation	Viva - Voce
Internship	60	40
Dissertation	60	40

Completion of the Course:

- A candidate is expected to successfully complete the Degree programme within two years from the date of admission.
- Whenever the syllabus is revised, the candidate reappearing will have to write the examination as per the syllabi prevailing to their academic year. (Syllabus that they studied during their academic year)

- The CBCS scheme is a fully **carry-over** system. However, the four-semesters (two years course) should be completed by the student. At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he/she is appearing for.
- If the candidate has not cleared semester I, he/she can appear for semester II and pending subjects of semester I simultaneously.
- For appearing for semester III he/she should have cleared semester I and can appear for papers pending from semester II along with semester III subjects.
- For appearing for semester IV he/she should have cleared semester II completely and can appear pending papers of semester III simultaneously.

Declaration of Results:

Minimum for a pass in each paper shall be 50% of the total 100 marks. However a candidate should obtain at-least 50% marks in the Semester-End examination. There is no minimum for the Internal Assessment marks. However after adding the IA marks and the semester end examination marks, the candidates should score a minimum of 50% of the maximum marks per paper.

Candidate shall secure a minimum of 50 % in aggregate in all papers of a programme in each semester to successfully complete the programme.

Marks and Grade Points:

The grading of successful candidate/s at the examination shall be as follows:

Percentage of Marks Obtained	Grade point	Grade	Performance
90.00 -100	9 - 10	O	Outstanding
80.00 -89.99	8 - < 9	A+	Excellent
70.00 -79.99	7 - < 8	A	Very Good
60.00 -69.99	6 - < 7	B+	Good
50.00 -59.99	5 - < 6	B	Average
Less than 50	0	C	Fail
Ab(Absent)	0	AB	Fail

Conversion of Grades into GPA:

$$\text{GPA or SGPA} = \text{Credits X Grade Points} / \text{Total Credits}$$

CGPA (Cumulative Grade Point Average)

$$\text{Total NO.GPA} / \text{Credits of All Semesters}$$

Class shall be declared on the basis of the aggregate marks scored in each semester i.e semester I, II, III and IV as follows;

1. 75% and Above = Distinction
2. 60% and Above but less than 75% = First Class
3. 50% and Above but less than 60% = Second Class

The candidate shall not take more than double the number of semesters prescribed for the course (i.e. 8 semesters) for passing, failing of which the candidate shall seek readmission.

SECTION – I

PREAMBLE

There is a dearth of core Public Health Professionals in the government health machinery. It is estimated that more than 10,000 Public Health Professionals would be required on an annual basis to equip the government machinery with an appropriately trained and qualified public health workforce. With a rapid health transition taking place, India faces two threats, one being the rising disease burden and the other is the poor allocation of government funds; both can be effectively managed by personnel trained in public health through appropriate public health training, i.e. ability to involve communities, work in multidisciplinary teams, and lobbying with government and community leaders with a deep understanding of social, economical and environmental determinants of health. Public Health Professionals are well armed to face these challenges.

Why Master of Public Health (MPH)?

The most widely recognized professional credential for leadership in public health is the MPH degree. This program prepares candidates to be competitive on a global level in the vast area of community health. It emphasizes on acquisition of skills essential to the practice of public health through techniques like student-directed learning, problem solving and field postings. Public Health Professionals can function as policy analysts, health planners, epidemiologists, demographers, social and behavioral scientists.

SECTION – II

VISION:

To be a premier Public Health Department for Quality Education, Research and Leadership.

MISSION:

The Department of Public Health is committed to:

- Train and Create a Cadre for Public Health Leadership
- Promote Positive Health across Population
- Ensure Collective Commitment to Quality Research

This shall be achieved by following objectives:

OBJECTIVES:

By the end of the MPH program the candidates will achieve the following learning objectives under ten different areas listed below.

I. Epidemiology skills:

Candidates shall be able to:

- Define, assess and understand the health status of populations, determinants of health and illness, factors contributing to health promotion and disease prevention and factors influencing the use of health services.
- Identify and apply the research methods used in all basic public health sciences, including epidemiology, health and policy administration, behavioral and social sciences, biostatistics and environmental and occupational public health to prevent illness and injury.
- Describe the correlation and interactions among multiple determinants of health at intra & interpersonal organizational, community and societal levels (i.e., ecological model).

II. Analytic skills:

Candidates shall be able to:

- Define, identify and resolve public health problems by using appropriate data and statistical methods.
- Select and define variables relevant to defined public health problems, use data to illustrate ethical, political, scientific, economic and overall public health issues.

3.11. Criteria for Declaring Pass

3.11.1 A candidate shall be declared to have passed MPH if all the conditions below are fulfilled:

MPH-Semester I:

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together

MPH-Semester II

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together.
- Candidate shall further obtain Grade B or above in viva-voce
- Candidate shall pass practical and theory separately.(e.g. If candidate passes in theory and fail in practical, he/she shall appear only practical examination)

MPH-Semester III

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together.

MPH-Semester IV

- Candidate who secures Grade B or above each subject in theory University & Sessional examinations considered together.
- Candidate shall further obtain Grade B or above in viva-voce.

3.11.2 Carry over:

At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he is appearing for. e.g:

- If the candidate has not cleared semester I, he can appear for semester II and pending subjects of semester I simultaneously.
- For appearing for semester III he should have cleared semester I and can appear for papers pending from semester II along with semester III subjects.
- For appearing for semester IV he/she should have cleared semester II completely and can appear pending papers of semester III simultaneously.

Cumulative Grade Point Average (CGPA)

Letter Grades and Grade Points equivalent to percentage of Marks and performances

10 Point Grade Scale

Percentage of marks obtained	Letter Grade	Grade Point	Performance
91.00 - 100	O	10	Outstanding
80.00 -89.99	A+	9	Excellent
70.00-79.99	A	8	Good
60.00-69.99	B+	7	Fair
50.00-59.99	B	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

1. Conversion of Grades in to GPA:

$$\text{GPA} = \text{Credits} \times \text{Grade Points} / \text{Total Credits}$$

2. Cumulative Grade Point Average (CGPA) of all 4 Semester will be calculated as:

$$\text{Total No. GPA} / \text{No. of Semester}$$

SECTION – I

PREAMBLE

There is a dearth of core Public Health Professionals in the government health machinery. It is estimated that more than 10,000 Public Health Professionals would be required on an annual basis to equip the government machinery with an appropriately trained and qualified public health workforce. With a rapid health transition taking place, India faces two threats, one being the rising disease burden and the other is the poor allocation of government funds; both can be effectively managed by personnel trained in public health through appropriate public health training, i.e. ability to involve communities, work in multidisciplinary teams, and lobbying with government and community leaders with a deep understanding of social, economical and environmental determinants of health. Public Health Professionals are well armed to face these challenges.

Why Master of Public Health (MPH)?

The most widely recognized professional credential for leadership in public health is the MPH degree. This program prepares candidates to be competitive on a global level in the vast area of community health. It emphasizes on acquisition of skills essential to the practice of public health through techniques like student-directed learning, problem solving and field postings. Public Health Professionals can function as policy analysts, health planners, epidemiologists, demographers, social and behavioral scientists.

SECTION – II

VISION:

To be a premier Public Health Department for Quality Education, Research and Leadership.

MISSION:

The Department of Public Health is committed to:

- Train and Create a Cadre for Public Health Leadership
- Promote Positive Health across Population
- Ensure Collective Commitment to Quality Research

This shall be achieved by following objectives:

OBJECTIVES:

By the end of the MPH program the candidates will achieve the following learning objectives under ten different areas listed below.

I. Epidemiology skills:

Candidates shall be able to:

- Define, assess and understand the health status of populations, determinants of health and illness, factors contributing to health promotion and disease prevention and factors influencing the use of health services.
- Identify and apply the research methods used in all basic public health sciences, including epidemiology, health and policy administration, behavioral and social sciences, biostatistics and environmental and occupational public health to prevent illness and injury.
- Describe the correlation and interactions among multiple determinants of health at intra & interpersonal organizational, community and societal levels (i.e., ecological model).

II. Analytic skills:

Candidates shall be able to:

- Define, identify and resolve public health problems by using appropriate data and statistical methods.
- Select and define variables relevant to defined public health problems, use data to illustrate ethical, political, scientific, economic and overall public health issues.

3.11. Criteria for Declaring Pass

3.11.1 A candidate shall be declared to have passed MPH if all the conditions below are fulfilled:

MPH-Semester I:

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together

MPH-Semester II

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together.
- Candidate shall further obtain Grade B or above in viva-voce
- Candidate shall pass practical and theory separately.(e.g. If candidate passes in theory and fail in practical, he/she shall appear only practical examination)

MPH-Semester III

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together.

MPH-Semester IV

- Candidate who secures Grade B or above each subject in theory University & Sessional examinations considered together.
- Candidate shall further obtain Grade B or above in viva-voce.

3.11.2 Carry over:

At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he is appearing for. e.g:

- If the candidate has not cleared semester I, he can appear for semester II and pending subjects of semester I simultaneously.
- For appearing for semester III he should have cleared semester I and can appear for papers pending from semester II along with semester III subjects.
- For appearing for semester IV he/she should have cleared semester II completely and can appear pending papers of semester III simultaneously.

Cumulative Grade Point Average (CGPA)

Letter Grades and Grade Points equivalent to percentage of Marks and performances

10 Point Grade Scale

Percentage of marks obtained	Letter Grade	Grade Point	Performance
91.00 - 100	O	10	Outstanding
80.00 -89.99	A+	9	Excellent
70.00-79.99	A	8	Good
60.00-69.99	B+	7	Fair
50.00-59.99	B	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

1. Conversion of Grades in to GPA:

$$\text{GPA} = \frac{\text{Credits} \times \text{Grade Points}}{\text{Total Credits}}$$

2. Cumulative Grade Point Average (CGPA) of all 4 Semester will be calculated as:

$$\text{Total No. GPA} / \text{No. of Semester}$$

**Ordinance Governing
Master of Public Health (HCQS)
Health Care Quality and Safety
Syllabus / Curriculum
2018-19**



Accredited 'A' Grade by NAAC (2nd Cycle)

Placed in Category 'A' by MHRD (GoI)

**KLE ACADEMY OF HIGHER EDUCATION AND
RESEARCH**

JNMC Campus, Nehru Nagar, Belagavi – Karnataka, India

Phone: +91 0831-2472777, 2493779, FAX: +91 0831 – 249377

E-mail: info@kledeemeduniversity.edu.in Website: kledeemeduniversity.com

CONTENT

SECTION – I

PREAMBLE

There is a dearth of core Public Health Professionals in the government health machinery. It is estimated that more than 10,000 Public Health Professionals would be required on an annual basis to equip the government machinery with an appropriately trained and qualified public health workforce. With a rapid health transition taking place, India faces two threats, one being the rising disease burden and the other is the poor allocation of government funds; both can be effectively managed by personnel trained in public health through appropriate public health training, i.e. ability to involve communities, work in multidisciplinary teams, and lobbying with government and community leaders with a deep understanding of social, economical and environmental determinants of health. Public Health Professionals are well armed to face these challenges.

Why Master of Public Health (MPH)?

The most widely recognized professional credential for leadership in public health is the MPH degree. This program prepares candidates to be competitive on a global level in the vast area of community health. It emphasizes on acquisition of skills essential to the practice of public health through techniques like student-directed learning, problem solving and field postings. Public Health Professionals can function as policy analysts, health planners, epidemiologists, demographers, social and behavioral scientists.

3.11. Criteria for Declaring Pass

3.11.1 A candidate shall be declared to have passed MPH if all the conditions below are fulfilled:

MPH-Semester I:

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together

MPH-Semester II

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together.
- Candidate shall further obtain Grade B or above in viva-voce
- Candidate shall pass practical and theory separately.(e.g. If candidate passes in theory and fail in practical, he/she shall appear only practical examination)

MPH-Semester III

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together.

MPH-Semester IV

- Candidate who secures Grade B or above each subject in theory University & Sessional examinations considered together.
- Candidate shall further obtain Grade B or above in viva-voce.

3.11.2 Carry over:

At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he is appearing for. e.g:

- If the candidate has not cleared semester I, he can appear for semester II and pending subjects of semester I simultaneously.
- For appearing for semester III he should have cleared semester I and can appear for papers pending from semester II along with semester III subjects.
- For appearing for semester IV he/she should have cleared semester II completely and can appear pending papers of semester III simultaneously.

Cumulative Grade Point Average (CGPA)

Letter Grades and Grade Points equivalent to percentage of Marks and performances

10 Point Grade Scale

Percentage of marks obtained	Letter Grade	Grade Point	Performance
91.00 - 100	O	10	Outstanding
80.00 -89.99	A+	9	Excellent
70.00-79.99	A	8	Good
60.00-69.99	B+	7	Fair
50.00-59.99	B	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

1. Conversion of Grades in to GPA:

$$\text{GPA} = \text{Credits} \times \text{Grade Points} / \text{Total Credits}$$

2. Cumulative Grade Point Average (CGPA) of all 4 Semester will be calculated as:

$$\text{Total No. GPA} / \text{No. of Semester}$$

**Ordinance Governing
Master of Public Health
Syllabus / Curriculum
2019-20**



**Accredited 'A' Grade by NAAC (2nd Cycle)
Placed in Category 'A' by MHRD (GoI)**

**KLE ACADEMY OF HIGHER EDUCATION AND
RESEARCH**

JNMC Campus, Nehru Nagar, Belagavi – Karnataka, India

Phone: +91 0831-2472777, 2493779, FAX: +91 0831 – 249377

E-mail: info@kledeemeduniversity.edu.in Website: kledeemeduniversity.com

CONTENT

S. NO.	TOPICS	PAGE NO.
1.	Section I Preamble	1
2.	Section II Vision, Mission & Objectives	2
3.	Section III Regulations Governing MPH Degree Semester Course	5
4.	Section IV Course Content	16
	4.1 Semester I Theory	
	MPH-I-1 T Research Methods(Qualitative & Quantitative)	16
	MPH-I-2 T Bio – Ethics	16
	MPH-I-3 T Health Care Delivery System	18
	MPH-II-1T Epidemiology (Part I)	19
	MPH II-2 T Biostatistics (Part I)	
	4.2 Semester II Theory	
	MPH-II-1 T Epidemiology (Part II)	20
	MPH-II-2 T Biostatistics (Part II)	21
	MPH-II-3 T Epidemiology of Infectious & Non-Communicable Diseases	21
	4.3 Semester III Theory	
	MPH-III-1 T Planning & Management	22
	MPH-III-2 T Occupational & Environmental Health	
	MPH-III-3 T Public Health Legislation & Public Health Information Systems	
	MPH-IV-1 T Maternal and Child Health & Public Health Nutrition (part I)	23
	4.4 Semester IV Theory	24
	MPH-IV-1 T Maternal and Child Health & Public Health Nutrition (part II)	
	MPH-IV-2 T Demography & Family Planning	25
	4.5 Electives	
5	SECTION-V Recommended Books (Latest Editions)	30

SECTION – I

PREAMBLE

There is a dearth of core Public Health Professionals in the government health machinery. It is estimated that more than 10,000 Public Health Professionals would be required on an annual basis to equip the government machinery with an appropriately trained and qualified public health workforce. With a rapid health transition taking place, India faces two threats, one being the rising disease burden and the other is the poor allocation of government funds; both can be effectively managed by personnel trained in public health through appropriate public health training, i.e. ability to involve communities, work in multidisciplinary teams, and lobbying with government and community leaders with a deep understanding of social, economic and environmental determinants of health. Public Health Professionals are well armed to face these challenges.

Why Master of Public Health (MPH)?

The most widely recognized professional credential for leadership in public health is the MPH degree. This program prepares candidates to be competitive on a global level in the vast area of community health. It emphasizes on acquisition of skills essential to the practice of public health through techniques like student-directed learning, problem solving and field postings. Public Health Professionals can function as policy analysts, health planners, epidemiologists, demographers, social and behavioral scientists.

SECTION – II

VISION:

To be a premier Public Health Department for Quality Education, Research and Leadership.

MISSION:

The Department of Public Health is committed to:

- Train and Create a Cadre for Public Health Leadership
- Promote Positive Health across Population
- Ensure Collective Commitment to Quality Research

This shall be achieved by following objectives:

OBJECTIVES:

By the end of the MPH program the candidates will achieve the following learning objectives under ten different areas listed below.

I. Epidemiology skills:

Candidates shall be able to:

- Define, assess and understand the health status of populations, determinants of health and illness, factors contributing to health promotion and disease prevention and factors influencing the use of health services.
- Identify and apply the research methods used in all basic public health sciences, including epidemiology, health and policy administration, behavioral and social sciences, biostatistics and environmental and occupational public health to prevent illness and injury.
- Describe the correlation and interactions among multiple determinants of health at intra & interpersonal organizational, community and societal levels (i.e., ecological model).

II. Analytic skills:

Candidates shall be able to:

- Define, identify and resolve public health problems by using appropriate data and statistical methods.
- Select and define variables relevant to defined public health problems, use data to illustrate ethical, political, scientific, economic and overall public health issues.

- Use rigorous critical thinking to analyze public health problems and apply public health knowledge to translate theory into public health practice by effective planning, implementation and evaluation.

III. Ethics:

Candidates shall be able to:

- Use and apply ethical analysis to inform decision-making in public health.
- Apply ethical issues involved in conducting research.

IV. Information and technology:

Candidates shall be able to:

- Define a focused research question and conduct electronic and hand literature searches for issues of concern in public health.
- Use one of several statistical packages (e.g., EPI Info, SPSS) to analyze data and graphic software package (e.g., PowerPoint) to develop presentations for public health problems.
- Use information systems in improving the effectiveness of public health activities.

V. Communication skills:

Candidates shall be able to:

- Present accurately and effectively demographic, statistical and scientific public health information for professionals and lay audiences.
- Lead and participate in groups, communicate effectively both in writing and orally to address specific public health issues and use the media to communicate important public health information.

VI. Cultural skills:

Candidates shall be able to:

- Demonstrate an understanding of the dynamic forces that cultural diversity plays in public health, both within India and internationally.
- Identify cultural, demographic and socio-economic factors in determining disease, disease prevention, health promotion and health care services organization and delivery.
- Develop approaches to public health that take into account cultural differences.

VII. Policy development:

Candidates shall be able to:

- Understand the historical development and structure of national, state & local public health-related agencies including communities.
- Describe processes and strategies used to inform and influence policy makers as they develop evidence-based decision-making policies, laws and regulations that have an impact on the public health.

VIII. Community practice:

Candidates shall be able to:

- Establish and maintain professional relations with key stakeholders in community-based initiatives to address public health issues.
- Develop, implement and evaluate a community public health programme.
- Practice ethical community-based research.

IX. Financial planning and management:

Candidates shall be able to:

- Develop and justify a budget through cost-effectiveness, cost-benefit and cost utility analysis.
- Monitor & evaluate public health programs.

X. Leadership and systems thinking:

Candidates shall be able to:

- Describe public health and health care delivery systems and will develop skills to assess a Public health organization's structure and performance
- Exercise strategic planning in public health and describe the elements of organizational leadership including coordinating teams, managing conflicts, motivating staff and continuous quality improvement.

SECTION-III

Regulations Governing MPH Degree Semester Course

3.1. Eligibility for Admission:

3.1.1 A Graduate in Medicine, Dentistry, Physiotherapy, Nursing, Pharmacy, Ayurveda, Homoeopathy, Social Sciences, Nutrition, Life Sciences, Commerce, Law, or any other degree courses recognized as equivalent by KLE Academy of Higher Education & Research. Preference shall be given to candidates from health sciences.

3.1.2 The degree should have been obtained from any University recognized by UGC, established by law in India and the medium of instruction for the degree should be English. For international candidates their degree should be recognized by AIU and where medium of instruction may not be English they should have passed any International proficiency test like IELTS, TOEFL etc.

3.1.3 A Candidate who has scored a minimum of 50% of the marks (aggregate of three/four years for graduate degree holders) prescribed for the qualifying examination shall be eligible for the admission to the MPH Course.

3.2. Proposed Intake of Candidates: 40

3.3. Duration of the Course:

The course of study including submission of dissertation on the topic registered shall be semester based, that includes 4 semesters each extending for six months from the commencement of academic semester. At the end of each semester, there shall be a University examination. At the end of Semester IV, there shall be a Final University Examination. Candidate shall submit a dissertation on the topic approved by the University five months prior to Semester IV Examination.

Medium of Instruction and Examination shall be English

3.4. Requirement to Complete the Course:

Semester	+	Semester	+	Semester	+	Semester	+	Dissertation	+	Intern	=	MPH
I		II		III		IV				ship		Degree

3.5. Training, Teaching and Learning Activities:

A candidate pursuing the course shall work in the Department as a full time candidate. No candidate shall be permitted to run a clinic/ laboratory/ nursing home while studying.

Every candidate shall take part in seminars, group discussions, journal review meetings etc. Every candidate shall attend teaching and learning activities during each semester as prescribed by the Department and not absent himself /herself without valid reasons.

A list of teaching and learning activities designed to facilitate acquiring of essential knowledge and skills outlined is given below:

Lectures: For all subjects lectures shall be conducted by the faculty.

Journal Club: Recommended to be held twice a week. All the MPH candidates are expected to attend and actively participate in discussion and enter the relevant details in the log book. Further, every candidate must make a presentation from the allotted journal(s), selected articles with special emphasis on public health related topics, at least two times a year.

Subject Seminar: Recommended once a week. All the MPH candidates are expected to attend and actively participate in discussion and enter in the log book the relevant details. Further, every candidate shall present a seminar on selected topics at least four times a year and have a total of eight seminars in two years. The presentations would be evaluated using checklist and would carry weightage for internal assessment. A timetable with the subjects and the names of the candidate and the moderator will be scheduled at the beginning of each semester.

Field Visit : PHC, Sub-center, DHO office, KLE Hospital, Sewage treatment plant, Water purification plant, milk dairy, HLL Industry, Campbell factory, Pollution Control Board, CDPO office, IDSP, and other institutions of Public Health importance.

3.6. Attendance and Monitoring Progress:

3.6.1 Attendance:

3.6.1.1 A candidate pursuing MPH Course shall study for the entire period as full time candidate. No candidate shall join any other course of study or appear for any other examination conducted by this University or any other University in India or abroad during the period of registration.

3.6.1.2 Each semester shall be considered as a unit for the purpose of calculating attendance.

3.6.1.3 Every candidate shall attend symposia, seminars, conferences, journal review meetings, dissertation review meetings and lectures during each year as prescribed by the Department/College/University and not absent himself / herself without valid reasons.

3.6.1.4 Candidate who has put in a minimum of 75% of attendance in the theory and practical assignments separately shall be permitted to appear for University examination at the end of each semester.

3.6.1.5 Candidate will be allowed to appear the Semester IV examination only if the dissertation submitted is accepted.

3.6.1.6 Any candidate who fails to complete the course in the manner stated above shall not be permitted to appear for the semester University examinations.

3.6.2 Monitoring Progress of Studies

3.6.2.1 *Log Book:* Every candidate shall maintain a log diary and record his/her participation in the training programs conducted by the Department such as journal reviews, seminars, etc. Special mention shall be made of the scientific presentations in conference by the candidate as well as details of assessment works like essay writing, etc submitted by the candidate. The work diary shall be scrutinized and certified by the Head of the Department and presented in the University viva-voce examination.

3.6.2.2 *Sessional Examination:* Records and marks obtained in sessional test shall be maintained by the Head of the Department and sent to the University, when called for.

3.6.2.3 *Records:* Records and marks obtained in sessional tests, seminars, journal club, field activities, and weekly written assignments which shall be maintained by the Head of the Department and shall be made available to the University.

3.7. Dissertation

3.7.1 *Synopsis:* Every candidate shall submit a synopsis of the intended dissertation work through the guide to the Director Academic Affairs of KLE Academy of Higher Education & Research through the

HOD and Head of the institution, not later than five months from the date of admission to MPH. The date will be notified by KLE Academy of Higher Education & Research.

3.7.2 Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.

3.7.3 Every candidate pursuing MPH course is required to carry out work on a selected research project under the guidance of a recognized guide. The results of such work shall be submitted in the form of a dissertation.

3.7.4 The dissertation is aimed to train the candidate in research methodology. It includes identification of the problem, formulation of a hypothesis, review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis and comparison of results and drawing conclusions.

3.7.5 Dissertation shall require approval of the Institutional Ethics Committee (IEC) prior to initiation of any dissertation work. Candidate shall work under the supervisor to attain IEC approval. Student shall maintain regular contact with the guide during his/her dissertation work.

3.7.6 The dissertation should be written under the following headings:

- Introduction
- Objectives
- Review of literature
- Material and Methods
- Results – including tables & graphs
- Discussion
- Conclusion
- Summary
- References
- Annexures

3.7.7 The written text of dissertation shall not be less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexures. It should be neatly typed with double line spacing on one side of the bond paper (A4 size, 8.27” x 11.69”) and bound properly. Spiral binding is not permitted. The dissertation shall be certified by the guide and co-guide if any, Head of the Department and Head of the Institution.

3.7.8 The dissertation shall be valued by examiners appointed by the University.

3.7.9 A guide shall be a full time postgraduate teacher of a constituent college of KLE Academy of Higher Education & Research and recognized by KLE Academy of Higher Education & Research as a guide for supervision of dissertation work.

3.7.10: Change of Guide: Guide may be changed with prior permission from the University.

3.7.11 Submission of Dissertation: Two copies of the dissertation duly certified by the Guide, the Head of Department of Public Health shall be submitted to the Controller of Examinations, KLE Academy of Higher Education & Research, through the Head of the Department at least five months before University Examination of semester IV.

3.8 Internship:

Every candidate shall undergo field training for a period of two months in fourth semester at an organization of national recognition for field experience

Candidate should submit two copies of the training report duly certified by the authorities of the training center in which he/she has undergone training duly accepted and certified by the Head of the Department.

3.9. Schedule of Examination

There shall be a University examination at the end of each semester for all four semesters and viva-voce at the end of semester II (subjects of semester I&II) & semester IV (subjects of semester III & IV). There shall be a dissertation presentation at the end of semester IV in addition to viva voce.

3.10. Scheme of Examination

3.10.1 Sessional Examination

There shall be a minimum of two sessional examinations in each subject conducted by the Department at midterms and before term end in theory and viva-voce.

The sessional marks shall be awarded out of a maximum of 80 for theory and 50 for viva-voce separately as follows and shall be calculated out of 20 marks and 10 marks respectively.

Theory

Written examination 80 marks

The total marks obtained have to be calculated out of 10.

Seminar 10 marks

Journal Club 10 marks

Reports of field visits 10 marks

Models/Essay writing/Project work 10 marks

Camps/ Group activities 10 marks

The total marks obtained have to be calculated out of 10.

2 marks will be given to candidates who make scientific presentations in National Conferences

A cumulative total will be calculated out of 20 as “Internal Assessment” (IA) marks

3.10.2 University Examinations

3.10.2.1 Theory:

There shall be four University examinations for the entire course namely I, II, III, IV semester examination. The examination will be conducted at the end of each semester. There shall be three (3) core theory papers and elective papers. All core subjects will have University exam and electives will have college exam. Each theory paper shall be of 3 hours duration carrying 80 marks each.

3.10.2.2 Practical: There shall be practical examination for Biostatistics and Epidemiological exercise in semester II

3.10.2.3 Viva-voce: - Each candidate shall give viva-voce examination for semester II (subjects of semester I&II) & semester IV (subjects of semester III &IV).

SCHEME OF EXAMINATION FOR THEORY

Question	Number of Questions	Marks	Maximum Marks	Total Marks
Long Essay Questions	2	15	30	80
Short Essay Questions	5	10	50	

(A) MPH Semester I Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum Marks to pass
MPH-I-1 T	Research Methods (Qualitative & Quantitative)	20	80	100	50
MPH-I-2 T	Bio – Ethics	20	80	100	50
MPH-I-3 T	Health Care Delivery System	20	80 (45 + 35)	100	50
MPH-I-E T	Elective(s) as per selection	20	80	100	50

(B) MPH Semester II Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to pass
MPH-II-1 T	Epidemiology (Part I & II)	20	80	100	50
MPH-II-2 T	Biostatistics (Part I & II)	20	80	100	50
MPH-II-3 T	Epidemiology of Infectious & Non Communicable Diseases	20	80 (35 + 45)	100	50
MPH-II-E T	Elective(s) as per selection	20	80	100	50

Viva Voce Examination

MPH-II-1 P	Viva-voce	-	100	100	50
-------------------	-----------	---	-----	-----	----

(C) MPH Semester III Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
MPH-III-1 T	Planning & Management	20	80	100	50
MPH-III-2 T	Occupational & Environmental Health	20	80 (35 + 45)	100	50
MPH-III-3 T	Public Health Legislation & Public Health Information Systems	20	80 (45 + 35)	100	50
MPH-III-E T	Elective(s) as per selection	20	80	100	50

(D) MPH Semester IV Theory

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
MPH-IV-1 T	Maternal & Child Health and Nutrition (Part I & II)	20	80	100	50
MPH-IV-2 T	Demography & Family Planning	20	80 (45 + 35)	100	50
MPH-IV-E T	Elective(s) as per selection	20	80	100	50

Viva Voce Examination

MPH-IV-1 P	Viva-voce & Dissertation Presentation	-	100	100	50
-------------------	---------------------------------------	---	-----	-----	----

VIVA VOCE

At the end of semester II (subjects of semester I & II) & semester IV (subjects of semester III & IV) candidate will appear for University viva-voce examination.

Practical (College Exam): A college level practical exam will be conducted at 5 months after the commencement of MPH Semester II in which the candidate has to obtain at least 50% marks to appear for University Examination of semester II and semester III

(D). College Practical Exam

Practical No.	Paper	Max. College marks	Total maximum marks	Minimum marks to Pass
CE 1P	Critical Appraisal	40	40	50
CE 2P	Biostatistics Exercises	30	30	
CE 3P	Epidemiological exercises	30	30	

3.10.3. Dissertation Valuation:

The examiners appointed by the University shall evaluate the dissertation. Approval of dissertation work is an essential prerequisite for a candidate to appear in the semester IV University examination. The dissertation shall be valued by two evaluators (examiners) one within the University and one outside. Any one-evaluator acceptance will be considered as a prerequisite for eligibility to take up the examination.

3.10.3.1 Viva-Voce and Defense Examination: The viva-voce and defense examination shall aim at assessing the depth of knowledge, logical reasoning, confidence and oral communication skills.

The viva – voce and defense examination shall be held after the submission of dissertation. If a candidate fails to submit the dissertation on or before the date prescribed, his/her viva-voce and defense shall be conducted during the subsequent University examination.

3.10.3.2 Examiners: There shall be at least two examiners, out of them one shall be external examiner and the other internal examiner.

3.11. Criteria for Declaring Pass

3.11.1 A candidate shall be declared to have passed MPH if all the conditions below are fulfilled:

MPH-Semester I:

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together

MPH-Semester II

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together.
- Candidate shall further obtain Grade B or above in viva-voce
- Candidate shall pass practical and theory separately.(e.g. If candidate passes in theory and fail in practical, he/she shall appear only practical examination)

MPH-Semester III

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together.

MPH-Semester IV

- Candidate who secures Grade B or above each subject in theory University & Sessional examinations considered together.
- Candidate shall further obtain Grade B or above in viva-voce.

3.11.2 Carry over:

At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he is appearing for. e.g:

- If the candidate has not cleared semester I, he can appear for semester II and pending subjects of semester I simultaneously.
- For appearing for semester III he should have cleared semester I and can appear for papers pending from semester II along with semester III subjects.
- For appearing for semester IV he/she should have cleared semester II completely and can appear pending papers of semester III simultaneously.

Cumulative Grade Point Average (CGPA)

Letter Grades and Grade Points equivalent to percentage of Marks and performances

10 Point Grade Scale

Percentage of marks obtained	Letter Grade	Grade Point	Performance
91.00 - 100	O	10	Outstanding
80.00 -89.99	A+	9	Excellent
70.00-79.99	A	8	Good
60.00-69.99	B+	7	Fair
50.00-59.99	B	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

1. Conversion of Grades in to GPA:

GPA= Credits x Grade Points / Total Credits

2. **Cumulative Grade Point Average (CGPA)** of all 4 Semester will be calculated as:

Total No. GPA / No. of Semester

**SECTION-IV
COURSE CONTENT**

4.1 SEMESTER I

S. No.	Core Subjects	Credits
MPH-I-1 T	Research Methods (Qualitative & Quantitative)	2
MPH-I-2 T	Bioethics	2
MPH-I-3 T	Health Care Delivery System	4
MPH-II-1 T	Epidemiology (Part I)	4
MPH-II-2 T	Biostatistics (Part I)	4 (3 +1)
MPH-I-1 P	Under Five Clinic posting & Community Project (Practical)	2
MPH-I-2 P	Dissertation (Synopsis development practical)	2
MPH-I-E T	Electives*	3
TOTAL:		23

**Note- Choose electives (from List of Electives) amounting to total of 3 CREDITS*

THEORY

MPH-I-1 T Research Methods (Qualitative & Quantitative)

Quantitative Research Methods:

Introduction to Research Methodology

Developing a Research Plan

- Research Problem
- Research Question
- Research Hypothesis
- Variables

Data Collection Tool Development

Epidemiological study designs: Cross Sectional, Cohort, Case Control

Experimental Design: Randomized, Non randomized, Parallel, Factorial, Cross Over

Qualitative Research Methods:

Overview of Qualitative Research Methods

- Comparing Quantitative and Qualitative Research
- Sampling in Qualitative Research
- Recruitment in Qualitative Research

Theories

- Grounded Theory
- Phenomenology
- Case studies
- Ethnography

Participant Observation

- Logistics of Participant Observation
- How to Take Field Notes

In-Depth Interviews

- Logistics of interviewing
- Interview Steps and Tips for Taking Interview Notes.

Focus Groups

- Logistics of Focus Groups
- Skills of Effective Moderator and Note Taker
- Steps in Focus Group Note Taking
- Steps in Moderating a Focus Group

Data Documentation and Management: Organizing and storing Data

- Converting Raw Data to Computer Files
- Organizing Data Storage list
- Data Archiving Steps
- Data Management Check

Importance Experimental Designs

- Before and after Without Control Design
- After only Control Design
- Before and after With Control Design
- Completely Randomized Designs
- Randomized Block Designs
- Latin square Design
- Factorial Design

MPH-I-2 T Bio –Ethics:

Historical Perspectives

General Principles on Ethical Considerations Involving Human Participants

Statements of Specific Principles for Epidemiological Studies

- Nuremberg Code
- Belmont Report
- Declaration of Helsinki
- General Consideration for Clinical Trials
- International Conference on Harmonization & Good Clinical Practices
 - Structure & Contents of Clinical Study Report
 - Good Clinical Data Management Practices
 - Investigator Brochures
 - Essential Documents
 - Composition & Functions of Ethical Committee/ IRB
 - Duties & Roles of Principal Investigator
 - Roles & Duties of Sponsor
 - Good Clinical Practice India- DCGI
 - ICMR Guidelines
 - Revised Schedule Y
- Informed Consent process and informed consent form
- Ethical Principles Related to Animal Experiments.

MPH-I-3 T Health Care Delivery System

Introduction to Public Health

- Evolution of Public Health
- Ancient India and Public Health

- Founders of Modern Public Health

Changing concepts of Health Care

- Comprehensive Health Care
- Basic Health Care
- Primary Health Care

Levels of Health Care

- Primary Health Care
- Secondary Health Care
- Tertiary Health Care
- Three tier system of health care: Sub centre, Primary Health Centre, Community Health Centre
- Function, Staffing pattern with job responsibilities of each staff at each of the above levels
- Assessing "Health Status" and "Health Needs"
- Assessing the "Health Impact"
- Community Diagnosis
- Health Administration in India
 - Central Level
 - State level
 - District Level - Panchayat Raj Institutions
- Health for all- Millennium Development Goals & Sustainable Development Goals
- Voluntary & International Health Agencies
- Global Health:
 - Globalization,
 - Health disparities between developed and developing countries,
 - Global Health Agenda for 21st Century.
- Health Insurance Plans
- National Health Policy
 - National Health Policy 2002
 - National Population Policy 2000
- National Health Programs
 - Integrated Child Development Scheme
 - RNTCP
 - NACO
 - RCH
 - NHM: NRHM & NUHM
 - NVBDCP
 - IDSP
 - NIDDCP
 - NLEP
 - NPCB
 - Pulse Polio Immunization Program
 - National Mental Health Program
 - National Cancer Control Program
 - National Program for Prevention and Control of Diabetes, Cardio-vascular Diseases and stroke
 - INAP

MPH-II-1 T Epidemiology (Part I)

- Concept of Health & Disease
 - Concepts and dimensions of health, well being
 - Quality of life, spectrum of health
 - Determinants of Health
 - Indicators of Health
 - Epidemiological triad
 - Dynamics of Disease Transmission
 - Natural history of diseases
- Measuring the Occurrence of Diseases
 - Morbidity
 - Mortality
- Epidemiology Definition, Principles, Uses
- Identification of Health Problems
 - Survey methods
 - Planning, Designing and Conducting of Epidemiological Surveys
- Screening for Diseases
 - Types of screening test
 - Assessing the validity and reliability of diagnostic and screening tests

MPH-II- 2 T: Biostatistics (Part I)

- Introduction to Biostatistics
- Application of Statistics to problems in Clinical and Public Health Settings
- Data
 - Classification
 - Presentation – Tables AND Graphs
 - Collection
- Sampling Designs
- Sample Size Calculation
- Descriptive statistics
 - Measures of Central Tendency
 - Measures of Dispersion
 - Measures of Kurtosis and Skewness

PRACTICAL

MPH-I-1 P: Under Five Clinic posting & Community Project (Practical)

MPH-I-2 P: Dissertation (Synopsis Development)

4.2 SEMESTER II

S. No.	Core Subjects	Credit
MPH-II-1 T	Epidemiology (Part II)	4
MPH-II-2 T	Biostatistics (Part II)	3 (2+1)
MPH-II-3 T	Epidemiology of Infectious & Non-Communicable Diseases	4
MPH-II-1 P	Critical Appraisal (Practical)	2
MPH-II-2 P	Field Visit – Community Activities	3
MPH-II-3 P	Dissertation (Data collection)	4
MPH-II-E T	Electives*	3
TOTAL :		23

*NOTE: Choose electives (from List of Electives) amounting to total of 3 CREDITS

THEORY

<p>MPH-II-1 T Epidemiology (Part II)</p> <ul style="list-style-type: none"> • Surveillance • Association and causation • Bias • Confounding • Interaction • Investigation of an epidemic • Using Epidemiology to Identify the Cause of Diseases • Applying Epidemiology to Evaluate Health Services & Policy
<p>MPH-II-2 T Biostatistics Part II</p> <ul style="list-style-type: none"> • Probability and Probability Distribution (Binomial, Poisson and Normal Distribution) • Testing of Hypothesis: Parametric Tests (z test, t test, Analysis of variance – One way), • Non Parametric Tests (Mc Neimar test, Fisher Exact test, Median test, Sign test, Wilcoxon signed matched pair test, Mann Whitney test, Kruskal Walli test) • Correlation Analysis • Regression Analysis: Simple, Multiple, Logistic • Estimation: Point and Interval
<p>MPH-II-3 T Epidemiology of Infectious & Non-Communicable Diseases General control measures of communicable diseases Epidemiology & control of Infectious Diseases</p> <ul style="list-style-type: none"> • Acute diarrheal diseases • Cholera • Typhoid fever (Enteric fever) • Brucellosis • Leptospirosis • Plague • HIV/AIDS • Leprosy • Malaria, Filaria, Yellow fever Dengue, Chikungunya, Kala-Azar, Japanese Encephalitis • KFD

- Epidemiology and control of vaccine preventable diseases: Tuberculosis, Diphtheria, Whooping Cough, Measles, Tetanus, Poliomyelitis, Hepatitis.
- ARI
- Influenza
- SARS
- Viral Hepatitis- A,B,C,E
- Food Poisoning
- Parasitic infections, Ascariasis, Hookworm infestations
- Rabies
- STDs

Epidemiology & control of Non Communicable Diseases

- Cardiovascular Diseases
 - Rheumatic Heart Disease
 - Coronary artery disease
 - Hypertension
- Neoplasm
- Diabetes
- Mental Health Problems
- Obesity
- Blindness
- Accidents
- Emerging & Re-emerging infectious Diseases

PRACTICAL

MPH-II-1 P Critical Appraisal

Critical appraisal of published articles

MPH-II-2 P Dissertation

Data Collection and Entry.

4.3 SEMESTER III

S. No.	Core Subject	Credit
MPH-III-1 T	Planning & Management	4
MPH-III-2 T	Occupational & Environmental Health	4
MPH-III-3 T	Public Health Legislation & Public Health Information System	4
MPH-IV-1 T	Maternal & Child Health & Public Health Nutrition (Part I)	4
MPH-III-1 P	Dissertation (Data collection & analysis)	4
MPH-III-E T	Electives*	3
TOTAL :		23

* NOTE: Choose electives (from List of Electives) amounting to total of 3 CREDITS

THEORY

MPH-III-1 T Planning & Management

- Introduction to Planning & Management: Aims and Objectives
- Seven Steps and Predisposing Factors in Planning & Management.
- Planning Cycle
- Strategies/ Methods in Planning
- Skills on Making Effective Planning
- Alma-Atta Declaration
- Jakarta Health Declaration
- Ottawa Charter
- Need Assessment-Identifying Health Promotion Needs
- Audit
- Budget Allocation

Public Health Management

- General Concepts in Management Sciences
- Organizational Concepts & Behavior
- Time Management
- Materials Management
- Self-Management
- Modern Management Techniques
- Personnel Management & Human Resource Development
- Health Outcome Research

MPH-III-2 T Occupational & Environmental Health

Occupational Health

- Occupational Hazards
 - Risk vs Hazard
 - Types
 - Prevention & control
- Pneumoconiosis
- Lead Poisoning
- Occupational Cancers
- Occupational Dermatitis

Occupational Hazards in Agricultural Workers

- Accidents in Industry
- Sickness Absenteeism
- Ergonomics
- Problems of
 - Urbanization
 - Industrialization

Environmental Health

- Public Health Aspects of Extreme Hot and Cold Environment
- Food Sanitation and safety
- Vector & Rodent Control
- Solid waste disposal
- Excreta Disposal
- Environmental Health Policy
- Hospital Waste Management
- Water & Sanitation:
 - Characteristics of Safe Water
 - Water Distribution System
 - Water Pollution
 - Purification Of Water
 - Water Quality Standards
 - Water Problems In India
 - Water Conservation,
 - Rain Water Harvesting
- Environment Pollution:
 - Air Pollution
 - Soil Pollution
 - Noise Pollution
 - Thermal pollution
 - Housing & Ventilation
 - Nuclear Hazards
 - Role of an Individual In Prevention of Pollution
 - Disaster Management
 - Social Issues and the Environment

MPH-III-3 T Public Health Legislation & Health Information Systems

Public Health Legislation

- Legislation related to Quality of Professional Education and Services
 - Indian Medical Council Act
 - Indian Nursing Council Act
 - The Dentist Act
 - The Indian Medicine Central Council Act
- Legislation related to Census, Birth and Death
- Legislation related to control of Epidemics
- Legislation related to Tobacco and Drug Control
 - COTPA

- The Narcotic drugs and Psychotropic Substance act 1985
- The Transplantation of Human Organs Act 1994
- The Prevention of Food Adulteration Act 1959
- **Consumer Protection Act 1948**
- Food safety and standard Act
- The Protection of Human Rights Act 1993
- Legislation for Women Empowerment and Health
 - The dowry Prohibition Act 1961
 - Protection of Women from Domestic Violence Act 2005
 - Maternity Benefit Act
 - Immoral traffic(Prevention) Act 1956
 - The medical termination of pregnancy act 1971
 - PCPNDT Act 1994
- Legislation for Child Protection and Health
 - Child labor prohibition Act 1986
 - The Juvenile Justice Act 2000
- Legislation related to the Welfare Rehabilitation of Disadvantaged
 - PWD Act
 - Mental Health Act 2017
 - Welfare of Parents and senior citizens Act 2007
 - Citizenship Amendment Act 2019
- Occupational Health & Legislation
 - The Factory Act
 - ESI Act
 - Minimum wages Act
- Environment Health Legislations
 - Environmental Protection act 1986,
 - Air pollution
 - Water pollution
 - Biomedical waste management & handling rules 1998
 - Municipal solid waste management rules 2000
 - Plastic waste management and handling rules 2011
 - Disaster management Act 2005
- International Health Regulations
- Universal Declaration of Human Rights

Health Information Systems

- Evolution of Health Information System
- Principles of HIS
- Health Information System: Sources, Uses
- Application of Information System
- Managing Health information system
- Importance of data
- e-Health, telemedicine and m-health
- DIKW Hierarchy

MPH-IV-1 T Maternal and Child Health & Public Health Nutrition (Part I)

Maternal and Child Health

- Introduction to
 - Health Status of Women in General
 - Reproductive Health in particular
- Health Problems of Women across the Life Span
- Determinants of maternal & child health
- Preventive-Promotive Strategies and Indicators of Maternal and Child Health
- Maternal Health Care
 - Antenatal
 - Intranatal
 - Postnatal care
- Maternal Death Review
- Risk Approach in MCH
- Marriage, Preconception, Conception, Pregnancy

Public Health Nutrition

- Introduction to Nutrition in Public Health
- The Proximate Principles of food
- Micronutrients: The Vitamins and minerals
- Major Foods and their Nutritive Value
- Nutritional Requirements of Special Groups:
 - Pregnant women & Lactating Mothers
 - Children
 - Elderly & their prevention
- Nutritional Indicators
- Nutritional Programmes in India
- Nutritional status assessment of a Community
- Nutritional Surveillance
- Nutritional Deficiency Diseases of Public Health Importance:
 - Protein Energy Malnutrition
 - Iodine deficiency disorders
 - Vitamin A deficiency
 - Role of Fluorine in health and disease

PRACTICAL

MPH-III-1 P Dissertation

Data Collection and Entry.

4.4 SEMESTER IV

S. No.	Core Subject	Credit
MPH-IV-1 T	Maternal and Child Health and Public Health Nutrition (Part 2)	4
MPH-IV-2 T	Demography & Family Planning	4
MPH-IV-1 P	Dissertation writing & submission	10
MPH-IV-2 P	Internship	10
MPH-IV-E T	Electives*	3
TOTAL :		31

* NOTE: Choose electives (from List of Electives) amounting to total of 3 CREDITS

MPH-IV-1 T Maternal and Child Health and Public Health Nutrition (Part II):

Maternal and Child Health

- Child Health Care
- Child abuse, child prostitution, child trafficking, street children, child labour, child protection and child rights and child laws.
- Major causes of infants and child morbidity and mortality in India
- Socio-economic, educational and cultural factors affecting child rearing practices and child health care activities in India.
- Community based management of child health
 - Care of Infants
 - Care of Under Five Children
 - Growth and Development of Children
 - Children's Right to Health
 - Child placement
 - School Health Services
- Definition, classification, social and emotional development aspects
- Problems, social issues, programmes.
- Sexual health
- Sexual behaviour
- Early pregnancy and early marriage
- Sex education
- Mental health, Substance abuse and social crime
- Adolescent Health
- Tribal Health
- Geriatric Health
- Baby Friendly Hospital Initiative
- Under Five Clinic & Well Baby Clinic
- Programs for Health Problems of Women including RCH program (I & II) and NRHM
- Organization of MCH Services in the community

Public Health Nutrition

Public Health Aspects of Food Hygiene & Sanitary Regulation of Eating Establishments

Food Processing, Food Adulteration, Food Additives, Preservatives, Food Toxicants and Food Fortification

Methods for Establishing the Causal Role of Nutritional Factors on Health and Disease Status

Planning, Implementation & Evaluation of Nutrition programs

Nutrition & Non-communicable diseases

Nutrition during special situations:

- Disasters
- Fairs and Festivals

Community Feeding of Children

MPH-IV-2T Demography & Family

Planning

Demographic cycle

- Population Census
- Demographic Trends – World & India
 - Age & Sex Composition
 - Age Pyramids
 - Sex ratio
 - Dependency ratio
 - Family Size
 - Urbanization
 - Life expectancy
- Demographic transition
- Migration
- Fertility & Fertility Indicators
- Mortality:
 - The determinants of population health
 - The life table
- Causes and implications of social inequality

Family Planning:

- Scope of family planning services
- Health aspects of Family Planning
- Small family norm
- Eligible couples
- Target couples
- Couple protection rate (CPR)
- Evaluation of contraceptive methods
- Unmet need for Family Planning
- National Family Welfare Programme
- Sociology of Family Planning
- Evaluation of Family Planning
- National Population Policy – 2000
- Contraceptive Methods
- MTP Act 1971

LIST OF ELECTIVES

Sl.No.	Elective	Credit
1.	Health Behaviour and Sociology	2
2.	Health Economics	2
3.	Health Education & Health Promotion	2
4.	Language	1
5.	NSS (I,II,III,IV)	3
6.	Global Health	1
7.	Computer Skills	2
8.	Scientific Writing Skills	2
9.	Communication Skills	2
10.	Leadership Skills	2
11.	Disaster Management Project	3
12.	Library Dissertation	2
13.	Dental Public Health (I,II,III,IV)	3

<p>1. Health Behaviour and Sociology Health Belief Model (HBM)/ Risk Perception Theory of Reasoned Action/ Theory of Planned Behavior Social Cognitive Theory (SCT)/ Self-Efficacy (SE) Trans Theoretical Model (TTM) Motivation and Self-Efficacy; Stress, Coping, and Social Support Self-Determination Theory (SDT) Motivational Interviewing Behavior Modification Goal Setting, Attributions, Self-Regulation Building Conceptual Frameworks Elaboration Likelihood Model/ Cognitive Load Theory Theory-Informed Interventions</p>	<p>2. Health Economics: Supply and Demand for Health Services The Role of Insurance in the Medical Care Industry Public Policy, Issues of Cost and Quality Regulation Measurements and Evaluation of Costs and Benefits Policies and Strategies for the Developing World</p>
<p>3. Health Education and Health Promotion Introduction to Health Education and Health Promotion: Definition & principles Theories of Health Education Health Promotion Needs Assessment Planning, Implementation and Evaluation of Health Promotion Programs</p>	<p>4. Language (Kannada & English) Kannada: Conversational skills English: Comprehension skills</p>
<p>5NSS 5.1 NSS I UNIT 1: Introduction and Basic Concepts of NSS (4)</p> <ul style="list-style-type: none"> • History, philosophy, aims & objectives (1) • Emblem, flag, motto, song, badge (1) • Organizational structure, roles & responsibilities of various NSS functionaries (2) <p>UNIT 2: NSS Programmes and Activities (10)</p> <ul style="list-style-type: none"> • Concept of regular activities, special camping, day camps (3) • Basis of adoption of village/slums, methodology of conducting survey (2) • Financial pattern of the scheme (1) • Other young prog./schemes of GoI (2) • Coordination with different agencies (1) • Maintenance of the diary (1) <p>UNIT 3: Understanding Youth (5)</p> <ul style="list-style-type: none"> • Definition, profiles, categories of youth (2) 	<p>5.2 NSS II UNIT 1: Importance and Role of Youth leadership (6)</p> <ul style="list-style-type: none"> • Meaning and types of leadership (2) • Qualities of good leaders; traits of leadership (2) • Importance and role of youth leadership (2) <p>UNIT 2: Life Competencies (11)</p> <ul style="list-style-type: none"> • Definition and importance of life competencies (2) • Communication (3) • Inter Personal (3) • Problem-solving and decision-making (3) <p>UNIT 3: Social Harmony and National Integration (9)</p> <ul style="list-style-type: none"> • Indian history and culture (2) • Role of youth in peace-building and conflict resolution (5) • Role of youth in Nation Building (2)

<ul style="list-style-type: none"> • Issues, challenges and opportunities of youth (2) • Youth as an agent of social change (1) <p>UNIT 4: Health, Hygiene & Sanitation (7)</p> <ul style="list-style-type: none"> • Definition, needs and scope of health education (1) • Food and nutrition (1) • Safe drinking water, water borne diseases and sanitation (SBA) (2) • National Health Programme (2) • Reproductive Health (1) • <p>UNIT 5: Volunteerism and Shramdaan (7)</p> <ul style="list-style-type: none"> • Indian Tradition of volunteerism (1) • Needs & importance of volunteerism (2) • Motivation and constraints of volunteerism (2) • Shramdaan as part of volunteerism (2) <p>5.3 NSS III</p> <p>UNIT 1: Citizenship (7)</p> <ul style="list-style-type: none"> • Basic Features of Constitution of India (2) • Fundamental Rights and Duties (2) • Human Rights (1) • Consumer awareness and legal rights of consumer (1) • RTI (1) <p>UNIT 2: Family and Society (6)</p> <ul style="list-style-type: none"> • Concept of family, community, (PRIs & other community-based organizations) and society (2) • Growing up in the family- dynamics and impact (1) • Human Values (1) • Gender Justice (2) <p>UNIT 3: Community Mobilization (9)</p> <ul style="list-style-type: none"> • Mapping of community stakeholders (3) • Designing the message in the context of the problem and culture of community (1) • Identifying methods of mobilization (3) • Youth-adult partnership (2) <p>UNIT 4: Environment Issues (11)</p>	<p>UNIT 4: Youth Development Programmes in India (9)</p> <ul style="list-style-type: none"> • National Youth Policy (3) • Youth development programmes at the National level, State level and voluntary sector (4) • Youth-focused and Youth-led Organizations (2) <p>5.4 NSS IV</p> <p>UNIT 1: Youth Health and Yoga (15)</p> <ul style="list-style-type: none"> • Healthy lifestyles (yoga as a tool), substance abuse, HIV, home nursing, first aid (8) • Yoga: history, concept, misconceptions, traditions, impacts (5) • Yoga as preventive, promotive and curative method (2) <p>UNIT 2: Youth and Crime (7)</p> <ul style="list-style-type: none"> • Sociological and psychological factors influencing youth crime (2) • Peer mentoring in preventing crimes (1) • Awareness about anti-ragging (1) • Cyber crime and its prevention (2) • Juvenile Justice (1) <p>UNIT 3: Civil/ Defense (5)</p> <ul style="list-style-type: none"> • Positive Thinking (1) • Self Confidence and Self esteem (2) • Setting Life Goals and working to achieve them (2) • Management of Stress including Time Management (2) <p>UNIT 4: Entrepreneurship Development (8)</p>
---	--

<ul style="list-style-type: none"> • Environment conservation, enrichment and sustainability (2) • Climate change (2) • Waste management (2) • Natural resource management (5) <p>UNIT 5: Project Cycle Management(10)</p> <ul style="list-style-type: none"> • Project Planning (2) • Project Implementation (3) • Project monitoring (2) • Project evaluation: impact assessment(3) <p>UNIT 6: Documentation and Reporting (7)</p> <ul style="list-style-type: none"> • Collection and analysis of data (3) • Preparation of documentation/ reports (2) • Dissemination of documents/reports (2) <p>UNIT 7: Additional Life Skills (7)</p> <ul style="list-style-type: none"> • Positive Thinking (1) • Self Confidence and Self Esteem (2) • Setting Life Goals and working to achieve them (2) • Management of Stress including Time Management (2) 	<ul style="list-style-type: none"> • Definition & Meaning (1) • Qualities of good entrepreneur (2) • Steps/ ways in opening an enterprise (3) • Role of financial and support service institutions (2) <p>UNIT 5: Resource Mobilization (3)</p> <ul style="list-style-type: none"> • Writing a Project Proposal (2) • Establishment of SFUs (1) <p>UNIT 6: Disaster Management (7)</p> <ul style="list-style-type: none"> • Introduction to Disaster Management, classification of disasters (4) • Role of youth in disaster management (3)
<p>8. Global Health Globalization of Health Global healthcare and critical analysis of global healthcare systems: India, USA, UK, Canada, Europe, Pakistan, Nepal, Australia, China, Japan, Africa, Cuba, Switzerland Universal Health Coverage International Health Organizations</p>	<p>7. Computer Skills Introduction to Information Technology Introduction to MS Office: MS Word, MS Excel, MS PowerPoint Presentation Skills Internet</p> <ul style="list-style-type: none"> ▪ Search Strategies ▪ Email and Email etiquettes ▪ Online survey development tools
<p>8. Scientific Writing Skills Application writing for Grants:</p> <ul style="list-style-type: none"> ▪ Introduction to information systems and sources of intelligence ▪ Format of writing a concept paper and mini protocol ▪ Critical issues and common errors in grant applications <p>Essay Writing: Candidates will submit 1 essay of 5000 words each on selected topics</p>	<p>9. Communication Skills Communication: definition, process, its application in health education. Models of communication process. Communication: Theories and principles. Methods & media of communication. Behaviour change communication. IEC Strategy</p>
<p>10. Leadership Skills SWOC Analysis Leadership Qualities and Challenges Motivation Ethics and responsibilities Communication</p>	<p>11. Library Dissertation Conducting a systematic literature review on the topic given Submission of the dissertation (5000 words) in bind</p>

Management Team Building	
-----------------------------	--

SECTION-V

Recommended Books (Latest Editions)

TITLE	AUTHOR(S)	PUBLISHER
Practical Statistics for Medical research	Altman D	Chapman & Hall
An Introduction To Medical statistics.	Bland M	Oxford Medical Publications
Statistical Methods In Clinical and Preventive Medicine.	Hill.S.A.B.	E.& S. Livingstone Ltd.
Textbook Of Preventive And Social Medicine.	Gupta.M.C; Mahajan.B.K.	Jaypee Brothers.
Topics In Public Health.	Mackintosh.J.M.	E.& S. Livingstone Ltd.
Textbook Of Preventive And Social Medicine.	Park.K; Park.J.E.	Banarsidas Bhanot
Industrial Injuries.	Featherstone.D.F.	John Wright & Sons.
Environment problems & solutions	Asthana & Asthana	S.Chand & Company Ltd.
Environmental Biology	P.D.Sharma	Rastogi Publication

Earth science	Edward J.Tarbuck	Prentice Hall
Environmental Issue-Measuring Analyzing, evaluating	Robert L.Mc.Connell & Lanniel C.Abel	Prentice Hall
Environmental Protection & law	C.S.Mehta	Ashish Publishing House.
Environmental Pollution,	Timmy Katyal & M.Satake	Anmol Publication
Promoting Health: A Practical Guide To Health Education	Ewles ,L Simnet,I	Scutari Press
Human Rights In Health.	Found.C.	Elsevier Publishing Co.
Public And Community Health.	Parker.W.S.	Staples Press London.
Public Health Informatics and Information systems	O'Carroll, P.W., Yasnoff, W.A., Ward, M.E., Ripp, L.H., Martin, E.L. (Eds.)	Springer
Public Health Informatics and Information systems	J.A. Magnuson, Jr., Paul C. Fu	Springer

TITLE	AUTHOR(S)	PUBLISHER
Sex, Disease, And Society: A Comparative History Of Sexually Transmitted Diseases And HIV/AIDS In Asia And The Pacific	Milton Lewis, Scott Bamber, Michael Waugh	Greenwood Press,
Living With HIV: Experiment In Courage	Mary Elizabeth O'Brien	Auburn House, 1992
The Unending Frontier: An Environmental History Of The Early Modern World	John F. Richards	California Press
Communicable Diseases Control	Anderson, Arnstein, Lester	The Macmillan Company
Encyclopedia Of Disaster Management	Goel, S. L.	Deep & Deep
Disaster Management	G.K. Ghosh	A.P.H.
Emergency Medical Services And Disaster Management: A Holistic Approach	P.K. Dave	Jaypee Brothers
Disaster Management - Recent Approaches	Arvind Kumar	Anmol Publication
The New Public Health: An Introduction For The 21st Century.	San Diego, CA:	Academic Press
Handbook Of Health Economics.	Culyer A.J. And J.P. Newhouse.	Elsevier
Biostatistical Aspects Of Health And Population	Edited By Arvind Pandey.	Hindustan Pub
Essentials Of Dental Public Health	Daly	Oxford
Community Dentistry	Cynthia Pine	Oxford
Community Oral Health Practice For The Dental Hygienist	Kathy Voigt Geurink,	Elsevier Science

Concepts In Dental Public Health	Jill Mason	Lippincott Williams & Wilkins
Essential Dental Public Health	Blanaid Daly, Richard Watt, Paul Batchelor, Elizabeth Treasure	Oxford Univ Press
Dental Public Health And Community Dentistry	Anthony Jong	C.V. Mosby Co
The Theory And Practice Of Public Health.	Hobson.W.	Oxford University
Oxford Textbook Of Public Health. Vol. Ii.	Holland.W.W.	Oxford University
Oxford Textbook Of Public Health. Vol. Iii.	Holland.W.W.	Oxford University
Oxford Textbook Of Public Health. Vol. Iv.	Holland.W.W.	Oxford University

TITLE	AUTHOR(S)	PUBLISHER
Man Adapting	Dubos, Rene	Yale University Press
Doing Your Research Project	Bell, J.	Open University
The Limits Of Medicine	Illich, I.	Pelican Books
The Role Of Medicine	Mckeown, T.	Blackwell

SECTION – I

PREAMBLE

There is a dearth of core Public Health Professionals in the government health machinery. It is estimated that more than 10,000 Public Health Professionals would be required on an annual basis to equip the government machinery with an appropriately trained and qualified public health workforce. With a rapid health transition taking place, India faces two threats, one being the rising disease burden and the other is the poor allocation of government funds; both can be effectively managed by personnel trained in public health through appropriate public health training, i.e. ability to involve communities, work in multidisciplinary teams, and lobbying with government and community leaders with a deep understanding of social, economical and environmental determinants of health, Public Health Professionals are well armed to face these challenges.

Why Master of Public Health (MPH)?

The most widely recognized professional credential for leadership in public health is the MPH degree. This program prepares candidates to be competitive on a global level in the vast area of community health. It emphasizes on acquisition of skills essential to the practice of public health through techniques like student-directed learning, problem solving and field postings. Public Health Professionals can function as policy analysts, health planners, epidemiologists, demographers, social and behavioral scientists.

(A). MPH Semester I Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum Marks to pass
MPH-I-1 T	Research Methods (Qualitative & Quantitative)	20	80	100	50
MPH-I-2 T	Bio – Ethics	20	80	100	50
MPH-I-3 T	Health Care Delivery System	20	80 (45 + 35)	100	50
MPH-I-E T	Elective(s) as per selection	20	80	100	50

(B). MPH Semester II Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to pass
MPH-II-1 T	Epidemiology (Part I & II)	20	80	100	50
MPH-II-2 T	Biostatistics (Part I & II)	20	80	100	50
MPH-II-3 T	Epidemiology of Infectious & Non Communicable Diseases	20	80 (35 + 45)	100	50
MPH-II-E T	Elective(s) as per selection	20	80	100	50

Viva Voce Examination

MPH-II-1 P	Viva-voce	-	100	100	50
-------------------	-----------	---	-----	-----	----

(C). MPH Semester III Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
MPH-III-1 T	Planning & Management	20	80	100	50
MPH-III-2 T	Occupational & Environmental Health	20	80 (35 + 45)	100	50
MPH-III-3 T	Public Health Legislation & Public Health Information Systems	20	80 (45 + 35)	100	50
MPH-III-E T	Elective(s) as per selection	20	80	100	50

(D). MPH Semester IV Theory

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
MPH-IV-1 T	Maternal & Child Health and Nutrition (Part I & II)	20	80	100	50
MPH-IV-2 T	Demography & Family Planning	20	80 (45 + 35)	100	50
MPH-IV-E T	Elective(s) as per selection	20	80	100	50

Viva Voce Examination

MPH-IV-1 P	Viva-voce & Dissertation Presentation	-	100	100	50
-------------------	---------------------------------------	---	-----	-----	----

VIVA VOCE

At the end of semester II (subjects of semester I & II) & semester IV (subjects of semester III & IV) candidate will appear for University viva-voce examination.

Practical (College Exam): A college level practical exam will be conducted at 5 months after the commencement of MPH Semester II in which the candidate has to obtain at least 50% marks to appear for University Examination of semester II and semester III

(D). College Practical Exam

Practical No.	Paper	Max. College marks	Total maximum marks	Minimum marks to Pass
CE 1P	Critical Appraisal	40	40	50
CE 2P	Biostatistics Exercises	30	30	
CE 3P	Epidemiological exercises	30	30	

3.10.3. Dissertation Valuation:

The examiners appointed by the University shall evaluate the dissertation. Approval of dissertation work is an essential prerequisite for a candidate to appear in the semester IV University examination. The dissertation shall be valued by two evaluators (examiners) one within the University and one outside. Any one-evaluator acceptance will be considered as a prerequisite for eligibility to take up the examination.

3.10.3.1 Viva-Voce and Defense Examination: The viva-voce and defense examination shall aim at assessing the depth of knowledge, logical reasoning, confidence and oral communication skills.

The viva – voce and defense examination shall be held after the submission of dissertation. If a candidate fails to submit the dissertation on or before the date prescribed, his/her viva-voce and defense shall be conducted during the subsequent University examination.

3.10.3.2 Examiners: There shall be at least two examiners, out of them one shall be external examiner and the other the internal examiner.

3.11. Criteria for Declaring Pass

3.11.1 A candidate shall be declared to have passed MPH if all the conditions below are fulfilled:

MPH-Semester I:

- Candidate who secures Grade D or above in each subject in theory of University & Sessional examinations considered together

MPH-Semester II

- Candidate who secures Grade D or above in each subject in theory of University & Sessional examinations considered together.
- Candidate shall further obtain Grade D or above in viva-voce

MPH-Semester III

- Candidate who secures Grade D or above in each subject in theory of University & Sessional examinations considered together.

MPH-Semester IV

- Candidate who secures Grade D or above each subject in theory University & Sessional examinations considered together.
- Candidate shall further obtain Grade D or above in viva-voce.
-

3.11.2 Carry over:

At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he is appearing for. e.g:

- If the candidate has not cleared semester I, he can appear for semester II and pending subjects of semester I simultaneously.
- For appearing for semester III he should have cleared semester I and can appear for papers pending from semester II along with semester III subjects.
- For appearing for semester IV he/she should have cleared semester II completely and can appear pending papers of semester III simultaneously.

Cumulative Grade Point Average (CGPA)

Letter Grades and Grade Points equivalent to percentage of Marks and performances

10 Point Grade Scale

Percentage of marks obtained	Letter Grade	Grade Point	Performance
91.00 - 100	O	10	Outstanding
80.00 - 89.99	A+	9	Excellent
70.00-79.99	A	8	Good
60.00-69.99	B+	7	Fair
50.00-59.99	B	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

1. Conversion of Grades in to GPA:

$$\text{GPA} = \text{Credits} \times \text{Grade Points} / \text{Total Credits}$$

2. Cumulative Grade Point Average (CGPA) of all 4 Semester will be calculated as:

$$\text{Total No. GPA} / \text{No. of Semester}$$

**Ordinance Governing
Master of Public Health
Epidemiology
Syllabus / Curriculum
2018-19**



Accredited 'A' Grade by NAAC (2nd Cycle)

Placed in Category 'A' by MHRD (GoI)

**KLE ACADEMY OF HIGHER EDUCATION AND
RESEARCH**

JNMC Campus, Nehru Nagar, Belagavi – Karnataka, India

Phone: +91 0831-2472777, 2493779, FAX: +91 0831 – 249377

E-mail: info@kledeemeduniversity.edu.in Website: kledeemeduniversity.com

SECTION – I

PREAMBLE

There is a dearth of core Epidemiologists in the government health machinery. It is estimated that more than 10,000 Public Health Professionals would be required on an annual basis to equip the government machinery with an appropriately trained and qualified public health workforce. With a rapid health transition taking place, India faces two threats, one being the rising disease burden and the other is the poor allocation of government funds; both can be effectively managed by personnel trained in public health through appropriate public health training, i.e. ability to involve communities, work in multidisciplinary teams, and lobbying with government and community leaders with a deep understanding of epidemiologists determinants of health.

Why Master of Public Health in Epidemiology (MPH)?

Most widely recognized professional credential for leadership in public health is MPH degree. MPH in epidemiological program specifically prepares candidates to be competitive on a global level in the vast area of epidemiology and community health. It emphasizes on acquisition of epidemiological skills essential for application in the field of Public Health. It equips students to apply epidemiological and bio statistical research methods to solve problems of the community to keep population healthy. Public Health (Epidemiology) Professionals can function as epidemiologists, policy analysts and health planners.

SECTION – II

VISION:

To be a premier Public Health Department for Quality Education, Research and Leadership.

MISSION:

The Department of Public Health is committed to:

- Train and Create a Cadre for Public Health Leadership
- Promote Positive Health across Population
- Ensure Collective Commitment to Quality Research

This shall be achieved by following objectives:

OBJECTIVES:

By the end of the MPH program the candidates will achieve the following learning objectives under ten different areas listed below.

I. Epidemiology skills:

Candidates shall be able to:

- Define, assess and understand the health status of populations, determinants of health and illness, factors contributing to health promotion and disease prevention and factors influencing the use of health services.
- Identify and apply the research methods used in all basic public health sciences, including epidemiology, health and policy administration, behavioral and social sciences, biostatistics and environmental and occupational public health to prevent illness and injury.
- Describe the correlation and interactions among multiple determinants of health at intra & interpersonal organizational, community and societal levels (i.e., ecological model).

II. Analytic skills:

Candidates shall be able to:

- Define, identify and resolve public health problems by using appropriate data and statistical methods.
- Select and define variables relevant to defined public health problems, use data to illustrate ethical, political, scientific, economic and overall public health issues.

- Use rigorous critical thinking to analyze public health problems and apply public health knowledge to translate theory into public health practice by effective planning, implementation and evaluation.

III. Ethics:

Candidates shall be able to:

- Use and apply ethical analysis to inform decision-making in public health.
- Apply ethical issues involved in conducting research.

IV. Information and technology:

Candidates shall be able to:

- Define a focused research question and conduct electronic and hand literature searches for issues of concern in public health.
- Use one of several statistical packages (e.g., EPI Info, SPSS) to analyze data and graphic software package (e.g., PowerPoint) to develop presentations for public health problems.
- Use information systems in improving the effectiveness of public health activities.

V. Communication skills:

Candidates shall be able to:

- Present accurately and effectively demographic, statistical and scientific public health information for professionals and lay audiences.
- Lead and participate in groups, communicate effectively both in writing and orally to address specific public health issues and use the media to communicate important public health information.

VI. Cultural skills:

Candidates shall be able to:

- Demonstrate an understanding of the dynamic forces that cultural diversity plays in public health, both within India and internationally.
- Identify cultural, demographic and socio-economic factors in determining disease, disease prevention, health promotion and health care services organization and delivery.
- Develop approaches to public health that take into account cultural differences.

VII. Policy development:

Candidates shall be able to:

- Understand the historical development and structure of national, state & local public health-related agencies including communities.
- Describe processes and strategies used to inform and influence policy makers as they develop evidence-based decision-making policies, laws and regulations that have an impact on the public health.

VIII. Community practice:

Candidates shall be able to:

- Establish and maintain professional relations with key stakeholders in community-based initiatives to address public health issues.
- Develop, implement and evaluate a community public health programme.
- Practice ethical community-based research.

IX. Financial planning and management:

Candidates shall be able to:

- Develop and justify a budget through cost-effectiveness, cost-benefit and cost utility analysis.
- Monitor & evaluate public health programs.

X. Leadership and systems thinking:

Candidates shall be able to:

- Describe public health and health care delivery systems and will develop skills to assess a Public health organization's structure and performance
- Exercise strategic planning in public health and describe the elements of organizational leadership including coordinating teams, managing conflicts, motivating staff and continuous quality improvement.

SECTION-III

Regulations Governing MPH Degree Semester Course

3.1. Eligibility for Admission:

3.1.1 A Graduate in Medicine, Dentistry, Physiotherapy, Nursing, Pharmacy, Ayurveda, Homoeopathy, Social Sciences, Nutrition, Life Sciences, Commerce, Law, or any other degree courses recognized as equivalent by KLE Academy of Higher Education & Research. Preference shall be given to candidates from health sciences.

3.1.2 The degree should have been obtained from any University recognized by UGC, established by law in India and the medium of instruction for the degree should be English. For international candidates their degree should be recognized by AIU and where medium of instruction may not be English they should have passed any International proficiency test like IELTS, TOEFL etc.

3.1.3 A Candidate who has scored a minimum of 50% of the marks (aggregate of three/four years for graduate degree holders) prescribed for the qualifying examination shall be eligible for the admission to the MPH Course.

3.2. Proposed Intake of Candidates: 40

3.3. Duration of the Course:

The course of study including submission of dissertation on the topic registered shall be semester based, that includes 4 semesters each extending for six months from the commencement of academic semester. At the end of each semester, there shall be a University examination. At the end of Semester IV, there shall be a Final University Examination. Candidate shall submit a dissertation on the topic approved by the University five months prior to Semester IV Examination.

Medium of Instruction and Examination shall be English

3.4. Requirement to Complete the Course:

Semester	+	Semester	+	Semester	+	Semester	+	Dissertation	+	Intern	=	MPH
I		II		III		IV				ship		Degree

3.5. Training, Teaching and Learning Activities:

A candidate pursuing the course shall work in the Department as a full time candidate. No candidate shall be permitted to run a clinic/ laboratory/ nursing home while studying.

Every candidate shall take part in seminars, group discussions, journal review meetings etc. Every candidate shall attend teaching and learning activities during each semester as prescribed by the Department and not absent himself /herself without valid reasons.

A list of teaching and learning activities designed to facilitate acquiring of essential knowledge and skills outlined is given below:

Lectures: For all subjects lectures shall be conducted by the faculty.

Journal Club: Recommended to be held twice a week. All the MPH candidates are expected to attend and actively participate in discussion and enter the relevant details in the log book. Further, every candidate must make a presentation from the allotted journal(s), selected articles with special emphasis on public health related topics, at least two times a year.

Subject Seminar: Recommended once a week. All the MPH candidates are expected to attend and actively participate in discussion and enter in the log book the relevant details. Further, every candidate shall present a seminar on selected topics at least four times a year and have a total of eight seminars in two years. The presentations would be evaluated using checklist and would carry weightage for internal assessment. A timetable with the subjects and the names of the candidate and the moderator will be scheduled at the beginning of each semester.

Field Visit : PHC, Subcenter, DHO office, KLE Hospital, Sewage treatment plant, Water purification plant, milk dairy, HLL Industry, Campbell factory, Pollution Control Board, CDPO office, IDSP, and other institutions of Public Health importance.

3.6. Attendance and Monitoring Progress:

3.6.1 Attendance:

3.6.1.1 A candidate pursuing MPH Course shall study for the entire period as full time candidate. No candidate shall join any other course of study or appear for any other examination conducted by this University or any other University in India or abroad during the period of registration.

3.6.1.2 Each semester shall be considered as a unit for the purpose of calculating attendance.

3.6.1.3 Every candidate shall attend symposia, seminars, conferences, journal review meetings, dissertation review meetings and lectures during each year as prescribed by the Department/College/University and not absent himself / herself without valid reasons.

3.6.1.4 Candidate who has put in a minimum of 75% of attendance in the theory and practical assignments separately shall be permitted to appear for University examination at the end of each semester.

3.6.1.5 Candidate will be allowed to appear the Semester IV examination only if the dissertation submitted is accepted.

3.6.1.6 Any candidate who fails to complete the course in the manner stated above shall not be permitted to appear for the semester University examinations.

3.6.2 Monitoring Progress of Studies

3.6.2.1 *Log Book:* Every candidate shall maintain a log diary and record his/her participation in the training programs conducted by the Department such as journal reviews, seminars, etc. Special mention shall be made of the scientific presentations in conference by the candidate as well as details of assessment works like essay writing, etc submitted by the candidate. The work diary shall be scrutinized and certified by the Head of the Department and presented in the University viva-voce examination.

3.6.2.2 *Sessional Examination:* Records and marks obtained in sessional test shall be maintained by the Head of the Department and sent to the University, when called for.

3.6.2.3 *Records:* Records and marks obtained in sessional tests, seminars, journal club, field activities, and weekly written assignments which shall be maintained by the Head of the Department and shall be made available to the University.

3.7. Dissertation

3.7.1 *Synopsis:* Every candidate shall submit a synopsis of the intended dissertation work **in epidemiological field. It has to be submitted** through the guide to the Director Academic Affairs of KLE Academy of Higher Education & Research through the HOD and Head of the institution, not later than

five months from the date of admission to MPH. The date will be notified by KLE Academy of Higher Education & Research.

3.7.2 Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.

3.7.3 Every candidate pursuing MPH course is required to carry out work on a selected research project under the guidance of a recognized guide. The results of such work shall be submitted in the form of a dissertation.

3.7.4 The dissertation is aimed to train the candidate in research methodology. It includes identification of the problem, formulation of a hypothesis, review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis and comparison of results and drawing conclusions.

3.7.5 Dissertation shall require approval of the Institutional Ethics Committee (IEC) prior to initiation of any dissertation work. Candidate shall work under the supervisor to attain IEC approval. Student shall maintain regular contact with the guide during his/her dissertation work.

3.7.6 The dissertation should be written under the following headings:

- Introduction
- Objectives
- Review of literature
- Material and Methods
- Results – including tables & graphs
- Discussion
- Conclusion
- Summary
- References
- Annexures

3.7.7 The written text of dissertation shall not be less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexures. It should be neatly typed with double line spacing on one side of the bond paper (A4 size, 8.27” x 11.69”) and bound properly. Spiral binding is not permitted. The dissertation shall be certified by the guide and co-guide if any, Head of the Department and Head of the Institution.

3.7.8 The dissertation shall be valued by examiners appointed by the University.

3.7.9 A guide shall be a full time postgraduate teacher of a constituent college of KLE Academy of Higher Education & Research and recognized by KLE Academy of Higher Education & Research as a guide for supervision of dissertation work.

3.7.10: Change of Guide: Guide may be changed with prior permission from the University.

3.7.11 Submission of Dissertation: Two copies of the dissertation duly certified by the Guide, the Head of Department of Public Health shall be submitted to the Controller of Examinations, KLE Academy of Higher Education & Research, through the Head of the Department at least five months before University Examination of semester IV.

3.8 Internship:

Every candidate shall undergo field training for a period of two months in fourth semester at an organization of national recognition for field experience

Candidate should submit two copies of the training report duly certified by the authorities of the training center in which he/she has undergone training duly accepted and certified by the Head of the Department.

3.9. Schedule of Examination

There shall be a University examination at the end of each semester for all four semesters and viva-voce at the end of semester II (subjects of semester I&II) & semester IV (subjects of semester III & IV). There shall be a dissertation presentation at the end of semester IV in addition to viva voce.

3.10. Scheme of Examination

3.10.1 Sessional Examination

There shall be a minimum of two sessional examinations in each subject conducted by the Department at midterms and before term end in theory and viva-voce.

The sessional marks shall be awarded out of a maximum of 80 for theory and 50 for viva-voce separately as follows and shall be calculated out of 20 marks and 10 marks respectively.

Theory

Written examination 80 marks

The total marks obtained have to be calculated out of 10.

Seminar 10 marks

Journal Club 10 marks

Reports of field visits 10 marks

Models/Essay writing/Project work 10 marks

Camps/ Group activities 10 marks

The total marks obtained have to be calculated out of 10.

2 marks will be given to candidates who make scientific presentations in National Conferences

A cumulative total will be calculated out of 20 as “Internal Assessment” (IA) marks

3.10.2 University Examinations

3.10.2.1 Theory:

There shall be four University examinations for the entire course namely I, II, III, IV semester examination. The examination will be conducted at the end of each semester. There shall be three (3) core theory papers and elective papers. All core subjects will have University exam and electives will have college exam. Each theory paper shall be of 3 hours duration carrying 80 marks each.

3.10.2.2 Practical: There shall be practical examination for Biostatistics and Epidemiological exercise in semester II

3.10.2.3 Viva-voce: - Each candidate shall give viva-voce examination for semester II (subjects of semester I&II) & semester IV (subjects of semester III &IV).

SCHEME OF EXAMINATION FOR THEORY

Question	Number of Questions	Marks	Maximum Marks	Total Marks
Long Essay Questions	2	15	30	80
Short Essay Questions	5	10	50	

(A) MPH Semester I Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum Marks to pass
MPH-I-1 T	Research Methods (Qualitative & Quantitative)	20	80	100	50
MPH-I-2 T	Bio – Ethics	20	80	100	50
MPH-I-3 T	Health Care Delivery System	20	80 (45 + 35)	100	50
MPH-I-E T	Elective(s) as per selection	20	80	100	50

(B) MPH Semester II Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to pass
MPH-II-1 T	Epidemiology (Part I & II)	20	80	100	50
MPH-II-2 T	Biostatistics (Part I & II)	20	80	100	50
MPH-II-3 T	Epidemiology of Infectious & Non Communicable Diseases	20	80 (35 + 45)	100	50
MPH-II-E T	Elective(s) as per selection	20	80	100	50

Practical Examination

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to pass
MPH-II-1-P	Biostatistics Exercise	10	40	50	25
MPH-II-2-P	Epidemiological Exercise	10	40	50	25
Total				100	50

Viva Voce Examination

MPH-II-3 P	Viva-voce	-	100	100	50
-------------------	-----------	---	-----	-----	----

C) MPH Semester III Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
MPH-III-1 T	Planning & Management	20	80	100	50
MPH-III-2 T	Occupational & Environmental Health	20	80 (35 + 45)	100	50
MPH-III-3 T	Public Health Legislation & Public Health Information Systems	20	80 (45 + 35)	100	50
MPH-III-E T	Elective(s) as per selection	20	80	100	50

(D) MPH Semester IV Theory

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
MPH-IV-1 T	Maternal & Child Health and Nutrition (Part I & II)	20	80	100	50
MPH-IV-2 T	Demography & Family Planning	20	80 (45 + 35)	100	50
MPH-IV-E T	Elective(s) as per selection	20	80	100	50

Viva Voce Examination

MPH-IV-1 P	Viva-voce & Dissertation Presentation	-	100	100	50
-------------------	---------------------------------------	---	-----	-----	----

VIVA VOCE

At the end of semester II (subjects of semester I & II) & semester IV (subjects of semester III & IV) candidate will appear for University viva-voce examination.

Practical (College Exam): A college level practical exam will be conducted at 5 months after the commencement of MPH Semester II in which the candidate has to obtain at least 50% marks to appear for University Examination of semester II and semester III

(D) College Practical Exam

Practical No.	Paper	Max. College marks	Total maximum marks	Minimum marks to Pass
CE 1P	Critical Appraisal	40	40	50

3.10.3. Dissertation Valuation:

The examiners appointed by the University shall evaluate the dissertation. Approval of dissertation work is an essential prerequisite for a candidate to appear in the semester IV University examination. The dissertation shall be valued by two evaluators (examiners) one within the University and one outside. Any one-evaluator acceptance will be considered as a prerequisite for eligibility to take up the examination.

3.10.3.1 Viva-Voce and Defense Examination: The viva-voce and defense examination shall aim at assessing the depth of knowledge, logical reasoning, confidence and oral communication skills.

The viva – voce and defense examination shall be held after the submission of dissertation. If a candidate fails to submit the dissertation on or before the date prescribed, his/her viva-voce and defense shall be conducted during the subsequent University examination.

3.10.3.2 Examiners: There shall be at least two examiners, out of them one shall be external examiner and the other internal examiner.

3.11. Criteria for Declaring Pass

3.11.1 A candidate shall be declared to have passed MPH if all the conditions below are fulfilled:

MPH-Semester I:

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together

MPH-Semester II

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together.
- Candidate shall further obtain Grade B or above in viva-voce
- Candidate shall pass practical and theory separately.(e.g. If candidate passes in theory and fail in practical, he/she shall appear only practical examination)

MPH-Semester III

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together.

MPH-Semester IV

- Candidate who secures Grade B or above each subject in theory University & Sessional examinations considered together.
- Candidate shall further obtain Grade B or above in viva-voce.

3.11.2 Carry over:

At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he is appearing for. e.g:

- If the candidate has not cleared semester I, he can appear for semester II and pending subjects of semester I simultaneously.
- For appearing for semester III he should have cleared semester I and can appear for papers pending from semester II along with semester III subjects.
- For appearing for semester IV he/she should have cleared semester II completely and can appear pending papers of semester III simultaneously.

Cumulative Grade Point Average (CGPA)

Letter Grades and Grade Points equivalent to percentage of Marks and performances

10 Point Grade Scale

Percentage of marks obtained	Letter Grade	Grade Point	Performance
91.00 - 100	O	10	Outstanding
80.00 -89.99	A+	9	Excellent
70.00-79.99	A	8	Good
60.00-69.99	B+	7	Fair
50.00-59.99	B	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

1. Conversion of Grades in to GPA:

GPA= Credits x Grade Points / Total Credits

2. Cumulative Grade Point Average (CGPA) of all 4 Semester will be calculated as:

Total No. GPA / No. of Semester

**SECTION-IV
COURSE CONTENT**

4.1 SEMESTER I

S. No.	Core Subjects	Credits
MPH-I-1 T	Research Methods (Qualitative & Quantitative)	2
MPH-I-2 T	Bioethics	2
MPH-I-3 T	Health Care Delivery System	4
MPH-II-1 T	Epidemiology (Part I)	4
MPH-II-2 T	Biostatistics (Part I)	4 (3 +1)
MPH-I-1 P	Under Five Clinic posting & Community Project (Practical)	2
MPH-I-2 P	Dissertation (Synopsis development practical)	2
MPH-I-E T	Electives*	3
TOTAL:		23

**Note- Choose electives (from List of Electives) amounting to total of 3 CREDITS*

THEORY

MPH-I-1 T Research Methods (Qualitative & Quantitative)

Quantitative Research Methods:

Introduction to Research Methodology

Developing a Research Plan

- Research Problem
- Research Question
- Research Hypothesis
- Variables

Data Collection Tool Development

Epidemiological study designs: Cross Sectional, Cohort, Case Control

Experimental Design: Randomized, Non randomized, Parallel, Factorial, Cross Over

Qualitative Research Methods:

Overview of Qualitative Research Methods

- Comparing Quantitative and Qualitative Research
- Sampling in Qualitative Research
- Recruitment in Qualitative Research

Theories

- Grounded Theory
- Phenomenology
- Case studies
- Ethnography

Participant Observation

- Logistics of Participant Observation
- How to Take Field Notes

In-Depth Interviews

- Logistics of interviewing
- Interview Steps and Tips for Taking Interview Notes.

Focus Groups

- Logistics of Focus Groups
- Skills of Effective Moderator and Note Taker
- Steps in Focus Group Note Taking
- Steps in Moderating a Focus Group

Data Documentation and Management: Organizing and storing Data

- Converting Raw Data to Computer Files
- Organizing Data Storage list
- Data Archiving Steps
- Data Management Check

Importance Experimental Designs

- Before and after Without Control Design
- After only Control Design
- Before and after With Control Design
- Completely Randomized Designs
- Randomized Block Designs
- Latin square Design
- Factorial Design

MPH-I-2 T Bio –Ethics:

Historical Perspectives

General Principles on Ethical Considerations Involving Human Participants

Statements of Specific Principles for Epidemiological Studies

- Nuremberg Code
- Belmont Report
- Declaration of Helsinki
- General Consideration for Clinical Trials
- International Conference on Harmonization & Good Clinical Practices
 - Structure & Contents of Clinical Study Report
 - Good Clinical Data Management Practices
 - Investigator Brochures
 - Essential Documents
 - Composition & Functions of Ethical Committee/ IRB
 - Duties & Roles of Principal Investigator
 - Roles & Duties of Sponsor
 - Good Clinical Practice India- DCGI
 - ICMR Guidelines
 - Revised Schedule Y
- Informed Consent process and informed consent form
- Ethical Principles Related to Animal Experiments.

MPH-I-3 T Health Care Delivery System

Introduction to Public Health

- Evolution of Public Health
- Ancient India and Public Health

- Founders of Modern Public Health

Changing concepts of Health Care

- Comprehensive Health Care
- Basic Health Care
- Primary Health Care

Levels of Health Care

- Primary Health Care
- Secondary Health Care
- Tertiary Health Care
- Three tier system of health care: Sub centre, Primary Health Centre, Community Health Centre
- Function, Staffing pattern with job responsibilities of each staff at each of the above levels
- Assessing "Health Status" and "Health Needs"
- Assessing the "Health Impact"
- Community Diagnosis
- Health Administration in India
 - Central Level
 - State level
 - District Level - Panchayat Raj Institutions
- Health for all- Millennium Development Goals & Sustainable Development Goals
- Voluntary & International Health Agencies
- Global Health:
 - Globalization,
 - Health disparities between developed and developing countries,
 - Global Health Agenda for 21st Century.
- Health Insurance Plans
- National Health Policy
 - National Health Policy 2002
 - National Population Policy 2000
- National Health Programs
 - Integrated Child Development Scheme
 - RNTCP
 - NACO
 - RCH
 - NHM: NRHM & NUHM
 - NVBDCP
 - IDSP
 - NIDDCP
 - NLEP
 - NPCB
 - Pulse Polio Immunization Program
 - National Mental Health Program
 - National Cancer Control Program
 - National Program for Prevention and Control of Diabetes, Cardio-vascular Diseases and stroke
 - INAP

MPH-II-1 T Epidemiology (Part I)

- Concept of Health & Disease
 - Concepts and dimensions of health, well being
 - Quality of life, spectrum of health
 - Determinants of Health
 - Indicators of Health
 - Epidemiological triad
 - Dynamics of Disease Transmission
 - Natural history of diseases
- Measuring the Occurrence of Diseases
 - Morbidity
 - Mortality
- Epidemiology Definition, Principles, Uses
- Identification of Health Problems
 - Survey methods
 - Planning, Designing and Conducting of Epidemiological Surveys
- Screening for Diseases
 - Types of screening test
 - Assessing the validity and reliability of diagnostic and screening tests

MPH-II- 2 T: Biostatistics (Part I)

- Introduction to Biostatistics
- Application of Statistics to problems in Clinical and Public Health Settings
- Data
 - Classification
 - Presentation – Tables AND Graphs
 - Collection
- Sampling Designs
- Sample Size Calculation
- Descriptive statistics
 - Measures of Central Tendency
 - Measures of Dispersion
 - Measures of Kurtosis and Skewness

PRACTICAL

MPH-I-1 P: Under Five Clinic posting & Community Project (Practical)

MPH-I-2 P: Dissertation (Synopsis Development)

4.2 SEMESTER II

S. No.	Core Subjects	Credit
MPH-II-1 T	Epidemiology (Part II)	6(4+2)
MPH-II-2 T	Biostatistics (Part II)	3 (2+1)
MPH-II-3 T	Epidemiology of Infectious & Non-Communicable Diseases	4
MPH-II-1 P	Critical Appraisal (Practical)	2
MPH-II-2 P	Field Visit – Community Activities	3
MPH-II-3 P	Dissertation (Data collection)	4
MPH-II-E T	Electives*	3
TOTAL :		25

**NOTE: Choose electives (from List of Electives) amounting to total of 3 CREDITS*

THEORY

<p>MPH-II-1 T Epidemiology (Part II)</p> <ul style="list-style-type: none"> • Surveillance • Association and causation • Bias • Confounding • Interaction • Investigation of an epidemic • Using Epidemiology to Identify the Cause of Diseases • Applying Epidemiology to Evaluate Health Services & Policy
<p>MPH-II-2 T Biostatistics Part II</p> <ul style="list-style-type: none"> • Probability and Probability Distribution (Binomial, Poisson and Normal Distribution) • Testing of Hypothesis: Parametric Tests (z test, t test, Analysis of variance – One way), • Non Parametric Tests (Mc Neimar test, Fisher Exact test, Median test, Sign test, Wilcoxon signed matched pair test, Mann Whitney test, Kruskal Walli test) • Correlation Analysis • Regression Analysis: Simple, Multiple, Logistic • Estimation: Point and Interval
<p>MPH-II-3 T Epidemiology of Infectious & Non-Communicable Diseases General control measures of communicable diseases Epidemiology & control of Infectious Diseases</p> <ul style="list-style-type: none"> • Acute diarrheal diseases • Cholera • Typhoid fever (Enteric fever) • Brucellosis • Leptospirosis • Plague • HIV/AIDS • Leprosy • Malaria, Filaria, Yellow fever Dengue, Chikungunya, Kala-Azar, Japanese Encephalitis • KFD

- Epidemiology and control of vaccine preventable diseases: Tuberculosis, Diphtheria, Whooping Cough, Measles, Tetanus, Poliomyelitis, Hepatitis.
- ARI
- Influenza
- SARS
- Viral Hepatitis- A,B,C,E
- Food Poisoning
- Parasitic infections, Ascariasis, Hookworm infestations
- Rabies
- STDs

Epidemiology & control of Non Communicable Diseases

- Cardiovascular Diseases
 - Rheumatic Heart Disease
 - Coronary artery disease
 - Hypertension
- Neoplasm
- Diabetes
- Mental Health Problems
- Obesity
- Blindness
- Accidents
- Emerging & Re-emerging infectious Diseases

PRACTICAL

MPH-II-1 P Critical Appraisal

Critical appraisal of published articles

MPH-II-2 P Dissertation

Data Collection and Entry.

4.3 SEMESTER III

S. No.	Core Subject	Credit
MPH-III-1 T	Planning & Management	4
MPH-III-2 T	Occupational & Environmental Health	4
MPH-III-3 T	Public Health Legislation & Public Health Information System	4
MPH-IV-1 T	Maternal & Child Health & Public Health Nutrition (Part I)	4
MPH-III-1 P	Dissertation (Data collection & analysis)	4
MPH-III-E T	Electives*	3
TOTAL :		23

* NOTE: Choose electives (from List of Electives) amounting to total of 3 CREDITS

THEORY

MPH-III-1 T Planning & Management

- Introduction to Planning & Management: Aims and Objectives
- Seven Steps and Predisposing Factors in Planning & Management.
- Planning Cycle
- Strategies/ Methods in Planning
- Skills on Making Effective Planning
- Alma-Atta Declaration
- Jakarta Health Declaration
- Ottawa Charter
- Need Assessment-Identifying Health Promotion Needs
- Audit
- Budget Allocation

Public Health Management

- General Concepts in Management Sciences
- Organizational Concepts & Behavior
- Time Management
- Materials Management
- Self-Management
- Modern Management Techniques
- Personnel Management & Human Resource Development
- Health Outcome Research

MPH-III-2 T Occupational & Environmental Health

Occupational Health

- Occupational Hazards
 - Risk vs Hazard
 - Types
 - Prevention & control
- Pneumoconiosis
- Lead Poisoning
- Occupational Cancers
- Occupational Dermatitis

Occupational Hazards in Agricultural Workers

- Accidents in Industry
- Sickness Absenteeism
- Ergonomics
- Problems of
 - Urbanization
 - Industrialization

Environmental Health

- Public Health Aspects of Extreme Hot and Cold Environment
- Food Sanitation and safety
- Vector & Rodent Control
- Solid waste disposal
- Excreta Disposal
- Environmental Health Policy
- Hospital Waste Management
- Water & Sanitation:
 - Characteristics of Safe Water
 - Water Distribution System
 - Water Pollution
 - Purification Of Water
 - Water Quality Standards
 - Water Problems In India
 - Water Conservation,
 - Rain Water Harvesting
- Environment Pollution:
 - Air Pollution
 - Soil Pollution
 - Noise Pollution
 - Thermal pollution
 - Housing & Ventilation
 - Nuclear Hazards
 - Role of an Individual In Prevention of Pollution
 - Disaster Management
 - Social Issues and the Environment

MPH-III-3 T Public Health Legislation & Health Information Systems

Public Health Legislation

- Legislation related to Quality of Professional Education and Services
 - Indian Medical Council Act
 - Indian Nursing Council Act
 - The Dentist Act
 - The Indian Medicine Central Council Act
- Legislation related to Census, Birth and Death
- Legislation related to control of Epidemics
- Legislation related to Tobacco and Drug Control
 - COTPA

- The Narcotic drugs and Psychotropic Substance act 1985
- The Transplantation of Human Organs Act 1994
- The Prevention of Food Adulteration Act 1959
- Food safety and standard Act
- The Protection of Human Rights Act 1993
- Legislation for Women Empowerment and Health
 - The dowry Prohibition Act 1961
 - Protection of Women from Domestic Violence Act 2005
 - Maternity Benefit Act
 - Immoral traffic(Prevention) Act 1956
 - The medical termination of pregnancy act 1971
 - PCPNDT Act 1994
- Legislation for Child Protection and Health
 - Child labor prohibition Act 1986
 - The Juvenile Justice Act 2000
- Legislation related to the Welfare Rehabilitation of Disadvantaged
 - PWD Act
 - Mental Health Act 2017
 - Welfare of Parents and senior citizens Act 2007
 - Citizenship Amendment Act 2019
- Occupational Health & Legislation
 - The Factory Act
 - ESI Act
 - Minimum wages Act
- Environment Health Legislations
 - Environmental Protection act 1986,
 - Air pollution
 - Water pollution
 - Biomedical waste management & handling rules 1998
 - Municipal solid waste management rules 2000
 - Plastic waste management and handling rules 2011
 - Disaster management Act 2005
- International Health Regulations
- Universal Declaration of Human Rights

Health Information Systems

- Evolution of Health Information System
- Principles of HIS
- Health Information System: Sources, Uses
- Application of Information System
- Managing Health information system
- Importance of data
- e-Health, telemedicine and m-health
- DIKW Hierarchy

MPH-IV-1 T Maternal and Child Health & Public Health Nutrition (Part I)

Maternal and Child Health

- Introduction to
 - Health Status of Women in General
 - Reproductive Health in particular
- Health Problems of Women across the Life Span
- Determinants of maternal & child health
- Preventive-Promotive Strategies and Indicators of Maternal and Child Health
- Maternal Health Care
 - Antenatal
 - Intranatal
 - Postnatal care
- Maternal Death Review
- Risk Approach in MCH
- Marriage, Preconception, Conception, Pregnancy

Public Health Nutrition

- Introduction to Nutrition in Public Health
- The Proximate Principles of food
- Micronutrients: The Vitamins and minerals
- Major Foods and their Nutritive Value
- Nutritional Requirements of Special Groups:
 - Pregnant women & Lactating Mothers
 - Children
 - Elderly & their prevention
- Nutritional Indicators
- Nutritional Programmes in India
- Nutritional status assessment of a Community
- Nutritional Surveillance
- Nutritional Deficiency Diseases of Public Health Importance:
 - Protein Energy Malnutrition
 - Iodine deficiency disorders
 - Vitamin A deficiency
 - Role of Fluorine in health and disease

PRACTICAL

MPH-III-1 P Dissertation

Data Collection and Entry.

4.4 SEMESTER IV

S. No.	Core Subject	Credit
MPH-IV-1 T	Maternal and Child Health and Public Health Nutrition (Part 2)	4
MPH-IV-2 T	Demography & Family Planning	4
MPH-IV-1 P	Dissertation writing & submission	10
MPH-IV-2 P	Internship	10
MPH-IV-E T	Electives*	3
TOTAL :		31

* NOTE: Choose electives (from List of Electives) amounting to total of 3 CREDITS

MPH-IV-1 T Maternal and Child Health and Public Health Nutrition (Part II):

Maternal and Child Health

- Child Health Care
- Child abuse, child prostitution, child trafficking, street children, child labour, child protection and child rights and child laws.
- Major causes of infants and child morbidity and mortality in India
- Socio-economic, educational and cultural factors affecting child rearing practices and child health care activities in India.
- Community based management of child health
 - Care of Infants
 - Care of Under Five Children
 - Growth and Development of Children
 - Children's Right to Health
 - Child placement
 - School Health Services
- Definition, classification, social and emotional development aspects
- Problems, social issues, programmes.
- Sexual health
- Sexual behaviour
- Early pregnancy and early marriage
- Sex education
- Mental health, Substance abuse and social crime
- Adolescent Health
- Tribal Health
- Geriatric Health
- Baby Friendly Hospital Initiative
- Under Five Clinic & Well Baby Clinic
- Programs for Health Problems of Women including RCH program (I & II) and NRHM
- Organization of MCH Services in the community

Public Health Nutrition

Public Health Aspects of Food Hygiene & Sanitary Regulation of Eating Establishments

Food Processing, Food Adulteration, Food Additives, Preservatives, Food Toxicants and Food Fortification

Methods for Establishing the Causal Role of Nutritional Factors on Health and Disease Status

Planning, Implementation & Evaluation of Nutrition programs

Nutrition & Non-communicable diseases

Nutrition during special situations:

- Disasters
- Fairs and Festivals

Community Feeding of Children

MPH-IV-2T Demography & Family

Planning

Demographic cycle

- Population Census
- Demographic Trends – World & India
 - Age & Sex Composition
 - Age Pyramids
 - Sex ratio
 - Dependency ratio
 - Family Size
 - Urbanization
 - Life expectancy
- Demographic transition
- Migration
- Fertility & Fertility Indicators
- Mortality:
 - The determinants of population health
 - The life table
- Causes and implications of social inequality

Family Planning:

- Scope of family planning services
- Health aspects of Family Planning
- Small family norm
- Eligible couples
- Target couples
- Couple protection rate (CPR)
- Evaluation of contraceptive methods
- Unmet need for Family Planning
- National Family Welfare Programme
- Sociology of Family Planning
- Evaluation of Family Planning
- National Population Policy – 2000
- Contraceptive Methods
- MTP Act 1971

LIST OF ELECTIVES

Sl.No.	Elective	Credit
1.	Health Behaviour and Sociology	2
2.	Health Economics	2
3.	Health Education & Health Promotion	2
4.	Language	1
5.	NSS (I,II,III,IV)	3
6.	Global Health	1
7.	Computer Skills	2
8.	Scientific Writing Skills	2
9.	Communication Skills	2
10.	Leadership Skills	2
11.	Disaster Management Project	3
12.	Library Dissertation	2
13.	Dental Public Health (I,II,III,IV)	3

<p>1. Health Behaviour and Sociology Health Belief Model (HBM)/ Risk Perception Theory of Reasoned Action/ Theory of Planned Behavior Social Cognitive Theory (SCT)/ Self-Efficacy (SE) Trans Theoretical Model (TTM) Motivation and Self-Efficacy; Stress, Coping, and Social Support Self-Determination Theory (SDT) Motivational Interviewing Behavior Modification Goal Setting, Attributions, Self-Regulation Building Conceptual Frameworks Elaboration Likelihood Model/ Cognitive Load Theory Theory-Informed Interventions</p>	<p>2. Health Economics: Supply and Demand for Health Services The Role of Insurance in the Medical Care Industry Public Policy, Issues of Cost and Quality Regulation Measurements and Evaluation of Costs and Benefits Policies and Strategies for the Developing World</p>
<p>3. Health Education and Health Promotion Introduction to Health Education and Health Promotion: Definition & principles Theories of Health Education Health Promotion Needs Assessment Planning, Implementation and Evaluation of Health Promotion Programs</p>	<p>4. Language (Kannada & English) Kannada: Conversational skills English: Comprehension skills</p>

5NSS

5.1 NSS I

UNIT 1: Introduction and Basic Concepts of NSS (4)

- History, philosophy, aims & objectives (1)
- Emblem, flag, motto, song, badge (1)
- Organizational structure, roles & responsibilities of various NSS functionaries (2)

UNIT 2: NSS Programmes and Activities (10)

- Concept of regular activities, special camping, day camps (3)
- Basis of adoption of village/slums, methodology of conducting survey (2)
- Financial pattern of the scheme (1)
- Other young prog./schemes of GoI (2)
- Coordination with different agencies (1)
- Maintenance of the diary (1)

UNIT 3: Understanding Youth (5)

- Definition, profiles, categories of youth (2)
- Issues, challenges and opportunities of youth (2)
- Youth as an agent of social change (1)

UNIT 4: Health, Hygiene & Sanitation (7)

- Definition, needs and scope of health education (1)
- Food and nutrition (1)
- Safe drinking water, water borne diseases and sanitation (SBA) (2)
- National Health Programme (2)
- Reproductive Health (1)
-

UNIT 5: Volunteerism and Shramdaan (7)

- Indian Tradition of volunteerism (1)
- Needs & importance of volunteerism (2)
- Motivation and constraints of volunteerism (2)
- Shramdaan as part of volunteerism (2)

5.2 NSS II

UNIT 1: Importance and Role of Youth leadership (6)

- Meaning and types of leadership (2)
- Qualities of good leaders; traits of leadership (2)
- Importance and role of youth leadership (2)

UNIT 2: Life Competencies (11)

- Definition and importance of life competencies (2)
- Communication (3)
- Inter Personal (3)
- Problem-solving and decision-making (3)

UNIT 3: Social Harmony and National Integration (9)

- Indian history and culture (2)
- Role of youth in peace-building and conflict resolution (5)
- Role of youth in Nation Building (2)

UNIT 4: Youth Development Programmes in India (9)

- National Youth Policy (3)
- Youth development programmes at the National level, State level and voluntary sector (4)
- Youth-focused and Youth-led Organizations (2)

5.3 NSS III

UNIT 1: Citizenship (7)

- Basic Features of Constitution of India (2)
- Fundamental Rights and Duties (2)
- Human Rights (1)
- Consumer awareness and legal rights of consumer (1)
- RTI (1)

UNIT 2: Family and Society (6)

- Concept of family, community, (PRIs & other community-based organizations) and society (2)
- Growing up in the family- dynamics and impact (1)
- Human Values (1)
- Gender Justice (2)

UNIT 3: Community Mobilization (9)

- Mapping of community stakeholders (3)
- Designing the message in the context of the problem and culture of community (1)
- Identifying methods of mobilization (3)
- Youth-adult partnership (2)

UNIT 4: Environment Issues (11)

- Environment conservation, enrichment and sustainability (2)
- Climate change (2)
- Waste management (2)
- Natural resource management (5)

UNIT 5: Project Cycle Management(10)

- Project Planning (2)
- Project Implementation (3)
- Project monitoring (2)
- Project evaluation: impact assessment(3)

UNIT 6: Documentation and Reporting (7)

- Collection and analysis of data (3)
- Preparation of documentation/ reports (2)
- Dissemination of documents/reports (2)

UNIT 7: Additional Life Skills (7)

- Positive Thinking (1)
- Self Confidence and Self Esteem (2)
- Setting Life Goals and working to achieve them (2)
- Management of Stress including Time Management (2)

5.4 NSS IV

UNIT 1: Youth Health and Yoga (15)

- Healthy lifestyles (yoga as a tool), substance abuse, HIV, home nursing, first aid (8)
- Yoga: history, concept, misconceptions, traditions, impacts (5)
- Yoga as preventive, promotive and curative method (2)

UNIT 2: Youth and Crime (7)

- Sociological and psychological factors influencing youth crime (2)
- Peer mentoring in preventing crimes (1)
- Awareness about anti-ragging (1)
- Cyber crime and its prevention (2)
- Juvenile Justice (1)

UNIT 3: Civil/ Defense (5)

- Positive Thinking (1)
- Self Confidence and Self esteem (2)
- Setting Life Goals and working to achieve them (2)
- Management of Stress including Time Management (2)

UNIT 4: Entrepreneurship Development (8)

- Definition & Meaning (1)
- Qualities of good entrepreneur (2)
- Steps/ ways in opening an enterprise (3)
- Role of financial and support service institutions (2)

UNIT 5: Resource Mobilization (3)

- Writing a Project Proposal (2)
- Establishment of SFUs (1)

UNIT 6: Disaster Management (7)

- Introduction to Disaster Management, classification of disasters (4)
- Role of youth in disaster management (3)

<p>8. Global Health Globalization of Health Global healthcare and critical analysis of global healthcare systems: India, USA, UK, Canada, Europe, Pakistan, Nepal, Australia, China, Japan, Africa, Cuba, Switzerland Universal Health Coverage International Health Organizations</p>	<p>7. Computer Skills Introduction to Information Technology Introduction to MS Office: MS Word, MS Excel, MS PowerPoint Presentation Skills Internet <ul style="list-style-type: none"> ▪ Search Strategies ▪ Email and Email etiquettes ▪ Online survey development tools </p>
<p>8. Scientific Writing Skills Application writing for Grants: <ul style="list-style-type: none"> ▪ Introduction to information systems and sources of intelligence ▪ Format of writing a concept paper and mini protocol ▪ Critical issues and common errors in grant applications Essay Writing: Candidates will submit 1 essay of 5000 words each on selected topics</p>	<p>9. Communication Skills Communication: definition, process, its application in health education. Models of communication process. Communication: Theories and principles. Methods & media of communication. Behaviour change communication. IEC Strategy</p>
<p>10. Leadership Skills SWOC Analysis Leadership Qualities and Challenges Motivation Ethics and responsibilities Communication Management Team Building</p>	<p>11. Library Dissertation Conducting a systematic literature review on the topic given Submission of the dissertation (5000 words) in bind</p>

SECTION-V

Recommended Books (Latest Editions)

TITLE	AUTHOR(S)	PUBLISHER
Practical Statistics for Medical research	Altman D	Chapman & Hall
An Introduction To Medical statistics.	Bland M	Oxford Medical Publications
Statistical Methods In Clinical and Preventive Medicine.	Hill.S.A.B.	E.& S. Livingstone Ltd.
Textbook Of Preventive And Social Medicine.	Gupta.M.C; Mahajan.B.K.	Jaypee Brothers.
Topics In Public Health.	Mackintosh.J.M.	E.& S. Livingstone Ltd.
Textbook Of Preventive And Social Medicine.	Park.K; Park.J.E.	Banarsidas Bhanot
Industrial Injuries.	Featherstone.D.F.	John Wright & Sons.
Environment problems & solutions	Asthana & Asthana	S.Chand & Company Ltd.
Environmental Biology	P.D.Sharma	Rastogi Publication
Earth science	Edward J.Tarback	Prentice Hall
Environmental Issue-Measuring Analyzing, evaluating	Robert L.Mc.Connell & Lanniel C.Abel	Prentice Hall
Environmental Protection & law	C.S.Mehta	Ashish Publishing House.
Environmental Pollution,	Timmy Katyal & M.Satake	Anmol Publication
Promoting Health: A Practical Guide To Health Education	Ewles ,L Simnet,I	Scutari Press
Human Rights In Health.	Found.C.	Elsevier Publishing Co.
Public And Community Health.	Parker.W.S.	Staples Press London.
Public Health Informatics and Information systems	O'Carroll, P.W., Yasnoff, W.A., Ward, M.E., Ripp, L.H., Martin, E.L. (Eds.)	Springer
Public Health Informatics and Information systems	J.A. Magnuson, Jr., Paul C. Fu	Springer

TITLE	AUTHOR(S)	PUBLISHER
Sex, Disease, And Society: A Comparative History Of Sexually Transmitted Diseases And HIV/AIDS In Asia And The Pacific	Milton Lewis, Scott Bamber, Michael Waugh	Greenwood Press,
Living With HIV: Experiment In Courage	Mary Elizabeth O'Brien	Auburn House, 1992
The Unending Frontier: An Environmental History Of The Early Modern World	John F. Richards	California Press
Communicable Diseases Control	Anderson, Arnstein, Lester	The Macmillan Company
Encyclopedia Of Disaster Management	Goel, S. L.	Deep & Deep
Disaster Management	G.K. Ghosh	A.P.H.
Emergency Medical Services And Disaster Management: A Holistic Approach	P.K. Dave	Jaypee Brothers
Disaster Management - Recent Approaches	Arvind Kumar	Anmol Publication
The New Public Health: An Introduction For The 21st Century.	San Diego, CA:	Academic Press
Handbook Of Health Economics.	Culyer A.J. And J.P. Newhouse.	Elsevier
Biostatistical Aspects Of Health And Population	Edited By Arvind Pandey.	Hindustan Pub
Essentials Of Dental Public Health	Daly	Oxford
Community Dentistry	Cynthia Pine	Oxford
Community Oral Health Practice For The Dental Hygienist	Kathy Voigt Geurink,	Elsevier Science
Concepts In Dental Public Health	Jill Mason	Lippincott Williams & Wilkins
Essential Dental Public Health	Blanaid Daly, Richard Watt, Paul Batchelor, Elizabeth Treasure	Oxford Univ Press
Dental Public Health And Community Dentistry	Anthony Jong	C.V. Mosby Co
The Theory And Practice Of Public Health.	Hobson.W.	Oxford University
Oxford Textbook Of Public Health. Vol. Ii.	Holland.W.W.	Oxford University
Oxford Textbook Of Public Health. Vol. Iii.	Holland.W.W.	Oxford University
Oxford Textbook Of Public Health. Vol. Iv.	Holland.W.W.	Oxford University

TITLE	AUTHOR(S)	PUBLISHER
Man Adapting	Dubos, Rene	Yale University Press
Doing Your Research Project	Bell, J.	Open University
The Limits Of Medicine	Illich, I.	Pelican Books
The Role Of Medicine	Mckeown, T.	Blackwell

SECTION - II

REGULATIONS

1. Short Title and Commencement

These regulations shall be called as “The Revised Regulations for the B. Pharm. Degree Program (CBCS) of the Pharmacy Council of India, New Delhi”. They shall come into effect from the Academic Year 2016-17. The regulations framed are subject to modifications from time to time by Pharmacy Council of India.

2. Minimum qualification for admission

2.1 First year B. Pharm:

Candidate shall have passed 10 + 2 examination conducted by the respective state/central government authorities recognized as equivalent to 10 + 2 examination by the Association of Indian Universities (AIU) with English as one of the subjects and Physics, Chemistry, Mathematics (P.C.M) and or Biology (P.C.B / P.C.M.B.) as optional subjects individually. Any other qualification approved by the Pharmacy Council of India as equivalent to any of the above examinations.

2.2. B. Pharm lateral entry (to third semester):

A pass in D. Pharm. course from an institution approved by the Pharmacy Council of India under section 12 of the Pharmacy Act.

3. Duration of the program

The course of study for B.Pharm shall extend over a period of eight semesters (four academic years) and six semesters (three academic years) for lateral entry students. The curricula and syllabi for the program shall be prescribed from time to time by Pharmacy Council of India, New Delhi.

4. Medium of instruction and examinations

Medium of instruction and examination shall be in English.

5. Working days in each semester

Each semester shall consist of not less than 100 working days. The odd semesters shall be conducted from the month of June/July to November/December and the even semesters shall be conducted from December/January to May/June in every calendar year.

6. Attendance and progress

A candidate is required to put in at least 80% attendance in individual courses considering theory and practical separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.

7. Program/Course credit structure

As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, tutorial hours, practical classes, etc. are measured in terms of credits. On satisfactory completion of the courses, a candidate earns credits. The amount of credit associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly, the credit associated with any of the other academic, co/extra-curricular activities is dependent upon the quantum of work expected to be put in for each of these activities per week.

7.1. Credit assignment

7.1.1. Theory and Laboratory courses

Courses are broadly classified as Theory and Practical. Theory courses consist of lecture (L) and /or tutorial (T) hours, and Practical (P) courses consist of hours spent in the laboratory. Credits (C) for a course is dependent on the number of hours of instruction per week in that course, and is obtained by using a multiplier of one (1) for lecture and tutorial hours, and a multiplier of half (1/2) for practical (laboratory) hours. Thus, for example, a theory course having three lectures and one tutorial per week throughout the semester carries a credit of 4. Similarly, a practical having four laboratory hours per week throughout semester carries a credit of 2.

7.2. Minimum credit requirements

The minimum credit points required for award of a B. Pharm. degree is 208. These credits are divided into Theory courses, Tutorials, Practical, Practice School and Project over the duration of eight semesters. The credits are distributed semester-wise as shown in Table IX. Courses generally progress in sequences, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester-wise schedule of courses given in the syllabus.

The lateral entry students shall get 52 credit points transferred from their D. Pharm program. Such students shall take up additional remedial courses of 'Communication Skills' (Theory and Practical) and 'Computer Applications in

Pharmacy' (Theory and Practical) equivalent to 3 and 4 credit points respectively, a total of 7 credit points to attain 59 credit points, the maximum of I and II semesters.

8. Academic work

A regular record of attendance both in Theory and Practical shall be maintained by the teaching staff of respective courses.

9. Course of study

The course of study for B. Pharm shall include Semester Wise Theory & Practical as given in Table – I to VIII. The number of hours to be devoted to each theory, tutorial and practical course in any semester shall not be less than that shown in Table – I to VIII.

Table-I: Course of study for semester I

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP101T	Human Anatomy and Physiology I– Theory	3	1	4
BP102T	Pharmaceutical Analysis I – Theory	3	1	4
BP103T	Pharmaceutics I – Theory	3	1	4
BP104T	Pharmaceutical Inorganic Chemistry – Theory	3	1	4
BP105T	Communication skills – Theory *	2	-	2
BP106RBT BP106RMT	Remedial Biology/ Remedial Mathematics – Theory*	2	-	2
BP107P	Human Anatomy and Physiology – Practical	4	-	2
BP108P	Pharmaceutical Analysis I – Practical	4	-	2
BP109P	Pharmaceutics I – Practical	4	-	2
BP110P	Pharmaceutical Inorganic Chemistry – Practical	4	-	2
BP111P	Communication skills – Practical*	2	-	1
BP112RBP	Remedial Biology – Practical*	2	-	1
Total		32/34^{\$}/36[#]	4	27/29^{\$}/30[#]

#Applicable ONLY for the students who have studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology (RB) course.

\$Applicable ONLY for the students who have studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics (RM) course.

* Non University Examination (NUE)

Table-II: Course of study for semester II

Course Code	Name of the course	No. of hours	Tutorial	Credit points
BP201T	Human Anatomy and Physiology II – Theory	3	1	4
BP202T	Pharmaceutical Organic Chemistry I – Theory	3	1	4
BP203T	Biochemistry – Theory	3	1	4
BP204T	Pathophysiology – Theory	3	1	4
BP205T	Computer Applications in Pharmacy – Theory*	3	-	3
BP206T	Environmental sciences – Theory *	3	-	3
3BP207P	Human Anatomy and Physiology II –Practical	4	-	2
BP208P	Pharmaceutical Organic Chemistry I– Practical	4	-	2
BP209P	Biochemistry – Practical	4	-	2
BP210P	Computer Applications in Pharmacy – Practical*	2	-	1
Total		32	4	29

*Non University Examination (NUE)

Table-III: Course of study for semester III

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP301T	Pharmaceutical Organic Chemistry II – Theory	3	1	4
BP302T	Physical Pharmaceutics I – Theory	3	1	4
BP303T	Pharmaceutical Microbiology – Theory	3	1	4
BP304T	Pharmaceutical Engineering – Theory	3	1	4
BP305P	Pharmaceutical Organic Chemistry II–Practical	4	-	2
BP306P	Physical Pharmaceutics I – Practical	4	-	2
BP307P	Pharmaceutical Microbiology – Practical	4	-	2
BP 308P	Pharmaceutical Engineering –Practical	4	-	2
Total		28	4	24

Table-IV: Course of study for semester IV

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP401T	Pharmaceutical Organic Chemistry III– Theory	3	1	4
BP402T	Medicinal Chemistry I – Theory	3	1	4
BP403T	Physical Pharmaceutics II – Theory	3	1	4
BP404T	Pharmacology I – Theory	3	1	4
BP405T	Pharmacognosy and Phytochemistry I– Theory	3	1	4
BP406P	Medicinal Chemistry I – Practical	4	-	2
BP407P	Physical Pharmaceutics II – Practical	4		2
BP408P	Pharmacology I – Practical	4	-	2
BP409P	Pharmacognosy and Phytochemistry I–Practical	4	-	2
Total		31	5	28

Table-V: Course of study for semester V

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP501T	Medicinal Chemistry II – Theory	3	1	4
BP502T	Industrial PharmacyI– Theory	3	1	4
BP503T	Pharmacology II – Theory	3	1	4
BP504T	Pharmacognosy and Phytochemistry II– Theory	3	1	4
BP505T	Pharmaceutical Jurisprudence – Theory	3	1	4
BP506P	Industrial PharmacyI – Practical	4	-	2
BP507P	Pharmacology II – Practical	4	-	2
BP508P	Pharmacognosy and Phytochemistry II – Practical	4	-	2
Total		27	5	26

Table-VI: Course of study for semester VI

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP601T	Medicinal Chemistry III – Theory	3	1	4
BP602T	Pharmacology III – Theory	3	1	4
BP603T	Herbal Drug Technology – Theory	3	1	4
BP604T	Biopharmaceutics and Pharmacokinetics – Theory	3	1	4
BP605T	Pharmaceutical Biotechnology – Theory	3	1	4
BP606T	Quality Assurance –Theory	3	1	4
BP607P	Medicinal chemistry III – Practical	4	-	2
BP608P	Pharmacology III – Practical	4	-	2
BP609P	Herbal Drug Technology – Practical	4	-	2
Total		30	6	30

Table-VII: Course of study for semester VII

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP701T	Instrumental Methods of Analysis – Theory	3	1	4
BP702T	Industrial PharmacyII – Theory	3	1	4
BP703T	Pharmacy Practice – Theory	3	1	4
BP704T	Novel Drug Delivery System – Theory	3	1	4
BP705P	Instrumental Methods of Analysis – Practical	4	-	2
BP706PS	Practice School*	12	-	6
Total		28	5	24

* Non University Examination (NUE)

Table-VIII: Course of study for semester VIII

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP801T	Biostatistics and Research Methodology	3	1	4
BP802T	Social and Preventive Pharmacy	3	1	4
BP803ET	Pharma Marketing Management	3 + 3 = 6	1 + 1 = 2	4 + 4 = 8
BP804ET	Pharmaceutical Regulatory Science			
BP805ET	Pharmacovigilance			
BP806ET	Quality Control and Standardization of Herbals			
BP807ET	Computer Aided Drug Design			
BP808ET	Cell and Molecular Biology			
BP809ET	Cosmetic Science			
BP810ET	Experimental Pharmacology			
BP811ET	Advanced Instrumentation Techniques			
BP812ET	Dietary Supplements and Nutraceuticals			
BP813PW	Project Work	12	-	6
Total		24	4	22

Table-IX: Semester wise credits distribution

Semester	Credit Points
I	27/29 [§] /30 [#]
II	29
III	26
IV	28
V	26
VI	26
VII	24
VIII	22
Extracurricular/ Co curricular activities	01*
Total credit points for the program	209/211[§]/212[#]

* The credit points assigned for extracurricular and or co-curricular activities shall be given by the Principals of the colleges and the same shall be submitted to the University. The criteria to acquire this credit point shall be defined by the colleges from time to time.

[§]Applicable ONLY for the students studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics course.

[#]Applicable ONLY for the students studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology course.

course completion certificate until all the courses of I, II, III, IV, V and VI semesters are successfully completed.

A student shall be eligible to get his/her CGPA upon successful completion of the courses of I to VIII semesters within the stipulated time period as per the norms specified in 26.

A lateral entry student shall be eligible to carry forward all the courses of III, IV and V semesters till the VI semester examinations. However, he/she shall not be eligible to attend the courses of VII semester until all the courses of III and IV semesters are successfully completed.

A lateral entry student shall be eligible to carry forward all the courses of V, VI and VII semesters till the VIII semester examinations. However, he/she shall not be eligible to get the course completion certificate until all the courses of III, IV, V and VI semesters are successfully completed.

A lateral entry student shall be eligible to get his/her CGPA upon successful completion of the courses of III to VIII semesters within the stipulated time period as per the norms specified in 26.

Any student who has given more than 4 chances for successful completion of I / III semester courses and more than 3 chances for successful completion of II / IV semester courses shall be permitted to attend V / VII semester classes ONLY during the subsequent academic year as the case may be. In simpler terms there shall NOT be any ODD BATCH for any semester.

Note: Grade AB should be considered as failed and treated as one head for deciding academic progression. Such rules are also applicable for those students who fail to register for examination(s) of any course in any semester.

17. Grading of performances

17.1. Letter grades and grade points allocations:

Based on the performances, each student shall be awarded a final letter grade at the end of the semester for each course. The letter grades and their corresponding grade points are given in Table – XIV

Table – XIV: Letter grades and grade points equivalent to Percentage of marks and performances

Percentage of Marks Obtained	Letter Grade	Grade Point	Performance
90.00 – 100	O	10	Outstanding
80.00 – 89.99	A	9	Excellent
70.00 – 79.99	B	8	Good
60.00 – 69.99	C	7	Fair
50.00 – 59.99	D	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

A learner who remains absent for any end semester examination shall be assigned a letter grade of AB and a corresponding grade point of zero. He/she should reappear for the said evaluation/examination in due course.

18. The Semester grade point average (SGPA)

The performance of a student in a semester is indicated by a number called 'Semester Grade Point Average' (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester. For example, if a student takes five courses(Theory/Practical) in a semester with credits C₁, C₂, C₃, C₄ and C₅ and the student's grade points in these courses are G₁, G₂, G₃, G₄ and G₅, respectively, and then students' SGPA is equal to:

$$SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4G_4 + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F and AB grade awarded in that semester. For example if a learner has a F or AB grade in course 4, the SGPA shall then be computed as:

$$SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4 * ZERO + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

Ordinance Governing
Master of Public Health (HEOR)
Health Economics and Outcomes Research
Syllabus / Curriculum
2018-19



Accredited 'A' Grade by NAAC (2nd Cycle)

Placed in Category 'A' by MHRD (GoI)

KLE ACADEMY OF HIGHER EDUCATION AND
RESEARCH

JNMC Campus, Nehru Nagar, Belagavi – Karnataka, India

Phone: +91 0831-2472777, 2493779, FAX: +91 0831 – 249377

E-mail: info@kledeemeduniversity.edu.in Website: kledeemeduniversity.com

CONTENT

S. NO.	TOPICS	PAGE NO.
1.	Section I Preamble	1
2.	Section II Vision, Mission & Objectives	2
3.	Section III Regulations Governing MPH Degree Semester Course	5
4.	Section IV Course Content	
	4.1 Semester I Theory	16-19
	MPH-I-1 T Research Methods(Qualitative & Quantitative)	
	MPH-I-2 T Bio – Ethics	
	MPH-I-3 T Health Care Delivery System	
	MPH-II-1T Epidemiology (Part I)	
	MPH II-2 T Biostatistics (Part I)	
	4.2 Semester II Theory	20-21
	MPH-II-1 T Epidemiology (Part II)	
	MPH-II-2 T Biostatistics (Part II)	
	MPH-II-3 T Epidemiology of Infectious & Non-Communicable Diseases	
	4.3 Semester III Theory	22-25
	MPH-III-1 T Planning & Management	
	MPH-III-2 T Occupational & Environmental Health	
	MPH-III-3 T Public Health Legislation & Public Health Information Systems	
	MPH-IV-1 T Maternal and Child Health & Public Health Nutrition (part I)	
	4.4 Semester IV Theory	26-27
	MPH-IV-1 T Maternal and Child Health & Public Health Nutrition (part II)	
	MPH-IV-2 T Demography & Family Planning	
	4.5 Electives	28-31
5	SECTION-V Recommended Books (Latest Editions)	32-33

SECTION – I

PREAMBLE

There is a dearth of core Public Health Professionals in the government health machinery. It is estimated that more than 10,000 Public Health Professionals would be required on an annual basis to equip the government machinery with an appropriately trained and qualified public health workforce. With a rapid health transition taking place, India faces two threats, one being the rising disease burden and the other is the poor allocation of government funds; both can be effectively managed by personnel trained in public health through appropriate public health training, i.e. ability to involve communities, work in multidisciplinary teams, and lobbying with government and community leaders with a deep understanding of social, economical and environmental determinants of health. Public Health Professionals are well armed to face these challenges.

Why Master of Public Health (MPH)?

The most widely recognized professional credential for leadership in public health is the MPH degree. This program prepares candidates to be competitive on a global level in the vast area of community health. It emphasizes on acquisition of skills essential to the practice of public health through techniques like student-directed learning, problem solving and field postings. Public Health Professionals can function as policy analysts, health planners, epidemiologists, demographers, social and behavioral scientists.

SECTION – II

VISION:

To be a premier Public Health Department for Quality Education, Research and Leadership.

MISSION:

The Department of Public Health is committed to:

- Train and Create a Cadre for Public Health Leadership
- Promote Positive Health across Population
- Ensure Collective Commitment to Quality Research

This shall be achieved by following objectives:

OBJECTIVES:

By the end of the MPH program the candidates will achieve the following learning objectives under ten different areas listed below.

I. Epidemiology skills:

Candidates shall be able to:

- Define, assess and understand the health status of populations, determinants of health and illness, factors contributing to health promotion and disease prevention and factors influencing the use of health services.
- Identify and apply the research methods used in all basic public health sciences, including epidemiology, health and policy administration, behavioral and social sciences, biostatistics and environmental and occupational public health to prevent illness and injury.
- Describe the correlation and interactions among multiple determinants of health at intra & interpersonal organizational, community and societal levels (i.e., ecological model).

II. Analytic skills:

Candidates shall be able to:

- Define, identify and resolve public health problems by using appropriate data and statistical methods.
- Select and define variables relevant to defined public health problems, use data to illustrate ethical, political, scientific, economic and overall public health issues.

- Use rigorous critical thinking to analyze public health problems and apply public health knowledge to translate theory into public health practice by effective planning, implementation and evaluation.

III. Ethics:

Candidates shall be able to:

- Use and apply ethical analysis to inform decision-making in public health.
- Apply ethical issues involved in conducting research.

IV. Information and technology:

Candidates shall be able to:

- Define a focused research question and conduct electronic and hand literature searches for issues of concern in public health.
- Use one of several statistical packages (e.g., EPI Info, SPSS) to analyze data and graphic software package (e.g., PowerPoint) to develop presentations for public health problems.
- Use information systems in improving the effectiveness of public health activities.

V. Communication skills:

Candidates shall be able to:

- Present accurately and effectively demographic, statistical and scientific public health information for professionals and lay audiences.
- Lead and participate in groups, communicate effectively both in writing and orally to address specific public health issues and use the media to communicate important public health information.

VI. Cultural skills:

Candidates shall be able to:

- Demonstrate an understanding of the dynamic forces that cultural diversity plays in public health, both within India and internationally.
- Identify cultural, demographic and socio-economic factors in determining disease, disease prevention, health promotion and health care services organization and delivery.
- Develop approaches to public health that take into account cultural differences.

VII. Policy development:

Candidates shall be able to:

- Understand the historical development and structure of national, state & local public health-related agencies including communities.
- Describe processes and strategies used to inform and influence policy makers as they develop evidence-based decision-making policies, laws and regulations that have an impact on the public health.

VIII. Community practice:

Candidates shall be able to:

- Establish and maintain professional relations with key stakeholders in community-based initiatives to address public health issues.
- Develop, implement and evaluate a community public health programme.
- Practice ethical community-based research.

IX. Financial planning and management:

Candidates shall be able to:

- Develop and justify a budget through cost-effectiveness, cost-benefit and cost utility analysis.
- Monitor & evaluate public health programs.

X. Leadership and systems thinking:

Candidates shall be able to:

- Describe public health and health care delivery systems and will develop skills to assess a Public health organization's structure and performance
- Exercise strategic planning in public health and describe the elements of organizational leadership including coordinating teams, managing conflicts, motivating staff and continuous quality improvement.

SECTION-III

Regulations Governing MPH Degree Semester Course

3.1. Eligibility for Admission:

3.1.1 A Graduate in Medicine, Dentistry, Physiotherapy, Nursing, Pharmacy, Ayurveda, Homoeopathy, Social Sciences, Nutrition, Life Sciences, Commerce, Law, or any other degree courses recognized as equivalent by KLE Academy of Higher Education & Research. Preference shall be given to candidates from health sciences.

3.1.2 The degree should have been obtained from any University recognized by UGC, established by law in India and the medium of instruction for the degree should be English. For international candidates their degree should be recognized by AIU and where medium of instruction may not be English they should have passed any International proficiency test like IELTS, TOEFL etc.

3.1.3 A Candidate who has scored a minimum of 50% of the marks (aggregate of three/four years for graduate degree holders) prescribed for the qualifying examination shall be eligible for the admission to the MPH Course.

3.2. Proposed Intake of Candidates: 40

3.3. Duration of the Course:

The course of study including submission of dissertation on the topic registered shall be semester based, that includes 4 semesters each extending for six months from the commencement of academic semester. At the end of each semester, there shall be a University examination. At the end of Semester IV, there shall be a Final University Examination. Candidate shall submit a dissertation on the topic approved by the University five months prior to Semester IV Examination.

Medium of Instruction and Examination shall be English

3.4. Requirement to Complete the Course:

Semester I	+	Semester II	+	Semester III	+	Semester IV	+	Dissertation	+	Intern ship	=	MPH Degree
-----------------------	----------	------------------------	----------	-------------------------	----------	------------------------	----------	---------------------	----------	------------------------	----------	-----------------------

3.5. Training, Teaching and Learning Activities:

A candidate pursuing the course shall work in the Department as a full time candidate. No candidate shall be permitted to run a clinic/ laboratory/ nursing home while studying.

Every candidate shall take part in seminars, group discussions, journal review meetings etc. Every candidate shall attend teaching and learning activities during each semester as prescribed by the Department and not absent himself /herself without valid reasons.

A list of teaching and learning activities designed to facilitate acquiring of essential knowledge and skills outlined is given below:

Lectures: For all subjects lectures shall be conducted by the faculty.

Journal Club: Recommended to be held twice a week. All the MPH candidates are expected to attend and actively participate in discussion and enter the relevant details in the log book. Further, every candidate must make a presentation from the allotted journal(s), selected articles with special emphasis on public health related topics, at least two times a year.

Subject Seminar: Recommended once a week. All the MPH candidates are expected to attend and actively participate in discussion and enter in the log book the relevant details. Further, every candidate shall present a seminar on selected topics at least four times a year and have a total of eight seminars in two years. The presentations would be evaluated using checklist and would carry weightage for internal assessment. A timetable with the subjects and the names of the candidate and the moderator will be scheduled at the beginning of each semester.

Field Visit : PHC, Subcenter, DHO office, KLE Hospital, Sewage treatment plant, Water purification plant, milk dairy, HLL Industry, Campbell factory, Pollution Control Board, CDPO office, IDSP, and other institutions of Public Health importance.

3.6. Attendance and Monitoring Progress:

3.6.1 Attendance:

3.6.1.1 A candidate pursuing MPH Course shall study for the entire period as full time candidate. No candidate shall join any other course of study or appear for any other examination conducted by this University or any other University in India or abroad during the period of registration.

3.6.1.2 Each semester shall be considered as a unit for the purpose of calculating attendance.

3.6.1.3 Every candidate shall attend symposia, seminars, conferences, journal review meetings, dissertation review meetings and lectures during each year as prescribed by the Department/College/University and not absent himself / herself without valid reasons.

3.6.1.4 Candidate who has put in a minimum of 75% of attendance in the theory and practical assignments separately shall be permitted to appear for University examination at the end of each semester.

3.6.1.5 Candidate will be allowed to appear the Semester IV examination only if the dissertation submitted is accepted.

3.6.1.6 Any candidate who fails to complete the course in the manner stated above shall not be permitted to appear for the semester University examinations.

3.6.2 Monitoring Progress of Studies

3.6.2.1 *Log Book:* Every candidate shall maintain a log diary and record his/her participation in the training programs conducted by the Department such as journal reviews, seminars, etc. Special mention shall be made of the scientific presentations in conference by the candidate as well as details of assessment works like essay writing, etc submitted by the candidate. The work diary shall be scrutinized and certified by the Head of the Department and presented in the University viva-voce examination.

3.6.2.2 *Sessional Examination:* Records and marks obtained in sessional test shall be maintained by the Head of the Department and sent to the University, when called for.

3.6.2.3 *Records:* Records and marks obtained in sessional tests, seminars, journal club, field activities, and weekly written assignments which shall be maintained by the Head of the Department and shall be made available to the University.

3.7. Dissertation

3.7.1 *Synopsis:* Every candidate shall submit a synopsis of the intended dissertation work through the guide to the Director Academic Affairs of KLE Academy of Higher Education & Research through the

HOD and Head of the institution, not later than five months from the date of admission to MPH. The date will be notified by KLE Academy of Higher Education & Research.

3.7.2 Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.

3.7.3 Every candidate pursuing MPH course is required to carry out work on a selected research project under the guidance of a recognized guide. The results of such work shall be submitted in the form of a dissertation.

3.7.4 The dissertation is aimed to train the candidate in research methodology. It includes identification of the problem, formulation of a hypothesis, review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis and comparison of results and drawing conclusions.

3.7.5 Dissertation shall require approval of the Institutional Ethics Committee (IEC) prior to initiation of any dissertation work. Candidate shall work under the supervisor to attain IEC approval. Student shall maintain regular contact with the guide during his/her dissertation work.

3.7.6 The dissertation should be written under the following headings:

- Introduction
- Objectives
- Review of literature
- Material and Methods
- Results – including tables & graphs
- Discussion
- Conclusion
- Summary
- References
- Annexures

3.7.7 The written text of dissertation shall not be less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexures. It should be neatly typed with double line spacing on one side of the bond paper (A4 size, 8.27” x 11.69”) and bound properly. Spiral binding is not permitted. The dissertation shall be certified by the guide and co-guide if any, Head of the Department and Head of the Institution.

3.7.8 The dissertation shall be valued by examiners appointed by the University.

3.7.9 A guide shall be a full time postgraduate teacher of a constituent college of KLE Academy of Higher Education & Research and recognized by KLE Academy of Higher Education & Research as a guide for supervision of dissertation work.

3.7.10: Change of Guide: Guide may be changed with prior permission from the University.

3.7.11 Submission of Dissertation: Two copies of the dissertation duly certified by the Guide, the Head of Department of Public Health shall be submitted to the Controller of Examinations, KLE Academy of Higher Education & Research, through the Head of the Department at least five months before University Examination of semester IV.

3.8 Internship:

Every candidate shall undergo field training for a period of two months in fourth semester at an organization of national recognition for field experience

Candidate should submit two copies of the training report duly certified by the authorities of the training center in which he/she has undergone training duly accepted and certified by the Head of the Department.

3.9. Schedule of Examination

There shall be a University examination at the end of each semester for all four semesters and viva-voce at the end of semester II (subjects of semester I&II) & semester IV (subjects of semester III & IV). There shall be a dissertation presentation at the end of semester IV in addition to viva voce.

3.10. Scheme of Examination

3.10.1 Sessional Examination

There shall be a minimum of two sessional examinations in each subject conducted by the Department at midterms and before term end in theory and viva-voce.

The sessional marks shall be awarded out of a maximum of 80 for theory and 50 for viva-voce separately as follows and shall be calculated out of 20 marks and 10 marks respectively.

Theory

Written examination 80 marks

The total marks obtained have to be calculated out of 10.

Seminar 10 marks

Journal Club 10 marks

Reports of field visits 10 marks

Models/Essay writing/Project work 10 marks

Camps/ Group activities 10 marks

The total marks obtained have to be calculated out of 10.

2 marks will be given to candidates who make scientific presentations in National Conferences

A cumulative total will be calculated out of 20 as “Internal Assessment” (IA) marks

3.10.2 University Examinations

3.10.2.1 Theory:

There shall be four University examinations for the entire course namely I, II, III, IV semester examination. The examination will be conducted at the end of each semester. There shall be three (3) core theory papers and elective papers. All core subjects will have University exam and electives will have college exam. Each theory paper shall be of 3 hours duration carrying 80 marks each.

3.10.2.2 Practical: There shall be practical examination for Biostatistics and Epidemiological exercise in semester II

3.10.2.3 Viva-voce: - Each candidate shall give viva-voce examination for semester II (subjects of semester I&II) & semester IV (subjects of semester III &IV).

SCHEME OF EXAMINATION FOR THEORY

Question	Number of Questions	Marks	Maximum Marks	Total Marks
Long Essay Questions	2	15	30	80
Short Essay Questions	5	10	50	

(A) MPH Semester I Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum Marks to pass
MPH-I-1 T	Research Methods (Qualitative & Quantitative)	20	80	100	50
MPH-I-2 T	Bio – Ethics	20	80	100	50
MPH-I-3 T	Health Care Delivery System	20	80 (45 + 35)	100	50
MPH-I-E T	Elective(s) as per selection	20	80	100	50

(B) MPH Semester II Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to pass
MPH-II-1 T	Epidemiology (Part I & II)	20	80	100	50
MPH-II-2 T	Biostatistics (Part I & II)	20	80	100	50
MPH-II-3 T	Epidemiology of Infectious & Non Communicable Diseases	20	80 (35 + 45)	100	50
MPH-II-E T	Elective(s) as per selection	20	80	100	50

Practical Examination

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to pass
MPH-II-1-P	Biostatistics Exercise	10	40	50	25
MPH-II-2-P	Epidemiological Exercise	10	40	50	25
Total				100	50

Viva Voce Examination

MPH-II-3 P	Viva-voce	-	100	100	50
-------------------	-----------	---	-----	-----	----

C) MPH Semester III Theory:

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
MPH-III-1 T	Planning & Management	20	80	100	50
MPH-III-2 T	Occupational & Environmental Health	20	80 (35 + 45)	100	50
MPH-III-3 T	Public Health Legislation & Public Health Information Systems	20	80 (45 + 35)	100	50
MPH-III-E T	Elective(s) as per selection	20	80	100	50

(D) MPH Semester IV Theory

Paper No.	Paper	Max. Sessional marks	Max. University marks	Total maximum marks	Minimum marks to Pass
MPH-IV-1 T	Maternal & Child Health and Nutrition (Part I & II)	20	80	100	50
MPH-IV-2 T	Demography & Family Planning	20	80 (45 + 35)	100	50
MPH-IV-E T	Elective(s) as per selection	20	80	100	50

Viva Voce Examination

MPH-IV-1 P	Viva-voce & Dissertation Presentation	-	100	100	50
-------------------	---------------------------------------	---	-----	-----	----

VIVA VOCE

At the end of semester II (subjects of semester I & II) & semester IV (subjects of semester III & IV) candidate will appear for University viva-voce examination.

Practical (College Exam): A college level practical exam will be conducted at 5 months after the commencement of MPH Semester II in which the candidate has to obtain at least 50% marks to appear for University Examination of semester II and semester III

(D) College Practical Exam

Practical No.	Paper	Max. College marks	Total maximum marks	Minimum marks to Pass
CE 1P	Critical Appraisal	40	40	50

3.10.3. Dissertation Valuation:

The examiners appointed by the University shall evaluate the dissertation. Approval of dissertation work is an essential prerequisite for a candidate to appear in the semester IV University examination. The dissertation shall be valued by two evaluators (examiners) one within the University and one outside. Any one-evaluator acceptance will be considered as a prerequisite for eligibility to take up the examination.

3.10.3.1 Viva-Voce and Defense Examination: The viva-voce and defense examination shall aim at assessing the depth of knowledge, logical reasoning, confidence and oral communication skills.

The viva – voce and defense examination shall be held after the submission of dissertation. If a candidate fails to submit the dissertation on or before the date prescribed, his/her viva-voce and defense shall be conducted during the subsequent University examination.

3.10.3.2 Examiners: There shall be at least two examiners, out of them one shall be external examiner and the other internal examiner.

3.11. Criteria for Declaring Pass

3.11.1 A candidate shall be declared to have passed MPH if all the conditions below are fulfilled:

MPH-Semester I:

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together

MPH-Semester II

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together.
- Candidate shall further obtain Grade B or above in viva-voce
- Candidate shall pass practical and theory separately.(e.g. If candidate passes in theory and fail in practical, he/she shall appear only practical examination)

MPH-Semester III

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together.

MPH-Semester IV

- Candidate who secures Grade B or above each subject in theory University & Sessional examinations considered together.
- Candidate shall further obtain Grade B or above in viva-voce.

3.11.2 Carry over:

At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he is appearing for. e.g:

- If the candidate has not cleared semester I, he can appear for semester II and pending subjects of semester I simultaneously.
- For appearing for semester III he should have cleared semester I and can appear for papers pending from semester II along with semester III subjects.
- For appearing for semester IV he/she should have cleared semester II completely and can appear pending papers of semester III simultaneously.

Cumulative Grade Point Average (CGPA)

Letter Grades and Grade Points equivalent to percentage of Marks and performances

10 Point Grade Scale

Percentage of marks obtained	Letter Grade	Grade Point	Performance
91.00 - 100	O	10	Outstanding
80.00 -89.99	A+	9	Excellent
70.00-79.99	A	8	Good
60.00-69.99	B+	7	Fair
50.00-59.99	B	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

1. Conversion of Grades in to GPA:

GPA= Credits x Grade Points / Total Credits

2. **Cumulative Grade Point Average (CGPA)** of all 4 Semester will be calculated as:

Total No. GPA / No. of Semester

**SECTION-IV
COURSE CONTENT**

4.1 SEMESTER I

S. No.	Core Subjects	Credits
MPH-I-1 T	Research Methods (Qualitative & Quantitative)	2
MPH-I-2 T	Bioethics	2
MPH-I-3 T	Health Care Delivery System	4
MPH-II-1 T	Epidemiology (Part I)	4
MPH-II-2 T	Biostatistics (Part I)	4 (3 +1)
MPH-I-1 P	Under Five Clinic posting & Community Project (Practical)	2
MPH-I-2 P	Dissertation (Synopsis development practical)	2
MPH-I-E T	Electives*	3
TOTAL:		23

**Note- Choose electives (from List of Electives) amounting to total of 3 CREDITS*

THEORY

MPH-I-1 T Research Methods (Qualitative & Quantitative)

Quantitative Research Methods:

Introduction to Research Methodology

Developing a Research Plan

- Research Problem
- Research Question
- Research Hypothesis
- Variables

Data Collection Tool Development

Epidemiological study designs: Cross Sectional, Cohort, Case Control

Experimental Design: Randomized, Non randomized, Parallel, Factorial, Cross Over

Qualitative Research Methods:

Overview of Qualitative Research Methods

- Comparing Quantitative and Qualitative Research
- Sampling in Qualitative Research
- Recruitment in Qualitative Research

Theories

- Grounded Theory
- Phenomenology
- Case studies
- Ethnography

Participant Observation

- Logistics of Participant Observation
- How to Take Field Notes

In-Depth Interviews

- Logistics of interviewing
- Interview Steps and Tips for Taking Interview Notes.

Focus Groups

- Logistics of Focus Groups
- Skills of Effective Moderator and Note Taker
- Steps in Focus Group Note Taking
- Steps in Moderating a Focus Group

Data Documentation and Management: Organizing and storing Data

- Converting Raw Data to Computer Files
- Organizing Data Storage list
- Data Archiving Steps
- Data Management Check

Importance Experimental Designs

- Before and after Without Control Design
- After only Control Design
- Before and after With Control Design
- Completely Randomized Designs
- Randomized Block Designs
- Latin square Design
- Factorial Design

MPH-I-2 T Bio –Ethics:

Historical Perspectives

General Principles on Ethical Considerations Involving Human Participants

Statements of Specific Principles for Epidemiological Studies

- Nuremberg Code
- Belmont Report
- Declaration of Helsinki
- General Consideration for Clinical Trials
- International Conference on Harmonization & Good Clinical Practices
 - Structure & Contents of Clinical Study Report
 - Good Clinical Data Management Practices
 - Investigator Brochures
 - Essential Documents
 - Composition & Functions of Ethical Committee/ IRB
 - Duties & Roles of Principal Investigator
 - Roles & Duties of Sponsor
 - Good Clinical Practice India- DCGI
 - ICMR Guidelines
 - Revised Schedule Y
- Informed Consent process and informed consent form
- Ethical Principles Related to Animal Experiments.

MPH-I-3 T Health Care Delivery System

Introduction to Public Health

- Evolution of Public Health
- Ancient India and Public Health

- Founders of Modern Public Health

Changing concepts of Health Care

- Comprehensive Health Care
- Basic Health Care
- Primary Health Care

Levels of Health Care

- Primary Health Care
- Secondary Health Care
- Tertiary Health Care
- Three tier system of health care: Sub centre, Primary Health Centre, Community Health Centre
- Function, Staffing pattern with job responsibilities of each staff at each of the above levels
- Assessing "Health Status" and "Health Needs"
- Assessing the "Health Impact"
- Community Diagnosis
- Health Administration in India
 - Central Level
 - State level
 - District Level - Panchayat Raj Institutions
- Health for all- Millennium Development Goals & Sustainable Development Goals
- Voluntary & International Health Agencies
- Global Health:
 - Globalization,
 - Health disparities between developed and developing countries,
 - Global Health Agenda for 21st Century.
- Health Insurance Plans
- National Health Policy
 - National Health Policy 2002
 - National Population Policy 2000
- National Health Programs
 - Integrated Child Development Scheme
 - RNTCP
 - NACO
 - RCH
 - NHM: NRHM & NUHM
 - NVBDCP
 - IDSP
 - NIDDCP
 - NLEP
 - NPCB
 - Pulse Polio Immunization Program
 - National Mental Health Program
 - National Cancer Control Program
 - National Program for Prevention and Control of Diabetes, Cardio-vascular Diseases and stroke
 - INAP

MPH-II-1 T Epidemiology (Part I)

- Concept of Health & Disease
 - Concepts and dimensions of health, well being
 - Quality of life, spectrum of health
 - Determinants of Health
 - Indicators of Health
 - Epidemiological triad
 - Dynamics of Disease Transmission
 - Natural history of diseases
- Measuring the Occurrence of Diseases
 - Morbidity
 - Mortality
- Epidemiology Definition, Principles, Uses
- Identification of Health Problems
 - Survey methods
 - Planning, Designing and Conducting of Epidemiological Surveys
- Screening for Diseases
 - Types of screening test
 - Assessing the validity and reliability of diagnostic and screening tests

MPH-II- 2 T: Biostatistics (Part I)

- Introduction to Biostatistics
- Application of Statistics to problems in Clinical and Public Health Settings
- Data
 - Classification
 - Presentation – Tables AND Graphs
 - Collection
- Sampling Designs
- Sample Size Calculation
- Descriptive statistics
 - Measures of Central Tendency
 - Measures of Dispersion
 - Measures of Kurtosis and Skewness

PRACTICAL

MPH-I-1 P: Under Five Clinic posting & Community Project (Practical)

MPH-I-2 P: Dissertation (Synopsis Development)

4.2 SEMESTER II

S. No.	Core Subjects	Credit
MPH-II-1 T	Epidemiology (Part II)	6(4+2)
MPH-II-2 T	Biostatistics (Part II)	3 (2+1)
MPH-II-3 T	Epidemiology of Infectious & Non-Communicable Diseases	4
MPH-II-1 P	Critical Appraisal (Practical)	2
MPH-II-2 P	Field Visit – Community Activities	3
MPH-II-3 P	Dissertation (Data collection)	4
MPH-II-E T	Electives*	3
TOTAL :		25

**NOTE: Choose electives (from List of Electives) amounting to total of 3 CREDITS*

THEORY

<p>MPH-II-1 T Epidemiology (Part II)</p> <ul style="list-style-type: none"> • Surveillance • Association and causation • Bias • Confounding • Interaction • Investigation of an epidemic • Using Epidemiology to Identify the Cause of Diseases • Applying Epidemiology to Evaluate Health Services & Policy
<p>MPH-II-2 T Biostatistics Part II</p> <ul style="list-style-type: none"> • Probability and Probability Distribution (Binomial, Poisson and Normal Distribution) • Testing of Hypothesis: Parametric Tests (z test, t test, Analysis of variance – One way), • Non Parametric Tests (Mc Neimar test, Fisher Exact test, Median test, Sign test, Wilcoxon signed matched pair test, Mann Whitney test, Kruskal Walli test) • Correlation Analysis • Regression Analysis: Simple, Multiple, Logistic • Estimation: Point and Interval
<p>MPH-II-3 T Epidemiology of Infectious & Non-Communicable Diseases General control measures of communicable diseases Epidemiology & control of Infectious Diseases</p> <ul style="list-style-type: none"> • Acute diarrheal diseases • Cholera • Typhoid fever (Enteric fever) • Brucellosis • Leptospirosis • Plague • HIV/AIDS • Leprosy • Malaria, Filaria, Yellow fever Dengue, Chikungunya, Kala-Azar, Japanese Encephalitis • KFD

- Epidemiology and control of vaccine preventable diseases: Tuberculosis, Diphtheria, Whooping Cough, Measles, Tetanus, Poliomyelitis, Hepatitis.
- ARI
- Influenza
- SARS
- Viral Hepatitis- A,B,C,E
- Food Poisoning
- Parasitic infections, Ascariasis, Hookworm infestations
- Rabies
- STDs

Epidemiology & control of Non Communicable Diseases

- Cardiovascular Diseases
 - Rheumatic Heart Disease
 - Coronary artery disease
 - Hypertension
- Neoplasm
- Diabetes
- Mental Health Problems
- Obesity
- Blindness
- Accidents
- Emerging & Re-emerging infectious Diseases

PRACTICAL

MPH-II-1 P Critical Appraisal

Critical appraisal of published articles

MPH-II-2 P Dissertation

Data Collection and Entry.

4.3 SEMESTER III

S. No.	Core Subject	Credit
MPH-III-1 T	Planning & Management	4
MPH-III-2 T	Occupational & Environmental Health	4
MPH-III-3 T	Public Health Legislation & Public Health Information System	4
MPH-IV-1 T	Maternal & Child Health & Public Health Nutrition (Part I)	4
MPH-III-1 P	Dissertation (Data collection & analysis)	4
MPH-III-E T	Electives*	3
TOTAL :		23

* NOTE: Choose electives (from List of Electives) amounting to total of 3 CREDITS

THEORY

MPH-III-1 T Planning & Management

- Introduction to Planning & Management: Aims and Objectives
- Seven Steps and Predisposing Factors in Planning & Management.
- Planning Cycle
- Strategies/ Methods in Planning
- Skills on Making Effective Planning
- Alma-Atta Declaration
- Jakarta Health Declaration
- Ottawa Charter
- Need Assessment-Identifying Health Promotion Needs
- Audit
- Budget Allocation

Public Health Management

- General Concepts in Management Sciences
- Organizational Concepts & Behavior
- Time Management
- Materials Management
- Self-Management
- Modern Management Techniques
- Personnel Management & Human Resource Development
- Health Outcome Research

MPH-III-2 T Occupational & Environmental Health

Occupational Health

- Occupational Hazards
 - Risk vs Hazard
 - Types
 - Prevention & control
- Pneumoconiosis
- Lead Poisoning
- Occupational Cancers
- Occupational Dermatitis

Occupational Hazards in Agricultural Workers

- Accidents in Industry
- Sickness Absenteeism
- Ergonomics
- Problems of
 - Urbanization
 - Industrialization

Environmental Health

- Public Health Aspects of Extreme Hot and Cold Environment
- Food Sanitation and safety
- Vector & Rodent Control
- Solid waste disposal
- Excreta Disposal
- Environmental Health Policy
- Hospital Waste Management
- Water & Sanitation:
 - Characteristics of Safe Water
 - Water Distribution System
 - Water Pollution
 - Purification Of Water
 - Water Quality Standards
 - Water Problems In India
 - Water Conservation,
 - Rain Water Harvesting
- Environment Pollution:
 - Air Pollution
 - Soil Pollution
 - Noise Pollution
 - Thermal pollution
 - Housing & Ventilation
 - Nuclear Hazards
 - Role of an Individual In Prevention of Pollution
 - Disaster Management
 - Social Issues and the Environment

MPH-III-3 T Public Health Legislation & Health Information Systems

Public Health Legislation

- Legislation related to Quality of Professional Education and Services
 - Indian Medical Council Act
 - Indian Nursing Council Act
 - The Dentist Act
 - The Indian Medicine Central Council Act
- Legislation related to Census, Birth and Death
- Legislation related to control of Epidemics
- Legislation related to Tobacco and Drug Control
 - COTPA

- The Narcotic drugs and Psychotropic Substance act 1985
- The Transplantation of Human Organs Act 1994
- The Prevention of Food Adulteration Act 1959
- Food safety and standard Act
- The Protection of Human Rights Act 1993
- Legislation for Women Empowerment and Health
 - The dowry Prohibition Act 1961
 - Protection of Women from Domestic Violence Act 2005
 - Maternity Benefit Act
 - Immoral traffic(Prevention) Act 1956
 - The medical termination of pregnancy act 1971
 - PCPNDT Act 1994
- Legislation for Child Protection and Health
 - Child labor prohibition Act 1986
 - The Juvenile Justice Act 2000
- Legislation related to the Welfare Rehabilitation of Disadvantaged
 - PWD Act
 - Mental Health Act 2017
 - Welfare of Parents and senior citizens Act 2007
 - Citizenship Amendment Act 2019
- Occupational Health & Legislation
 - The Factory Act
 - ESI Act
 - Minimum wages Act
- Environment Health Legislations
 - Environmental Protection act 1986,
 - Air pollution
 - Water pollution
 - Biomedical waste management & handling rules 1998
 - Municipal solid waste management rules 2000
 - Plastic waste management and handling rules 2011
 - Disaster management Act 2005
- International Health Regulations
- Universal Declaration of Human Rights

Health Information Systems

- Evolution of Health Information System
- Principles of HIS
- Health Information System: Sources, Uses
- Application of Information System
- Managing Health information system
- Importance of data
- e-Health, telemedicine and m-health
- DIKW Hierarchy

MPH-IV-1 T Maternal and Child Health & Public Health Nutrition (Part I)

Maternal and Child Health

- Introduction to
 - Health Status of Women in General
 - Reproductive Health in particular
- Health Problems of Women across the Life Span
- Determinants of maternal & child health
- Preventive-Promotive Strategies and Indicators of Maternal and Child Health
- Maternal Health Care
 - Antenatal
 - Intranatal
 - Postnatal care
- Maternal Death Review
- Risk Approach in MCH
- Marriage, Preconception, Conception, Pregnancy

Public Health Nutrition

- Introduction to Nutrition in Public Health
- The Proximate Principles of food
- Micronutrients: The Vitamins and minerals
- Major Foods and their Nutritive Value
- Nutritional Requirements of Special Groups:
 - Pregnant women & Lactating Mothers
 - Children
 - Elderly & their prevention
- Nutritional Indicators
- Nutritional Programmes in India
- Nutritional status assessment of a Community
- Nutritional Surveillance
- Nutritional Deficiency Diseases of Public Health Importance:
 - Protein Energy Malnutrition
 - Iodine deficiency disorders
 - Vitamin A deficiency
 - Role of Fluorine in health and disease

PRACTICAL

MPH-III-1 P Dissertation

Data Collection and Entry.

4.4 SEMESTER IV

S. No.	Core Subject	Credit
MPH-IV-1 T	Maternal and Child Health and Public Health Nutrition (Part 2)	4
MPH-IV-2 T	Demography & Family Planning	4
MPH-IV-1 P	Dissertation writing & submission	10
MPH-IV-2 P	Internship	10
MPH-IV-E T	Electives*	3
MPH-IV- 3T	TJU Health Economics and Outcome Research#	3
TOTAL :		34

* NOTE: Choose electives (from List of Electives) amounting to total of 3 CREDITS

Online course with TJU(Thomas Jefferson University) to be taken and certificate to be submitted to the department

MPH-IV-1 T Maternal and Child Health and Public Health Nutrition (Part II): Maternal and Child Health

- Child Health Care
- Child abuse, child prostitution, child trafficking, street children, child labour, child protection and child rights and child laws.
- Major causes of infants and child morbidity and mortality in India
- Socio-economic, educational and cultural factors affecting child rearing practices and child health care activities in India.
- Community based management of child health
 - Care of Infants
 - Care of Under Five Children
 - Growth and Development of Children
 - Children's Right to Health
 - Child placement
 - School Health Services
- Definition, classification, social and emotional development aspects
- Problems, social issues, programmes.
- Sexual health
- Sexual behaviour
- Early pregnancy and early marriage
- Sex education
- Mental health, Substance abuse and social crime
- Adolescent Health
- Tribal Health
- Geriatric Health
- Baby Friendly Hospital Initiative

- Under Five Clinic & Well Baby Clinic
- Programs for Health Problems of Women including RCH program (I & II) and NRHM
- Organization of MCH Services in the community

Public Health Nutrition

Public Health Aspects of Food Hygiene & Sanitary Regulation of Eating Establishments

Food Processing, Food Adulteration, Food Additives, Preservatives, Food Toxicants and Food Fortification

Methods for Establishing the Causal Role of Nutritional Factors on Health and Disease Status

Planning, Implementation & Evaluation of Nutrition programs

Nutrition & Non-communicable diseases

Nutrition during special situations:

- Disasters
- Fairs and Festivals

Community Feeding of Children

MPH-IV-2T Demography & Family Planning

Demographic cycle

- Population Census
- Demographic Trends – World & India
 - Age & Sex Composition
 - Age Pyramids
 - Sex ratio
 - Dependency ratio
 - Family Size
 - Urbanization
 - Life expectancy
- Demographic transition
- Migration
- Fertility & Fertility Indicators
- Mortality:
 - The determinants of population health
 - The life table
- Causes and implications of social inequality

Family Planning:

- Scope of family planning services
- Health aspects of Family Planning
- Small family norm
- Eligible couples
- Target couples
- Couple protection rate (CPR)
- Evaluation of contraceptive methods
- Unmet need for Family Planning
- National Family Welfare Programme
- Sociology of Family Planning
- Evaluation of Family Planning
- National Population Policy – 2000
- Contraceptive Methods
- MTP Act 1971

LIST OF ELECTIVES

Sl.No.	Elective	Credit
1.	Health Behaviour and Sociology	2
2.	Health Economics	2
3.	Health Education & Health Promotion	2
4.	Language	1
5.	NSS (I,II,III,IV)	3
6.	Global Health	1
7.	Computer Skills	2
8.	Scientific Writing Skills	2
9.	Communication Skills	2
10.	Leadership Skills	2
11.	Disaster Management Project	3
12.	Library Dissertation	2
13.	Dental Public Health (I,II,III,IV)	3

<p>1. Health Behaviour and Sociology Health Belief Model (HBM)/ Risk Perception Theory of Reasoned Action/ Theory of Planned Behavior Social Cognitive Theory (SCT)/ Self-Efficacy (SE) Trans Theoretical Model (TTM) Motivation and Self-Efficacy; Stress, Coping, and Social Support Self-Determination Theory (SDT) Motivational Interviewing Behavior Modification Goal Setting, Attributions, Self-Regulation Building Conceptual Frameworks Elaboration Likelihood Model/ Cognitive Load Theory Theory-Informed Interventions</p>	<p>2. Health Economics: Supply and Demand for Health Services The Role of Insurance in the Medical Care Industry Public Policy, Issues of Cost and Quality Regulation Measurements and Evaluation of Costs and Benefits Policies and Strategies for the Developing World</p>
<p>3. Health Education and Health Promotion Introduction to Health Education and Health Promotion: Definition & principles Theories of Health Education Health Promotion Needs Assessment Planning, Implementation and Evaluation of Health Promotion Programs</p>	<p>4. Language (Kannada & English) Kannada: Conversational skills English: Comprehension skills</p>

<p>5NSS</p> <p>5.1 NSS I</p> <p>UNIT 1: Introduction and Basic Concepts of NSS (4)</p> <ul style="list-style-type: none"> • History, philosophy, aims & objectives (1) • Emblem, flag, motto, song, badge (1) • Organizational structure, roles & responsibilities of various NSS functionaries (2) <p>UNIT 2: NSS Programmes and Activities (10)</p> <ul style="list-style-type: none"> • Concept of regular activities, special camping, day camps (3) • Basis of adoption of village/slums, methodology of conducting survey (2) • Financial pattern of the scheme (1) • Other young prog./schemes of GoI (2) • Coordination with different agencies (1) • Maintenance of the diary (1) <p>UNIT 3: Understanding Youth (5)</p> <ul style="list-style-type: none"> • Definition, profiles, categories of youth (2) • Issues, challenges and opportunities of youth (2) • Youth as an agent of social change (1) <p>UNIT 4: Health, Hygiene & Sanitation (7)</p> <ul style="list-style-type: none"> • Definition, needs and scope of health education (1) • Food and nutrition (1) • Safe drinking water, water borne diseases and sanitation (SBA) (2) • National Health Programme (2) • Reproductive Health (1) • <p>UNIT 5: Volunteerism and Shramdaan (7)</p> <ul style="list-style-type: none"> • Indian Tradition of volunteerism (1) • Needs & importance of volunteerism (2) • Motivation and constraints of volunteerism (2) • Shramdaan as part of volunteerism (2) 	<p>5.2 NSS II</p> <p>UNIT 1: Importance and Role of Youth leadership (6)</p> <ul style="list-style-type: none"> • Meaning and types of leadership (2) • Qualities of good leaders; traits of leadership (2) • Importance and role of youth leadership (2) <p>UNIT 2: Life Competencies (11)</p> <ul style="list-style-type: none"> • Definition and importance of life competencies (2) • Communication (3) • Inter Personal (3) • Problem-solving and decision-making (3) <p>UNIT 3: Social Harmony and National Integration (9)</p> <ul style="list-style-type: none"> • Indian history and culture (2) • Role of youth in peace-building and conflict resolution (5) • Role of youth in Nation Building (2) <p>UNIT 4: Youth Development Programmes in India (9)</p> <ul style="list-style-type: none"> • National Youth Policy (3) • Youth development programmes at the National level, State level and voluntary sector (4) • Youth-focused and Youth-led Organizations (2)
---	---

5.3 NSS III

UNIT 1: Citizenship (7)

- Basic Features of Constitution of India (2)
- Fundamental Rights and Duties (2)
- Human Rights (1)
- Consumer awareness and legal rights of consumer (1)
- RTI (1)

UNIT 2: Family and Society (6)

- Concept of family, community, (PRIs & other community-based organizations) and society (2)
- Growing up in the family- dynamics and impact (1)
- Human Values (1)
- Gender Justice (2)

UNIT 3: Community Mobilization (9)

- Mapping of community stakeholders (3)
- Designing the message in the context of the problem and culture of community (1)
- Identifying methods of mobilization (3)
- Youth-adult partnership (2)

UNIT 4: Environment Issues (11)

- Environment conservation, enrichment and sustainability (2)
- Climate change (2)
- Waste management (2)
- Natural resource management (5)

UNIT 5: Project Cycle Management(10)

- Project Planning (2)
- Project Implementation (3)
- Project monitoring (2)
- Project evaluation: impact assessment(3)

UNIT 6: Documentation and Reporting (7)

- Collection and analysis of data (3)
- Preparation of documentation/ reports (2)
- Dissemination of documents/reports (2)

UNIT 7: Additional Life Skills (7)

- Positive Thinking (1)
- Self Confidence and Self Esteem (2)
- Setting Life Goals and working to achieve them (2)
- Management of Stress including Time Management (2)

5.4 NSS IV

UNIT 1: Youth Health and Yoga (15)

- Healthy lifestyles (yoga as a tool), substance abuse, HIV, home nursing, first aid (8)
- Yoga: history, concept, misconceptions, traditions, impacts (5)
- Yoga as preventive, promotive and curative method (2)

UNIT 2: Youth and Crime (7)

- Sociological and psychological factors influencing youth crime (2)
- Peer mentoring in preventing crimes (1)
- Awareness about anti-ragging (1)
- Cyber crime and its prevention (2)
- Juvenile Justice (1)

UNIT 3: Civil/ Defense (5)

- Positive Thinking (1)
- Self Confidence and Self esteem (2)
- Setting Life Goals and working to achieve them (2)
- Management of Stress including Time Management (2)

UNIT 4: Entrepreneurship Development (8)

- Definition & Meaning (1)
- Qualities of good entrepreneur (2)
- Steps/ ways in opening an enterprise (3)
- Role of financial and support service institutions (2)

UNIT 5: Resource Mobilization (3)

- Writing a Project Proposal (2)
- Establishment of SFUs (1)

UNIT 6: Disaster Management (7)

- Introduction to Disaster Management, classification of disasters (4)
- Role of youth in disaster management (3)

<p>8. Global Health Globalization of Health Global healthcare and critical analysis of global healthcare systems: India, USA, UK, Canada, Europe, Pakistan, Nepal, Australia, China, Japan, Africa, Cuba, Switzerland Universal Health Coverage International Health Organizations</p>	<p>7. Computer Skills Introduction to Information Technology Introduction to MS Office: MS Word, MS Excel, MS PowerPoint Presentation Skills Internet <ul style="list-style-type: none"> ▪ Search Strategies ▪ Email and Email etiquettes ▪ Online survey development tools </p>
<p>8. Scientific Writing Skills Application writing for Grants: <ul style="list-style-type: none"> ▪ Introduction to information systems and sources of intelligence ▪ Format of writing a concept paper and mini protocol ▪ Critical issues and common errors in grant applications Essay Writing: Candidates will submit 1 essay of 5000 words each on selected topics</p>	<p>9. Communication Skills Communication: definition, process, its application in health education. Models of communication process. Communication: Theories and principles. Methods & media of communication. Behaviour change communication. IEC Strategy</p>
<p>10. Leadership Skills SWOC Analysis Leadership Qualities and Challenges Motivation Ethics and responsibilities Communication Management Team Building</p>	<p>11. Library Dissertation Conducting a systematic literature review on the topic given Submission of the dissertation (5000 words) in bind</p>

SECTION-V

Recommended Books (Latest Editions)

TITLE	AUTHOR(S)	PUBLISHER
Practical Statistics for Medical research	Altman D	Chapman & Hall
An Introduction To Medical statistics.	Bland M	Oxford Medical Publications
Statistical Methods In Clinical and Preventive Medicine.	Hill.S.A.B.	E.& S. Livingstone Ltd.
Textbook Of Preventive And Social Medicine.	Gupta.M.C; Mahajan.B.K.	Jaypee Brothers.
Topics In Public Health.	Mackintosh.J.M.	E.& S. Livingstone Ltd.
Textbook Of Preventive And Social Medicine.	Park.K; Park.J.E.	Banarsidas Bhanot
Industrial Injuries.	Featherstone.D.F.	John Wright & Sons.
Environment problems & solutions	Asthana & Asthana	S.Chand & Company Ltd.
Environmental Biology	P.D.Sharma	Rastogi Publication
Earth science	Edward J.Tarback	Prentice Hall
Environmental Issue-Measuring Analyzing, evaluating	Robert L.Mc.Connell & Lanniel C.Abel	Prentice Hall
Environmental Protection & law	C.S.Mehta	Ashish Publishing House.
Environmental Pollution,	Timmy Katyal & M.Satake	Anmol Publication
Promoting Health: A Practical Guide To Health Education	Ewles ,L Simnet,I	Scutari Press
Human Rights In Health.	Found.C.	Elsevier Publishing Co.
Public And Community Health.	Parker.W.S.	Staples Press London.
Public Health Informatics and Information systems	O'Carroll, P.W., Yasnoff, W.A., Ward, M.E., Ripp, L.H., Martin, E.L. (Eds.)	Springer
Public Health Informatics and Information systems	J.A. Magnuson, Jr., Paul C. Fu	Springer

TITLE	AUTHOR(S)	PUBLISHER
Sex, Disease, And Society: A Comparative History Of Sexually Transmitted Diseases And HIV/AIDS In Asia And The Pacific	Milton Lewis, Scott Bamber, Michael Waugh	Greenwood Press,
Living With HIV: Experiment In Courage	Mary Elizabeth O'Brien	Auburn House, 1992
The Unending Frontier: An Environmental History Of The Early Modern World	John F. Richards	California Press
Communicable Diseases Control	Anderson, Arnstein, Lester	The Macmillan Company
Encyclopedia Of Disaster Management	Goel, S. L.	Deep & Deep
Disaster Management	G.K. Ghosh	A.P.H.
Emergency Medical Services And Disaster Management: A Holistic Approach	P.K. Dave	Jaypee Brothers
Disaster Management - Recent Approaches	Arvind Kumar	Anmol Publication
The New Public Health: An Introduction For The 21st Century.	San Diego, CA:	Academic Press
Handbook Of Health Economics.	Culyer A.J. And J.P. Newhouse.	Elsevier
Biostatistical Aspects Of Health And Population	Edited By Arvind Pandey.	Hindustan Pub
Essentials Of Dental Public Health	Daly	Oxford
Community Dentistry	Cynthia Pine	Oxford
Community Oral Health Practice For The Dental Hygienist	Kathy Voigt Geurink,	Elsevier Science
Concepts In Dental Public Health	Jill Mason	Lippincott Williams & Wilkins
Essential Dental Public Health	Blanaid Daly, Richard Watt, Paul Batchelor, Elizabeth Treasure	Oxford Univ Press
Dental Public Health And Community Dentistry	Anthony Jong	C.V. Mosby Co
The Theory And Practice Of Public Health.	Hobson.W.	Oxford University
Oxford Textbook Of Public Health. Vol. Ii.	Holland.W.W.	Oxford University
Oxford Textbook Of Public Health. Vol. Iii.	Holland.W.W.	Oxford University
Oxford Textbook Of Public Health. Vol. Iv.	Holland.W.W.	Oxford University

TITLE	AUTHOR(S)	PUBLISHER
Man Adapting	Dubos, Rene	Yale University Press
Doing Your Research Project	Bell, J.	Open University
he Limits Of Medicine	Illich, I.	Pelican Books
The Role Of Medicine	Mckeown, T.	Blackwell

**SHRI BM KANKANAWADI AYURVED
MAHAVIDYALAYA**

Post Graduate Studies & Reseach Centre

(Approved by Central Council of Indial Medicine, New Delhi & M/o AYUSH, GoI)

A Constituent Unit of

KLE ACADEMY OF HIGHER EDUCATION & RESEARCH

(DEEMED-TO-BE-UNIVERSITY)

(Re-Accredited 'A' Grade by NAAC (2nd Cycle) || Placed under Category 'A' by MHRD GoI)

Department of Rachana Shareera

Credential course on Surgical

Anatomy

AIM:

Proficient to:

- To make efficiency and expert in surgical Anatomy

Type of Course: Choice Based Credit Course

- Regional Anatomy
- Surgical Anatomy
- Hands on training on cadaver

Advantage of the credit course

- The course facilitates the Anatomical knowledge for the surgical measures

Eligibility:

First year BAMS students

Language: English.

Intake Capacity: Minimum 15. Maximum 35

Duration: 50 hrs

Evaluation: Assignment based Assessment

Depending upon score card

Teaching Learning Methods:

- Didactic Lectures
- A.V lectures
- Guided self-learning
- Demonstration
- Hands on training
- Assignment

Syllabus:

- Regional Anatomy
- Surgical Anatomy
- Surgical Measures
- Operative Measures
- Hands on training on cadavers

1ST - Credit Hours: 11 hrs

Upper Limb - Arm, Forearm & Hand

Theory 6 hrs. & practical 5 hrs.

Sl No	Content	Hrs	Teaching & Learning Methodology
1	Regional Anatomy	3 hrs	Lecture
2	Clinical Anatomy	2 hrs	Guided Self Learning
3	Anatomical consideration in 1. Incision and drainage 2. Amputation of the fingers 3. Clean lacerated wound sutures 4. Nail bed infection (paronychia)	1 hrs	Lecture/Assignments
4	Surgical measures Incision – Blades Sutures – suturing material	5 hrs	Demo/lecture Hands on training on cadaver

2nd Credit Hours: 11 hrs

Lower limb- Thigh, Gluteal region, Leg, Foot

Theory 6 hrs. & practical 5 hrs.

Sl No	Content	Hrs	Teaching & Learning Methodology
1	Regional Anatomy	3 hrs	Lecture
2	Clinical Anatomy	2 hrs	Guided Self Learning
3	Anatomical consideration in 1. Excision of corn 2. Lower limb vessels 3. Amputation 4. Notes on -Strain, sprain	1 hrs	Lecture/Assignments
4	Surgical measures Incision – Blades Sutures – suturing material	5 hrs	Demo/lecture Hands on training on cadaver

3rd - Credit Hours: 16 hrs

Abdomen and Perineum

Theory 5 hrs. & practical 11 hrs.

Sl No	Content	Hrs	Teaching & Learning Methodology
54+	Regional Anatomy	3 hrs	Lecture
2	Clinical Anatomy	2 hrs	Guided Self Learning -
3	Anatomical consideration in 1. Anterior and posterior abdominal wall, inguinal region, 2. Hernias, ascites, abdominal incisions, appendicitis 3. piles, fistula & fissures	2 hrs	Lecture/Assignments
4	Surgical measures Incision – Blades Sutures – suturing material	9 hrs	Demo/lecture Hands on training on cadaver

4th - Credit Hours: 12 hrs

Thorax

Theory 6 hrs. & practical 6 hrs.

Sl No	Content	Hrs	Teaching & Learning Methodology
1	Regional Anatomy	3 hrs	Lecture
2	Clinical Anatomy	2 hrs	Guided Self Learning
3	Anatomical consideration in 1. Breast , axilla, pleura, mediastinum 2. operative procedures on breast, needle aspiration	2 hrs	Lecture/Assignments
4	Surgical measures Incision – Blades Sutures – suturing material	5 hrs	Demo/lecture Hands on training on cadaver

KAHE&R

Deemed to be University.Re-accredited 'A' Grade by NAAC (2nd cycle). Placed in Category 'A' by MHRD (GoI).

Shri B. M. Kankanawadi Ayurveda Mahavidyalaya

Post Graduate Studies and Research Centre,Shahapur,Belagavi-03

(India's only institution with NAAC &NABH Accreditation in AYUSH sector)

CHOICE BASED CREDIT COURSE

DEVELOPMENT OF NOVEL DOSAGE FORMS



DEPARTMENT RASASHASTRA & BHAISHAJYA KALPANA

KAHE&R

Deemed to be University.Re-accredited 'A' Grade by NAAC (2nd cycle). Placed in Category 'A' by MHRD (GoI).

Shri B. M. Kankanawadi Ayurveda Mahavidyalaya

Post Graduate Studies and Research Centre,Shahapur,Belagavi-03

KAHE&R
Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Post Graduate Studies and Research Centre, Shahapur, Belagavi-03
DEPARTMENT RASASHASTRA & BHAISHAJYA KALPANA

CHOICE BASED CREDIT COURSE

Aims and Objectives:

1. Development of novel herbal dosage forms.
2. Modification of classical formulations into conventional dosage forms.

Type of Course: Add on course.

Future Prospects

- Acquire skills required to develop and modify conventional dosage forms.
- Considering advantages and disadvantages of classical dosage forms
- Global acceptance for classical Ayurvedic formulations with advanced pharmaceutical technology.
- To bring revolution in the field of Ayurvedic pharma industry.
- Apply for patent for newly developed dosage forms.
- To create self confidence to develop newer dosage forms.
- To develop industry based skills required to work in modern Ayurvedic pharmacy.
- To develop the formulations for clinical practice.

Eligibility: Second BAMS students

Language: English.

Intake Capacity: Minimum 15. Maximum 35

Duration: 50hrs

Evaluation: Assignment based Assessment

Credits: 04 .

Teaching Learning Methods:

Didactic Lectures, A.V lectures, Demonstration, Hands on training, PBL and Assignment, Group discussion.

Syllabus:

- Introduction to concept of conventional dosage forms.
- Application of methodology for development of dosage forms
- Principles to modify classical in to conventional dosage forms.
- Orientation training for development and modify the dosage forms.
- Self-assessed quality assessment of dosage forms.

Credit No: 1**Duration: 15 hrs**

Sl. No	Content	Teaching & Learning Methodology	Time
1	Introduction to conventional dosage forms.	AV Narration	01hr
2	Acquainting of Conventional dosage forms.	Live demo (DrugDispensingUnit)	01hr
3	Fundamental Principles of dosage forms <ul style="list-style-type: none">• Introduction of Drug• Dosage forms• Classification• Pre formulation methodology• Drug design & Development	AV Narration	02hrs
4	Introduction to solid dosage forms Introduction, classifications, methodology, advantages, disadvantages.	AV Narration	01hr
5	Orientation about sieves, sizes of sieve, machineries used in GMP Pharmacy.	Live Demo	01hr
6	Developed formulations <ul style="list-style-type: none">• Powders• Granules• Tablets• Capsules	Live Demo	02hrs
7	Liquid dosage forms Introduction, classifications, methodology, advantages, disadvantages. <ul style="list-style-type: none">▪	AV Narration	02hrs
8	Monophasic liquid dosage forms -Development <ul style="list-style-type: none">➤ Internal Use<ul style="list-style-type: none">▪ Syrup▪ Drops	Live demo/Hands on training	02hrs

9	Biphasic dosage form- Development ➤ Internal/External ▪ Suspension ▪ Emulsion	Live demo/Hands on training	02hrs
10	Solid & Liquid dosage forms	PBL	01hr

Credit No: 2.

Duration: 10 hrs

Sl No	Content	Teaching & Learning Methodology	Time
1	Semi solid dosage forms Introduction, classification, methodology, advantages, disadvantages of Emulsion, Ointments, Creams, Pastes, Jellies	AV Narration	02hrs
2	Tulles Suppositories Pessaries	AV narration PBL	02 hrs
3	Development of <ul style="list-style-type: none"> • Ointment • Cream • Lotion 	Live demo/Hands on training	03hrs
4	Development of <ul style="list-style-type: none"> • Paste • Jelly • Pessary 	Live demo/Hands on training	03hrs

Credit No: 03

Duration: 15hrs

Sl No	Content	Teaching & Learning Methodology	Time
1	Selection of Base and excipients	AV Narration	02 hrs
2	Creams: Cold cream/Vanishing/Liquid cream,		02hrs
3	Powders: Face powder/Talcum powder		02 hrs

4	Paste: Tooth paste	Live demo Hands on training	02 hrs
5	Soap: Bath soap/Toilet soap		03hrs
6	Face pack, Lip balm/Lipstick		02hrs
07	Liquid and Semi solid dosage forms	PBL	02hr

Credit No: 04

Duration: 10 hrs

Sl No	Content	Teaching & Learning Methodology	Time
1	Quality assessment parameters	AV Narration	02hrs
2	Packing & storage techniques	AV Narration	02 hrs
3	Demonstration of Packing of different dosage forms	Live demo	02 hrs
4	Development of Labels, cartoons etc	Group Activity	02hrs
5	Advertising, Marketing and Patenting	Group Activity	01 hr
6	Discussion regarding credential course and feedback	Group Discussion	01 hr

Reference :

Srl.No	Name of the text book	Author	Edtn&Publisher
1	Pharmaceutics -I	R.M. Mehta	2 nd edtn-2003, VallabhaPrakashan ,Delhi
2	Pharmaceutics -II	R.M. Mehta	2 nd edtn-2003 ,VallabhaPrakashan ,Delhi.
3	A text book of professional pharmacy	N.K Jain & S.N Sharma	4 ^{tn} edn, 1998,Reprint 2004,VallabhaPrakashan ,New Delhi.
4	Text book of Physical Pharmaceutics	CVS Subrhamanyam	2 nd edn-12 reprint- 2013,VallabhaPrakashan ,New Delhi.
5	Bentley's, Text book of	E.A. Rawlins	8 th edtn-2010,

	Pharmaceutics		Elsevier,Gurgaon ,Haryana
6	Pharmaceutics	Dr.Gound,Dr.Yeole,Yadav, Gokhale	11 th edtn- 2010,Niraliprakashan, Pune.

SCORE CARD

CREDIT	Attendance Score % (1 Hour attendance =1%) 10%	Performance Score % Theory Internal Evaluation =1-20% MCQ	Performance Score % Practical Internal Evaluation =1-20%
1			
2			
3			
4			

OVER ALL SCORE %	Upto 39% D	40-59% C	60-79% B	80%& Above A
---------------------	-------------------	-----------------	-----------------	---------------------



Department of Panchakarma

Marma Chikitsa – Ayurvedic Approach for

Diagnosis

Credential course

Aim: To understand the concept of Marma in scientific manner.

Type of course: Credit course

Objectives:

- Method of examination of Marma.
- Imparting of a basic background of Marma Science and developing competence in giving marma therapy for selected diseases as well as for regular maintenance of health.
- To understand the pathological states of Marma .

Future prospects:

- To be a competent Marma Chikitsa Vaidya.
- To ensure Marma Chikitsa practice as a profession.

Eligibility:

Second year BAMS students

Language: English

Intake Capacity: Minimum 20. Maximum 35

Duration:50 hours

Evaluation: Assignment based Assessment

Five Credits of each 10 hours (students will be awarded credits points after attending 80% of teaching and training schedule and after completion of the given Assignments)

Teaching Learning Methods:

Didactic Lectures, A.V lectures, Demonstration, Hands on training and Assignment

Syllabus:

1. History & development of marma therapy in Ayurveda
2. Introduction
3. Detailed Explanation Of Marma Chikitsa
4. Distribution and Description of Marma Points in the Human Body
5. Marma Therapy in Different Diseases
6. Panchabhautika and Doshikaimportance in Marma.
7. Marma Pariksha and Marma Location
8. Concept of Pain in Ayurveda and its Management through Marma Therapy
9. Appropriate massage therapies for common health concerns and knowledge of common massage oils
10. Marma in various pathological states
 - Cervical Pain
 - Lumbar Pain
 - Muscular and joint pain
 - Frozen joints
 - Muscular strain
 - Digestion and elimination problems
 - Nervous system disorders
 - Headaches and migraines
 - General aging problems
 - Anxiety and depression
 - Stress response, fears, and phobias
 - Confusion, memory loss, and mental focus
 - Low energy and fatigue
11. Guidelines for practice ,stimulation techniques, and addressing specific conditions
12. Benefits of Marma Chikitsa

1ST - Credit Hours: theory and practical 4hrs and 6hrs assignments

Sl No	Content	Teaching & Learning Methodology	Hours
1	Introduction to Marma	Lecture	1 hr
2	Basic Principle of Massaging technique and Synonyms of Marma	Lecture	1 hr
3	Marma Shareeram and Anatomy and Marma Chikitsa	Lecture	2 hr
4	Bhagna Chikitsa Marma Location and Pariksha (Diagnosis and Treatment of Fracture and Dislocation Demo)	Demo/ Hands on training	6 hr

2nd- Credit Hours: theory and practical 4hrs and 6hrs assignments

Sl No	Content	Teaching & Learning Methodology	Hours
1	Radiology in Marma Chikitsa Panchabhautika, Doshikaimportance in Marma	Lecture	2 hr
2	Therapeutic treatment of Marma in <ul style="list-style-type: none">• Cervical Pain• Lumbar Pain• Muscular and joint pain	Lecture / Demo/ Hands on training	4 hr
3	Therapeutic treatment in Marma in <ul style="list-style-type: none">• Anxiety and depression• Stress response, fears, and phobias• Confusion, memory loss, and mental focus	Lecture/ Hands on training/ Discussion/ Assignment	4 hr

3rd- Credit Hours: theory and practical 2hrs and 8hrs assignments

Sl No	Content	Teaching & Learning Methodology	Hours
1	Massage Therapy/ Marma Rejuvenating Massage and Kalari Marma Chikitsa	Lecture	1 hr
2	Therapeutic treatment in Marma in <ul style="list-style-type: none">• Respiratory conditions• Digestion and elimination problems• Muscular strain	Lecture/ Demo/ Hands on training	5 hr
3	The concept of Prana and pranayama, Basic training in and developing competence in self marma therapy and therapy in common diseases	Discussion /Assignment	4 hr

4th- Credit Hours: theory and practical 2hrs and 8hrs assignments

Sl No	Content	Teaching & Learning Methodology	Hours
1	<ul style="list-style-type: none">• Bandaging Techniques• Marma assessment in sadhya and Yapyaroga• Marma assessment in asadhyaroga• Theory and practical of Marma Chikitsa.	Lecture / Demo/ Hands on training/ Assignment	6 hr
2	Hands on training for Bandaging and massage and Marma Medicine	Lecture / Demo/ Hands on training/ Assignment	4 hr

5th- Credit Hours: theory and practical 3hrs and 7hrs assignments

Sl No	Content	Teaching & Learning Methodology	Hours
1	Guidelines for practice Marma techniques, and addressing specific conditions	Lecture	3hr
2	Benefits of Marma Chikitsa and Marma Practice in Emergency Cases	Lecture / Assignment	3 hr
3	Practical and Examination of Marma and Hands on Training. Marma Chikitsa in Sports Ayurveda	Lecture/ Assignment	4 hr

SCORE CARD

CREDIT	Attendance Score % (1 Hour attendance =1%) 10%	Performance Score % Theory Internal Evaluation =1- 20% MCQ	Performance Score % Practical Internal Evaluation =1- 20%
1			
2			
3			
4			
5			

OVER ALL SCORE %	Upto 39% D	40-59% C	60-79% B	80% & Above A
------------------	-------------------	-----------------	-----------------	----------------------

KAHER,s
Re-accredited 'A' Grade by NAAC (2nd cycle).
Placed in category 'A' by MHRD (GoI).
Shri B. M. Kankanawadi Ayurveda Mahavidyalaya
Post Graduate Studies and Research Centre, Shahapur, Belagavi-03
(India's only institution with NAAC &NABH Accreditation in AYUSH sector)

Hospital Management

Choice Based Credit Course

DEPARTMENT OF BASIC PRINCIPLES

Aims and Objectives

- To provide conceptual understanding of Management
- To familiarise with the healthcare environment
- To understand the concepts of management with relevance to hospitals
- To get acquainted with the legal provision and issues related to health care
- To understand the importance of patient care management in the future perspective

Type of course: Add on course.

- **Eligibility: Internees.**
- **Language:** English.
- **Intake capacity:** Minimum 20, Maximum 35.
- **Duration :** 50 Hrs
- **Evaluation -** MCQ based assessment
- **Five credits of each 10 hours.**

- **Teaching learning methods :**

Didactic lectures, A.V Lectures, Assignment, Demonstration

Name of the Credit course - Hospital Management

Total Hours-50**1st credit****10 Hours**

Sl No.	Name Of The Topic	Contents	Hours	Teaching And Learning Methodology
1	Nature of Management	<ul style="list-style-type: none"> ✓ Social Responsibilities ✓ Managerial Skills 	2 Hrs.	Didactic / A.V Lectures
2	Introduction to Staffing	<ul style="list-style-type: none"> ✓ Directing and Controlling Functions ✓ Authority and Responsibility Relationships ✓ Interdepartmental Coordination 	2 Hrs	Didactic / A.V Lectures
3	Book-keeping and accounting	<ul style="list-style-type: none"> ✓ Preparation of Journal, Ledger ✓ Profit and Loss Account and Balance Sheet 	2 Hrs	Didactic / A.V Lectures
4	Marketing and Marketing Management,	<ul style="list-style-type: none"> ✓ Price Decisions ✓ Pricing objectives ✓ Pricing polices ✓ Promotion and Advertising - Sales Promotion ✓ Strategic choice-competitor and SWOT analysis 	2 Hrs	Didactic / A.V Lectures

2nd credit**10 Hours**

Sl no.	Name of the Topic	Contents	Hours	Teaching and learning methodology
1	Conceptual Approach to Understand the Health Care Systems Out Patient and In Patient services	<ul style="list-style-type: none"> ✓ Medical Services (Kayachikitsa) ✓ Surgical Services (Shalya Chikitsa) ✓ Pediatric services (Kaumarabritya) ✓ Dental services (Shalakya – Danta) 	3 Hrs	Didactic lectures, A.V Lectures
2	Conceptual Approach to Understand the Health Care Systems Out Patient and In Patient services	<ul style="list-style-type: none"> ✓ Psychiatric services (Manasaroga) ✓ Casualty & Emergency services (Atyayika) ✓ Hospital Laboratory services (Roga Nidana) ✓ Anaesthesia services (Sagyaharana) 	3 Hrs	Didactic lectures, A.V Lectures
3	Conceptual Approach to Understand the Health Care Systems Out Patient and In Patient services	<ul style="list-style-type: none"> ✓ Obstetrics and Gynaecology services (SRPT) ✓ Neurology services. (Vata Vyadhi) ✓ Purificatory (PK) ✓ Eye and ENT (Shalakya) ✓ Infertility (Vajikarna) 	4 Hrs	Didactic lectures, A.V Lectures

3rd credit

10 Hours

Sl no.	Name of the Topic	Contents	Hours	Teaching and learning methodology
1	Knowledge of Health Care Sectors	<ul style="list-style-type: none"> ✓ Primary care ✓ Secondary care ✓ Tertiary care ✓ Rural Medical care 	2 Hrs	Didactic lectures, A.V Lectures
2	Knowledge of Health Care Sectors	<ul style="list-style-type: none"> ✓ Urban medical care ✓ Curative care ✓ Preventive care ✓ General & special Hospitals 	2 Hrs	Didactic lectures, A.V Lectures
3	Knowledge of Health Care Sectors	<ul style="list-style-type: none"> ✓ Understanding the Hospital Management ✓ Role of Medical, Nursing Staff ✓ Paramedical and Supporting Staff ✓ Health Policy ✓ Population Policy ✓ Drug Policy 	6 Hrs	Didactic lectures, A.V Lectures

4 th credit

10 Hours

Sl no.	Name of the Topic	Contents	Hours	Teaching and learning methodology
1	Hospital as a system : Knowledge on Basic need of a Hospital	Knowledge on Basic need of a Hospital <ul style="list-style-type: none"> ✓ Land requirements for Hospital ✓ Project cost ✓ Space requirements ✓ Hospital drawings & documents ✓ Equipping a hospital ✓ Interiors & graphics ✓ General standards ✓ Mechanical standards ✓ Electrical standards ✓ Standard for centralized medical gas system ✓ Standards for biomedical waste 	3 Hrs	Didactic lectures, A.V Lectures
2	Technical analysis:	<ul style="list-style-type: none"> ✓ Assessment of the demand and need for hospital services ✓ Factors ✓ Influencing hospital utilization ✓ Bed planning 	2 Hrs	Didactic lectures, A.V Lectures
3	Laws and regulations relating to Hospital formation	<ul style="list-style-type: none"> ✓ Law of contracts ✓ Law of Insurance ✓ Filing Returns and Deductions at Source. 	2 Hrs	Didactic lectures, A.V Lectures
	Laws pertaining to Health:	<ul style="list-style-type: none"> ✓ Central Births and Deaths Registration Act, 1969- ✓ Recent amendments ✓ Medical Termination of Pregnancy Act, 1971 ✓ Medical Negligence ✓ Medico Legal Case ✓ Dying Declaration. ✓ The Biomedical Waste (Management and Handling) Rules ✓ Radiation Safety System. 	3 Hrs	Didactic lectures, A.V Lectures

5th credit

10 Hours

SL NO.	NAME OF THE topic	CONTENTS	HOURS	Teaching and learning methodology
1	HOSPITAL OPERATIONS MANAGEMENT	<ul style="list-style-type: none"> ✓ Front Office ✓ Admission ✓ Billing ✓ Medical Records ✓ Ambulatory Care ✓ Death in Hospital ✓ Brought-in Dead ✓ Clinical Services ✓ Clinical Departments 	3 Hrs	Didactic lectures, A.V Lectures
2	Supporting Services	<ul style="list-style-type: none"> ✓ House Keeping ✓ Linen and Laundry, ✓ Food Services (Pathyahara) ✓ Pharmacy services (Bishajagara) ✓ Ambulance services 	2 Hrs	Didactic lectures, A.V Lectures/Demonstration
3	The Electronic health record	<ul style="list-style-type: none"> ✓ Functions of the health record ✓ Advantages and Disadvantages of the EHR ✓ Who owns the data? ✓ Security 	2 hr	Didactic lectures, A.V Lectures
4	Telehealth	<ul style="list-style-type: none"> ✓ Types of Technology ✓ Clinical initiatives ✓ Administrative initiatives ✓ Advantages and Barriers of telehealth ✓ Future trends 	3Hrs	Didactic lectures, A.V Lectures/Demonstration

Assessment – Assessment will be done base on the valuation of Individual Project submitted at the end of the course.

Module	Attendance score% (1 hour attendance =10%)	Performance score % (Based on Project evaluation 40%)
1		
2		
3		
4		
5		

OVERALL SCORE %	UP TO 39% D	40-59% C	60 -79% B	80% & above A

Reference Book for Hospital Management

1. Charaka Samhita-Ayurveda Dipika commentary by Chakrapani – By Chaukamba Oriental, Varanasi,2018(Reprint)
2. Susruta Samhita –by Dr. Anant ram sharma, Chaukamba Publication, New delhi
3. Principles & Practices of Cost Accounting – By N. K. Prasad,1996 – Books syndicate
4. Organisational Behaviour – By John W. Newstrom,2002 – Tata McGraw Hill
5. Hospital Planning & Administration – WHO Monograph Series 54,1966 – By R. Llewelyn, Davis & H.M.C. Macaulay – Indian Edition – Jaypee Brothers, New Delhi
6. Principles of Hospital Administration & Planning – By B.M. Sakharkar, 2009 – Japyee Brothers.
7. Healthcare System & Management – By S.L. Goel, 2001 – Deep & Deep Publisher.
8. Management of Hospital – By S.L. Goel & R. Kumar,2002 – Deep & Deep Publisher
9. Medical Records, Organisation & Management – By G.D. Mogli,2006 – Jaypee Brothers, New Delhi.
10. Effective Hospital Mangement – By Prajna Pai- The National Book Depot,Mumbai-2002
11. Hospital Administration and Planning – Dr A G Chandorkar – Paras Medical Publisher,Hyderabad-2004



KAHER's

Reaccredited 'A' Grade by NAAC (2 cycle) and
Placed in Category 'A' by MHRD (Gol)



Shri. B.M.K. Ayurveda Mahavidyalaya
Post Graduate Studies and Research Centre
Shahapur, Belagavi-590003, KARNATAKA

Department of Shalakyatantra

Ayurvedic Dentistry

Choice based credit course

About the Course:

The Choice Based Credit Course on ‘Ayurvedic Dentistry’ is an advanced step in developing the super specialty in the field of Ayurveda, as per the need of current era with unique combination of modern technology and Ayurvedic traditions. The course is designed to sensitize and train the learners on Ayurvedic dentistry by using special formulations and classical procedures. Thus the course will help learners to get a new perspective on dentistry.

Future Prospects & Placement:

An attempt is made to collect the golden mine of Ayurveda, so that this hidden wealth of knowledge can be easily understood, utilize/ practice and promote the health and hygiene of oral cavity by the Ayurvedic dentist as well as modern dentists. This Course will help the students, to learn and get practically trained on Oro-dental care by using different methodologies explained in classics as well as in modern and other gingiva-dental ailments. The student will become confident in this subject to practice Ayurvedic dentistry through Ayurveda and its principles. After completing the course, following will be scope for the students:

- 1) Oral hygiene for personal and family use.
- 2) Up gradation of knowledge in Ayurveda herbs, topical treatments and their uses in dentistry.
- 3) Value Addition in Ayurvedic clinics.

Aim:

1. To know the Dentistry (Danta Shastra) as per Ayurvedic view as local measures, surgical treatment and therapeutic measures.
2. To practice the chikitsa principles for the proper management of diseases by applying different Ayurvedic formulations
3. Practical exposure and surgical skill development in handling of surgical and para surgical conditions like scaling tooth extraction, lekhana karma, pratisarana, jaloukavacharan etc.

Type of Course: Add on course.

Specific learning objectives:

1. To train students on preventive oral health and promotion of positive oral hygiene through Ayurvedic perspective.
2. To introduce basic Shastras and their uses, in tooth scrapping, filling and extraction with modern correlation.
3. To know appropriate treatment modality for the particular stage of a disease, by selecting proper drug, formulation etc.

Eligibility: BAMS 4th Year Students

Language: The course language will be in English only.

Intake capacity: Minimum: 15 students; Maximum: 35 students

Duration: 50 hours

Evaluation: Assignment based Assessment

Five Credits (students will be awarded credits points after attending 80% of teaching and training schedule and after completion of the given Assignments)

Teaching learning Methods:

1. Teaching aids – Didactic Lectures / Guest lecture
 - Audio-visual Classes
 - Dental OPD exposure
 - Demo and Hands on training
2. Medicine Preparation (Hands on Training)
3. Clinics
4. Assignments

Credits: 5 Credits - 50 Hrs

Name of the Credits:

S.No	Name of the Credits	Total Hours / Credits
01	Introduction to Dentistry, Oral cavity hygiene and danta swasthya	10 hours
02	Clinical Examination of Gingivae and teeth as per Ayurveda and modern	10 hours
03	Disease review as per Ayurveda and modern in brief	10 hours
04	Treatment modalities as per Ayurveda and modern	10 hours
05	Benefits of Ayurvedic dentistry and Mukha Swasthya rakshana awareness programme and Survey Assessments and self-study	10 hours

S.N	Contents of the Credits	Total Hours / Credits	Teaching & Learning Methodology	Practicals
1.	<p>Introduction to Dentistry</p> <ul style="list-style-type: none"> • Dental Short Hand • common oro-dental problems and their prevalence • Causes of oral ill health • Links between oral & general health • Detailed Explanation of applied anatomical and physiological aspects of Mukha along with oral cavity parts - Gingiva and teeth <p>Oral cavity hygiene and danta swasthya Effective tooth brushing method (Danta dhavan vidhi)</p> <ul style="list-style-type: none"> • Types of Toothbrushes- Manual Toothbrushes Electric Toothbrush Baby Toothbrush Kid's Toothbrush Environmentally Friendly Toothbrush Travel Toothbrush Chewable Toothbrush End Tuft Brush Sulcabrush Interdental Toothbrush • Types of Toothpaste (Danta manjana) Toothpaste for adults Smokers toothpaste Special toothpaste to combat hypersensitivity Whitening toothpaste Natural toothpaste Tooth powders • Mouth rinses, Kavala and Gandush • Interdental cleaning aids (dental floss)- Recommended Flossing Technique • Plaque Disclosing Agents, Mardana, Lepa and Pratisarana • Denture cleansers and fixatives, gutika dharana and charvana • Saliva substitutes, Jihwa nirlekhana • Patyaapatya 	04 Hrs	Lecture/AV class	06 Hrs

SCORE CARD

Module	Attendance Score % (1 Hour attendance =1%) 10%	Performance Score % Theory Internal Evaluation =1-20% MCQ	Performance Score % Practical Internal Evaluation =1- 20%
1			
2			
3			
4			

OVER ALL SCORE %	Up to 39% D	40-59% C	60-79% B	80%& Above A
-------------------------	--------------------	-----------------	-----------------	-------------------------

References

Sl. No	Name of Author/ commentators	Title of the book	Edition	Name of the publication
01.	Sushruta	Sushruta Samhita with Dalhana Commentary	1 st 2012	Choukhambha Surabharati, Varanasi
02.	Agnivesh	Charaka Samhita with Chakrapaani Commentary	RP 2011	Rashtriya Sanskrit Sansthan New Delhi
03.	Vruddha Vagbhata	Ashtanag Sangraha with Indu Commentary	RP 2000	Krishnadas Academy Varanasi
04.	Vagbhata	Ashtanga Hrudaya with Arunadatta & Hemadri Commentary	3 rd 2012	Choukhambha Sanskrit Series Varanasi
05.	Shri Laxmipathi Shastri	Yogaratanakar	8 th 2004	Choukhambha Sanskrit Sanstana Varanasi
06.	Dr G S Pandey	Bhavaprakash Nighantu	RP 2004	Chaukhamba vishwabharati Varanasi
07.	Kaviraj Shri Ambika datta shastri	Bhaishajya Ratnavali	16 th 2002	Choukhambha Sanskrit Sanstana Varanasi
08.	P.V.tiwari	Kashyapa Samhita	5 th 2000	Chaukhamba vishwabharati Varanasi
09.	V.B.Athavale	Dentistry in Ayurveda	1 st 1999	Choukhambha Sanskrit Pratisthana, Varanasi
10.	Jimmy R. Pinkham	Pediatric Dentistry	1 st 2012	Jaypee Brothers Medical Publishers (P) Ltd. New Delhi
11.	Rushik Dhaduk	Essentials of Dentistry	1 st 2010	Jaypee Brothers Medical Publishers (P) Ltd. New Delhi



HRI B.M.KANKANWADI AYURVEDA MAHAVIDYALAYA

A Constituent Unit of K.L.E.Academy of Higher Education and Research

(Deemed to be University)

Re-Accredited 'A' Grade by NAAC (2nd Cycle) II, Placed in Category 'A' by MHRD (GoI)

Shahapur, BELAGAVI-590003 KARNATAKA

Contact Phone No: +91-831-2486286

Website: www.kleayurworld.edu.in

Fax No: +91831-2424157

Email: bmprincipal@gmail.com



Choice based credit course on PHYSIOTHERAPY

Introduction:

KLE University, Belagavi aspires to reach the zenith of excellence in Medical Education, Research and HealthCare services at the national and international level.

Though the curriculum strives to empower the graduates to be efficient doctors a skill development course would benefit the quality of health care rendered. With this intention the institute proposes an add on course on physiotherapy, as research studies suggest that integrative management have better and quicker result, also minimizing the relapse of condition.

Physiotherapy is a field of health care that aims to rehabilitate and improve health of people with disabilities. Basic methods that are used include relevant exercises, motivation, adapted equipments, education and advocacy. It deals with the interaction between physical therapists and patients. The study field has many areas such as pediatrics, orthopedic, neurologic, geriatrics, cardiopulmonary, gynecology and many more.

The examples of few therapeutic practices includes electrotherapy, basic motor skill development of children with disabilities, pain management, exercise therapy and kinesiology. Throughout the study program students will have the possibility to develop practical skills in different physiotherapy modalities. Treating people with illnesses or disabilities involves good interpersonal skills and the ability to be empathetic and to understand every patient's needs. The program will also equip students with the knowledge and practical skills needed to utilize and produce high quality research.

Course details

On this course you will be taught by a range of staff with relevant expertise and knowledge appropriate to the content of the unit. This will include senior academic staff, qualified professional practitioners, demonstrators, technicians and research students.

Aim:

Course provides an evidence based approach to contemporary physiotherapy, promoting clinical excellence. Continued professional development is an integral part of the programme facilitating the development of essential communication and team working skills.

Objectives:

At the end of the course learners should be able to

- Develop basic understanding and clinical application of physiotherapy
- Practice the techniques of physiotherapy

- Impart the basic concept of physiotherapy and develop competence in giving physiotherapy for selected conditions.

Future prospects and placement:

- Implement and establish in clinical practice along with integration of physiotherapy
- Placement in Wellness clinics, Hospitals, and Healthcare centres
- Graduates can work in different health areas, such as hospitals, private or sport clinics, special schools, and community centres.

Nature of Course:

- Choice Based Credit Course

Eligibility:

- Final Year BAMS students

Duration:

- 50 Hrs

Language:

- English

Intake Capacity:

- Minimum 20 and maximum 35 Students

Evaluation: Assignment based Assessment

- Five Credits of each 10 hours (students will be awarded credits points after attending 80% of teaching and training schedule and after completion of the given Assignments)

Teaching learning Methods:

1. Teaching aids – Chalk & Talk method, Audio-visual lectures, Demonstrations
2. Didactic Lectures
3. Journals (Research articles on recent advances in physiotherapy)
4. Hands on Training
5. Assignments

Syllabus:

1. Development of Physiotherapy as a science.
2. Introduction of Physiotherapy.
3. Detailed Explanation of Physiotherapy
4. Physiotherapy in different conditions.
5. Exercise therapy and electrotherapy.
6. Different treatment approaches in physiotherapy.
7. Pain Management through Physiotherapy.
8. Appropriate techniques for common health conditions.
9. Physiotherapy in various conditions like:
 - Orthopedic conditions
 - Pediatric conditions
 - Obesity
 - Neurological conditions
 - Ergonomic in general
10. Guidelines for practice, stimulation techniques and addressing the specific conditions.
11. Benefits and importance of physiotherapy.

SYLLABUS

Sl no	Content	Teaching and learning methodology	Hours
Credit-1	Basic principles of anatomy and physiology: 10Hrs		
	1. Introduction of various Physiotherapy terminologies and various systems used.	Theory	02Hrs
	2. Musculoskeletal system, muscles origin and insertion along with action of the muscles.	Assignment / Group Discussion	02 Hrs
	3. Joints – classification, structures of joints, movements, joint normal ranges, limiting factors, stability, dislocations and applied anatomy.	Practical's/ Group Discussion	02Hrs
	4. To understand the applied Physiology of various systems with special emphasis on musculoskeletal and neurological required in the effective management of various disorders.	Theory	02Hrs
	5. Exercise Physiology of Fatigue, neuromuscular transmission, physiology of reflexes, touch, pain, muscle tone, voluntary and involuntary movements, and effects of exercises.	Theory/ group discussion / demonstrations	02Hrs
Credit-2	Basic principles of biomechanics: 10 Hrs		
	1. Definition of mechanics and Biomechanics, kinesiology, different forces composition, classification and resolution of forces.	Theory	02 Hrs
	2. Definition and classification of movements- active, passive assisted and resisted.	Practical's/ Demonstrations	02Hrs
	3. Aims and scope of various biomechanical modalities: Shoulder wheel, shoulder ladder, shoulder-pulleys, pronator/supinator instrument.	Group discussion	02Hrs
	4. Static cycle, rowing machine, ankle exerciser, balancing board, springs, weights, etc.	Practical's	02Hrs
	5. Assessment of range of moments by goniometer.	Demonstration	02Hrs

Credit-3	Principles of exercise therapy: 10Hrs		
	1. Techniques of active, passive assisted and resisted exercises.	Demonstration	02Hrs
	2. Relaxation techniques – jacobson’s, muscle contract relax technique, laura Mitchell.	Demonstration	02Hrs
	3. Group Therapies, Warm up and cool down exercises, stretching.	Demonstration	02Hrs
	4. Principles of manual therapy and its applications.	Theory and practical’s	02Hrs
	5. Facilitatory and inhibitory techniques.	Theory and demonstration	02Hrs
Credit-4	Principles of bio-electrical modalities:10Hrs		
	1. To understand the basic electrical equipment and their application in Electrotherapy Definition, description, therapeutic effects, physiological effects and indications, contraindications, dangers of heat.	Theory	02Hrs
	2. Transcutaneous electrical nerve stimulation application and Interferential therapy.	Theory and practical’s	02Hrs
	3. Hot moist packs along with other heating modalities and its application.	Group discussion	02Hrs
	4. Cryotherapy and traction and its application.	Theory and practical’s	02Hrs
	5. Recent updates in electrotherapy.	Theory	02Hrs
Credit-5	Physiotherapy Practice in various disorders:10hrs		
	1. Utility of electrotherapy and exercise therapy in various orthopedic conditions.	Theory and demonstration	02 Hrs
	2. Utility of electrotherapy and exercise therapy in various neurological conditions.	Theory and demonstration	02Hrs
	3. Applications of and electrotherapy exercise therapy in various pediatric disorders.	Theory/ Group discussion	02 Hrs
	4. Physiotherapy and its applications in obesity and fitness training	Group discussion	02 Hrs

SCORE CARD

CREDIT	Attendance Score % (1 Hour attendance =1%) 10%	Performance Score % Theory Internal Evaluation =1-20% MCQ	Performance Score % Practical Internal Evaluation =1-20%
1)			
2)			
3)			
4)			
5)			

REFERENCE BOOKS

S.No	Author	Name of the Book	Publisher
01	Inderbir Singh	Anatomy and physiology for physiotherapists	Anshan
02	Jutla Hochschild	Functional anatomy for physical therapists	Publisher: Thieme
03	John Low and Ann Reed	Basic biomechanics explained	Publisher: Butterworth Heinemann
04	Subhash Khatri	Basics of electrotherapy	Publisher: Jaypee
05	MargaretNordin, Victor Frenkel	Basic biomechanics of musculoskeletal system	Publisher: Wolters Kluwer
06	Pamela K Levangie	Joint structure and function – a comprehensive analysis	Publisher: F. A Davis
07	Subhash Khatri	Basics of orthopedic Physiotherapy	Publisher:Jaypee.
08	Carolyn Kisner	Therapeutic exercise – foundation and techniques	Publisher: F. A davis
09	Mohanty	Managing common musculoskeletal conditions by physiotherapy and yoga	Publisher : Jaypee
10	Glady Samuel raj	Physiotherapy in neuro conditions	Publisher : Jaypee

Credential course

On

Integrated Pain Management

Department of Shalya Tantra

Preamble of pain management clinic

It stands unique in its kind; an integrated approach to conquer the pain (acute and chronic) was the main aim of this unit. This facility was started in the year 2016 by integrating departments like Shalyatantra, Panchakarma, Kayachikitsa, Yoga and Physiotherapy. In Ayurveda the word pain is described with many synonyms like *vedana*, *shoola*, *dukh*, *rukha*, *ruja* etc, which implies pain is important entity for any kind of diseases and pain may be a symptom or autonomous disease.

In Ayurveda pain management can be done by *Aatyayekachikitsa* (emergency management) and *vyadhipratyanikachikitsa* (disease modifying management). Pain, being the major entity for which a patient approaches to a doctor for immediate relief, this can be achieved by *Aatyayekachikitsa* which includes different technique of pain management mainly by *Agnikarma*, *Raktamokshana*, *lepa*, *Avagaha*, *Parisheka* and *Upnaha* etc. While other treatment modalities like Panchakarma, Physiotherapy, Yoga and internal medication etc, as *vyadhipratyanikachikitsa* (disease modifying management).

This unit has given encouraging results in different type's pain management, so to propagate, practice and to validate the different modalities explained in ancient science of Ayurveda the credential course is planned.

INTEGRATED PAIN MANAGEMENT



AIM:

1. Management of pain through Integrative approach.

Objectives:

1. To understand Rationality of para-surgical procedures in pain management.
2. To understand recent advancement and evidence based practice in pain management.
3. To Acquaint, implement and future practice of all para-surgical procedures to manage pain according to SOP.

Learning Outcome:

1. Able to understand para-surgical procedures with evidence based practice
2. Able to understand the concepts of pain management through Ayurveda with scientific approach
3. Able to execute, implement & regular practice of all para-surgical procedures to manage pain according to SOP.

Pre – requisite(s):

1. Books (Reference books, compiling text books), Journals, Research articles and Internet sources, Thesis, AV aids/Photographs, Video and Models.
2. Patients with different types of Pain.
3. Instruments required for Agnikarma and different modalities of Raktamokshana

Type of Course: Add on course.

Future Prospects:

- Enhance the diagnostic & treatment skills in Pain management

Eligibility: Fourth Professional BAMS students

Language: English.

Intake Capacity: Minimum 15, Maximum 35

Duration: 50hrs

Evaluation: Assignment based Assessment

Five Credits:

- Each credit includes 10 hours
- After completion of each credit assessment & evaluation is done
- After completion of 5 credits, final assessment & feedback.

Teaching Learning Methods:

- Didactic Lectures, AV class, Demonstration & Hands on training.

Teaching methods and hours

Methods	:	Hours
Didactic classes and AV classes	:	23hrs
Video demonstration	:	3hrs
Demonstration / Hands on experience	:	19 hrs
Problem based learning	:	0 min
Group activity	:	0 min
Discussion	:	1hr
Role play	:	0 min

Assessment: Assessed for Knowledge, Skills, Attitude, Written Activity, Comprehension, and Questionnaire.

Syllabus:

1st-Credit Hours: 10hrs

Sl. No.	Content	Teaching & Learning Methodology	Time
1.	Anatomy of Nervous system		03hrs
	a. Anatomy of Neuron, structure of chemical synapse	Video demonstration	01
	b. Autonomous nervous system c. Peripheral nervous system	Didactic class	02
2.	Physiology of pain		02 hrs
	a. Cause of Pain, Types of Pain	Didactic class	01
	b. Pain pathways, Neuro-transmitter's c. Pain receptors and stimulation d. Neurochemical of pain (Pain initiators & Pain inhibitors)	Video demonstration	01
3.	Pathophysiology of Inflammation in concern to pain		03hrs
	a. Analyzing various types of pain with different clinical condition	Didactic class	01
	b. Classification of pain pathogenesis- Nociceptor pain, Neuropathic pain and Psychogenic pain	Didactic class	01
	c. Diagnosis and assessment of pain by serological markers	Didactic class	01
4.	Concept of Pain in Ayurveda		02hrs
	a. Understanding the concept of <i>Vedana, Ruk, Shoola</i> etc	Discussion	01
	b. Understanding the concept of different types of vedana in various clinical conditions	Didactic class	01

IInd-Credit Hours: 10 hrs

Sl. No.	Content	Teaching & Learning Methodology	Time
Management of pain in Kayachikitsa			03
1.	Concept of <i>Aatyayekachikitsa</i> (emergency management) and <i>vyadhipratyanikachikitsa</i> (disease modifying management) in concerned to pain.	Didactic class	01
2.	Ekamoolikaprayoga in pain management, recent research updates.	Didactic class	01
3.	Shaman yoga in pain management (shoolaprashamandashamaneeyaetc), recent research updates	Didactic class	01
Management of pain in Panchakarma			04
4.	Importance of Basti karma in pain management with indication and contra indications, recent research updates	Didactic class	01
5.	Importance of local Panchakarma therapies like –lepa, Pichu, Kati, Janu and greevabasti with its indications and contra indications, recent research updates	Demo/Hands on training	01
6.	Importance of Abhyanga and Swedakarma in concern to pain with indications and contraindications, recent research updates	Demo/Hands on training	01
7.	Importance of Panchkarmaprocedures as a Poorvakama before Anushalya karma	Didactic class	01
Management of pain in Yoga			03
8.	Nutrition & dietetic intervention in the management of Pain	Didactic class	01
9.	Role of Yoga in the management of Pain	Didactic class	01
10.	Role of Pranayama & Dhyana in the management of Pain	Didactic class	01

IIIrd-Credit Hours: 10hrs

Sl. No.	Content	Teaching & learning methodology	Time
Management of pain in Yoga			04
1.	Practice of Shavasana, padmasana, hastapadottasana, sarvangasana, bhujangasana, dhanurasana, etc.	Demo/Practice	02
2.	Practice of Yoga nidra, Omkaradhyana, Avartitadhyana	Demo/Practice	02
Management of pain in Physiotherapy			06
3.	Introduction to Electrotherapy and Concepts of TENSE, IFT & Ultrasound therapy in pain management	Didactic class	01
4.	i. Hands on training on TENSE	Demo/Practice	01
5.	ii. Hands on training on IFT	Demo/Practice	01
6.	iii. Hands on training on Ultrasound therapy	Demo/Practice	01
7.	Exercise techniques (stretching, strengthening & various types of exercises related to different clinical conditions)	Demo/Practice	01
8.	Manual mobilization techniques Cold & Hot packs	Demo/Practice	01

IVth-Credit Hours: 10hrs

Sl.No.	Content	Teaching & learning methodology	Time
1.	Management of pain in Shalyatantra		10
2.	Utility of protocol based Pain Management by using Agnikarma or Raktamokshana	Didactic class	01
3.	Assessment of Pain scale by different methods and their importance in concerned to NABH	Didactic class	01
4.	Concept of Rakta and importance of Raktamokshana in pain management	Didactic class	01
5.	Concept of Agnikarma in pain management with its indication and contra indications, recent research updates	Didactic class	01
6.	Hands on training of Agnikarma in various disorders according to SOP	Demo/Practice	02
7.	Concept of Siravyadha in pain management with indication and contra indication, recent research updates.	Didactic class	01
8.	Hands on training of Siravyadha in various disorders according to SOP	Demo/Practice	02
9.	Concept of Cupping therapy in pain management with its indication and contra indications, recent research updates	Didactic class	01

Vth-Credit Hours: 10 hrs

Sl. No.	Content	Teaching & Learning Methodology	Time
Management of pain in Shalyatantra			03
1.	Hands on training of Cupping therapy in various disorders according to SOP	Demo/Practice	01
2.	Concept of Jaloukacharan in pain management with its indication and contra indications, recent research updates.	Didactic class	01
3.	Hands on training of Jaloukacharana in various disorders according to SOP	Demo/Practice	01
Integrated protocols according to different conditions			04
4.	Integration of various departments and their roles in treating the pain a) Shalya tantra – Athyayika chikitsa b) Kayachikitsa – Shamanachikitsa c) Panchakarma – Shodhanachikitsa d) Yoga - Rehabilitation e) Physiotherapy–Palliative care f) Pathya - Shamanachikitsa		01
5.	Few examples of Pain management integrated protocols according to different conditions		03
6.	Assessment & Evaluation		02
7.	Feedback		01

SCORE CARD

CREDIT	Attendance Score % (1 Hour attendance =1%) 10%	Performance Score % Theory Internal Evaluation =1-20% MCQ	Performance Score % Practical Internal Evaluation =1-20%
1			
2			
3			
4			
5			

OVER ALL SCORE %	Upto 39% D	40-59% C	60-79% B	80%& Above A
------------------	----------------------	--------------------	--------------------	------------------------

Reference Textbooks

- 1) Textbook of Physiology - Gyton & Hall
- 2) A Textbook of Human Physiology – A.K.Jain
- 3) Essentials of Medical Physiology - Sembulingam, K.
- 4) Concise Medical Physiology - Chaudhari, Sujit K.
- 5) Principals of Anatomy & Physiology - Tortora & Grabowski
- 6) Textbook of Medical Physiology- Indu Khurana
- 7) Textbook of Physiology - Guyton and Hall
- 8) Astang Hridaya : Hindi commentary by Lalchanda Vaidya
- 9) Astang Hridaya : Hindi commentary by Vd. B.L. Gaur
- 10) Astang Hridaya : English commentary by Dr. T. Sreekumar
- 11) Astang Hridaya : English commentary by Dr. Vishwvasu Gaur
- 12) Sushruta Samhita : Hindi commentary by Dr Ambika dutt shastri
- 13) Charaka Samhita : Hindi commentary by Dr Kushwaha
- 14) Charaka Samhita : Hindi commentary by Dr Vidyadar Shukla
- 15) Sushruta Samhita : Hindi commentary by Dr Anantram Sharma
- 16) Astang Sangraha : English commentary by Dr. Srikanth Murthy
- 17) Wall & Melzack's Textbook of Pain - Stephen B. McMahon FMedSci FSB
- 18) Chronic Abdominal and Visceral Pain - Pankaj Jay Pasricha, William D. Willis
- 19) Textbook of pain - Wall & Melzack's
- 20) Atlas of Interventional Pain Management - Steven D. Waldman
- 21) Pain review - Steven D. Waldman
- 22) Practical Management of Pain - Steven D. Waldman
- 23) Textbook of pain - Honorio T. Benzon, James P
- 24) Clinical Methods in pain medicine - Pramod Kumar
- 25) BASICS PAIN MANAGEMENT - Gautam Das
- 26) Handbook of Pain Management - Gautam Das
- 27) Pain Medicine: An Essential Review - G P Dureja
- 28) Integrative Pain Medicine - Joseph F. Audette Allison Bailey
- 29) The Acupuncture Treatment of Pain - Leon Chaitow



KAHER's

Reaccredited 'A' Grade by NAAC (2 cycle) and
Placed in Category 'A' by MHRD (GoI)



Shri. B.M.K. Ayurveda Mahavidyalaya
Post Graduate Studies and Research Centre
Shahapur, Belagavi-590003, KARNATAKA

Ayurvedic Cosmetalogy and Cosmetics
Choice based credit course

Department of Kayachikitsa

About the Course –

The Choice Based Credit Course on ‘**Ayurvedic Cosmetology & Cosmetics**’ is an advanced step in developing the super speciality in the field of Ayurveda, as per the need of the current era with a unique combination of modern technology and Ayurvedic traditions. The course is designed to sensitize and train the learners on Ayurvedic beauty care regimens by using herbs and classical procedures. Thus the course will help learners to get a new perspective on cosmetology.

Course Scope

This Course will help the students, to learn and get practically trained on beauty enhancing techniques by using different herbal solutions for skin, hair and other cosmetic ailments. The student will become confident in this subject along with a deeper insight into beauty enhancement through Ayurveda and its principles. After completing the course, following will be the scope for the students :

1. Self care beauty regimens to be followed for personal and family use.
2. Entrepreneurship and setting up of own herbal Cosmetology clinic
3. Updation of knowledge in Ayurveda herbs and their uses in cosmetology.
4. Value Addition in Ayurvedic clinics.

AIM: Proficient to

- Understand and clinically imply the knowledge of Ayurveda in the field of cosmetology

Type of Course: Add on course.

Eligibility: Fourth Professional BAMS students

Language: English.

Intake Capacity: Minimum 15. Maximum 35

Duration: 35 hrs

Evaluation : Assignment based Assessment

Four Modules

Teaching Learning Methods:

Didactic Lectures, A.V lectures, Demonstration, Hands on Experience and Assignment

Syllabus:

- Concept Cosmetics and Cosmetology
- Application of Ayurveda in -
 - Skin and Face care
 - Hair care
 - Nail, Eye & Lip care
 - Foot & Hand care
 - Breast enhancement &
 - Post pregnancy scar marks management

Sr. No.	Module	Credits	Credits Description
1	Module 1 Skin & Face Care	3 Credits	Credit 1 : Basic Concepts of Cosmetology Credit 2 : Classical Skin Treatments & Evaluation of Skin Credit 3 : Skin Treatments : Hands On Experience
2	Module 2 Hair & Scalp Care	2 Credits	Credit 1 : Basic Concepts in Hair Care Credit 2 : Hair & Scalp Care Treatments
3	Module 3 Eye, Lip, Hand & Foot care	1 Credit	Credit 1 : Eye, Lip, Hand & Foot care
4	Module 4 Body care, Breast care, Treatment of Scar marks	1 Credit	Credit 1 : Body care, Breast care, Treatment of Scar marks

Module 1 - Skin & Face Care

3 Credits : 15 Hours

Credit 1 (Basic Concepts of Cosmetology) : 5 Hours

Sl No	Content	Teaching & Learning Methodology	Time
1	<ul style="list-style-type: none">● Introduction to Cosmetology and Cosmoceuticals with its scope● Concept of Beauty in Ayurveda● Concept of Inner Beauty	Lecture	1 hrs
2	<ul style="list-style-type: none">● Applied anatomy of Skin - Ayurveda & Modern● Applied physiology of Skin -<ul style="list-style-type: none">➤ Twak as adhasthan of dosha dushya indriya➤ Strotas vivechan in relation to skin➤ Varna Chhaya Prabha & their vikar➤ Role of Prakriti, Sara and Manas in healthy skin	Lecture and AV	2 hrs
3	<ul style="list-style-type: none">● Role of Dincharya & Rutucharya in maintaining beauty● Ayurvedic diet guideline for skin health● Concept of Cosmoceuticles● Yoga excercises for healthy skin● Role of Rasayana in promotion of Skin health	Lecture	2 Hrs

Credit 2 (Classical Skin Treatments & Evaluation of Skin) : 5 Hours

Sl No	Content	Teaching & Learning Methodology	Time
1	<ul style="list-style-type: none">● Useful Ayurvedic herbs in beauty therapy - varnya, rakta prasadak, twachya etc.● Skin care treatments in Ayurveda - Lepa , Pralepa, Pradeha,Udvartan, Dhoopan, Abhyanga, Swedan, Utsadan, avsadan, krishnikaran, Pandukarma, Pratisarana, Romsanjanana, Romashatana,Nasya,Kavala etc.	Lecture and AV	2 hrs
2	<ul style="list-style-type: none">● Examination and Understanding type and diseases of skin - Dry skin, Oily skin, Wrinkled skin, Hyperpigmentation, Hypopigmentation etc.	Lecture and Hands on practice	1hrs

3	<ul style="list-style-type: none"> ● Choosing suitable skin care product from available products in market ➤ Common chemical composition of various skin care products available - which are safe & beneficial ➤ Paraben free products ➤ Difference between ayurvedic and Herbal Products ➤ Choosing product according to skin type and need 	Lecture and AV	2 hrs
---	--	----------------	-------

Credit 3 (Hands on Treatments) : 5 Hours

Sl No	Content	Teaching & Learning Methodology	Time
1	<ul style="list-style-type: none"> ● Face care Treatments - ➤ Facial Marmas and their role in beauty therapy ➤ Skin cleansing, toning & Moisturising according to ayurveda ➤ Ayurvedic Face Massage (Mukhabhyang) ➤ Herbal Steaming (Swedan) ➤ Hebal Scrub (Utsadan) ➤ Face mask (Mukhlepa) ➤ Herbal Facials - Marma Facial, Rejuvenating Facial , Anti Tan Facial, Facial for Acne prone skin 	Lecture , Hands on Experience	2 hrs
2	<ul style="list-style-type: none"> ➤ Acne & Scar Treatments ➤ Hyper and Hypo pigmentation Treatments 	A-V classes and Hands on Experience	2 hrs
3	<ul style="list-style-type: none"> ● Assessment ➤ Concepts of Beauty and Cosmetology ➤ Skin Care ➤ Face Care 	Quiz & Problem based learning	1 hrs

Module 2 : Hair & Scalp Care

2 Credits : 10 Hours

Credit 1 (Basic Concepts in Hair Care) : 5 hrs

Sl No	Content	Teaching & Learning Methodology	Time
1	● Applied Anatomy and physiology of Hair (Ayurveda & Modern)	Lecture	2 hrs
3	● Role of Dincharya & Rutucharya in maintaining healthy hairs ● Ayurvedic diet guideline for healthy Hairs ● Yoga excercises for healthy Hairs ● Role of Rasayana in promotion of healthy Hairs	Lecture & AV	2 hrs
	● Useful Ayurvedic herbs in Hair care - Keshya, Keshranjan, Keshsanjanan	Lecture & AV	1 hrs

Credit 2 (Hair & Scalp Care Treatments) : 5 Hours

Sl No	Content	Teaching & Learning Methodology	Time
2	● Disorders of Hair and Scalp with their management through ayurveda - Dandruff, Hair fall, Graying of Hair, Alopecia, Thinning of hair, Split ends, infections due to parasites.	Lecture & AV	2 hrs
4.	● Hair care treatments in Ayurveda - ➤ Ayurvedic head massage (Shiroabhyang) ➤ Herbal Steam (Swedana) ➤ Hebal Fumigation (Dhoopana)	Lecture and Hands on Experience	2 hrs

	<ul style="list-style-type: none"> ➤ Herbal Hair Mask (Lepa) ➤ Herbal Hair Wash (Prakshalana) 		
5	<ul style="list-style-type: none"> ● Choosing suitable Hair care product from available products in market ➤ Common chemical composition of various Shampoo, conditioners available - which are safe & beneficial ➤ Difference between ayurvedic and Herbal Products ➤ Choosing product according to Hair type and need 	Lecture and AV	00:30 Hrs
6	<ul style="list-style-type: none"> ● Assessment - ➤ Hair care 	PBL & MCQ	00:30Hrs

Module 3 : Eye, Lip, Hand & Foot care

1 Credit (Eye, Lip, Hand & Foot care) :05 hrs

Sl no	Content	Teaching & learning methodology	Time
1	<ul style="list-style-type: none"> ● Eye care treatments - ➤ Dark circle treatments ➤ Anjana ➤ Tarpana ➤ Pindi ➤ Bidalak ➤ Eye wash ➤ Eye exercises 	Lecture & Hands on Experience	1.5 hrs
2	<ul style="list-style-type: none"> ● Lip care ➤ Cracked lips, Lip scrub, lip moisturizer, Dark lips 	Lecture	00: 30Hrs
3	<ul style="list-style-type: none"> ● Hand & Foot care ➤ Hand & Foot care Tips ➤ Hand & Foot care Massage ➤ Hand & Foot care Soaks ➤ Hand & Foot care Mask 	Lecture & Demonstration	1 Hrs

	<ul style="list-style-type: none"> ➤ Treatment of cracked heels (Vipadika) ● Nail care 		
4	<ul style="list-style-type: none"> ● Choosing suitable product from available products in market ➤ Common chemical composition of various Eye & Lip care products available - which are safe & beneficial ➤ Difference between ayurvedic and Herbal Products ➤ Choosing product according need 	Lecture and AV	1hrs
5	<ul style="list-style-type: none"> ● Assessment - ➤ Eye, Lip, Hand & Foot care 	Quiz And MCQ	1 hrs

Module 4 : Body care, Breast care, Treatment of Scar marks

Credit 1 (Body care, Breast care, Treatment of Scar marks) : 5 hours

Sl no	Content	Teaching & learning methodology	Time
1	<ul style="list-style-type: none"> ● Body care - ➤ Relaxation massage ➤ Rejuvenating massage ➤ Herbal body wrap ➤ Herbal body Scrub ➤ Herbal body Bath 	Lecture & Demonstration	2hrs
2	<ul style="list-style-type: none"> ● Anti perspiration treatments ➤ Herbal deodorants 	Lecture	00:30hrs
3	<ul style="list-style-type: none"> ● Removal of post pregnancy marks (Kikkishara yoga) 	Lecture	00:30hrs
4	<ul style="list-style-type: none"> ● Breast care ➤ Stan Vriddhikar & dhardhyakar chikitsa 	Lecture	1 hrs
5	<ul style="list-style-type: none"> ● Assessment - ➤ Body care, breast care, scar marks 	PBL & Quiz	1 hrs

SCORE CARD

Module	Attendance Score % (1 Hour attendance =1%) 10%	Performance Score % Theory Internal Evaluation =1- 20% MCQ	Performance Score % Practical Internal Evaluation =1- 20%
1			
2			
3			
4			

OVER ALL SCORE %	Upto 39% D	40-59% C	60-79% B	80% & Above A
-----------------------------	-------------------	-----------------	-----------------	--------------------------

References

1. Vaidya Jadavji Trikamji Acharya, Sushruta Samhita, Chaukhambha Surbharati Publications Varanasi,2012
2. Krishna Ramchandra Shastri Navre, Ashtang Hridayam, Krishnadas Academy Varanasi,2000
3. Vaidya Harish Chandra Singh Kushvaha, Charak Samhita,Chaukhambha Orientalia Varanasi,2014
4. Blossom Kochar, Hair, Skin and Beauty care, The complete Body Book, VBS publisher New Delhi, 2002.
5. Dr. Renugupta, Complete Beautician Course, Diamond Pocket books, Pvt. Ltd. New Delhi, 2001.
6. Madhumita Pauwal, Practical Guide to Beautician Training, Asian Publishers, New Delhi, 2002.
7. Charles Zviak, (1986), The Science of Hair Care, Taylor & Francis.
8. Dale H. Jhonson, (1997), Hair and Hair Care, Marcel Decker Inc., New York. 3. Claude Bouillon and John Wilkinson, (2005), The Science of Hair Care, Taylor & Francis.
9. Audrey Davis Sivasothy, (2012), Hair Care Rehab, The ultimate hair repair and reconditioning manual, Saja Publishing Company, LLC.
10. Meenakshi Sinha, Reena Rajgopal, Suchismita Banerjee, (2000), All You Wanted To Know About Hair Care, Sterling Publishers Pvt. Ltd., New Delhi.
11. Beatriz A. Adriano and Annabel L. Guardian, Beauty Care (Nail Care) Services, K to 12 – Technology and Livelihood Education

KAHER,s
Re-accredited 'A' Grade by NAAC (2nd cycle).
Placed in category 'A' by MHRD (GoI).
Shri B. M. Kankanawadi Ayurveda Mahavidyalaya
Post Graduate Studies and Research Centre, Shahapur, Belagavi-03
(India's only institution with NAAC &NABH Accreditation in AYUSH sector)

GARBHA SAMSKARA

(Preconception care and Prenatal Education)

CHOICE BASED CREDIT COURSE

DEPARTMENT OF PRASOOTI & STREEROGA

Course Title : Garbha samskara (Preconception care and Prenatal Education)

Aims and Objectives :

To Promote Healthy Pregnancy

Type: Credit course

Specific Learning Objectives

- Practices for Healthy pregnancy
- Overcome stress related to Pregnancy and Labor
- Promote Healthy Progeny

Future prospects & Placement

After completing this course a student will be able to:

- Practice as a routine during Antenatal / Prenatal period
- Candidate may be placed in Health sectors, AYUSH -Research units, MCH Research centres, Maternity homes and Well baby clinics

Eligibility : Third BAMS students

Language : English

Intake capacity: Minimum -15 Maximum - 35

Duration : 50 hours

Evaluation : Assignment based Assessment

Students will be awarded credit points after attending 80% of teaching and training schedule and completion of assignment

Teaching & Learning resources

Tutorials / Lectures

Audiovisual –Learning

Practical demonstration

Group activities

Case Recording & Assignment

SYLLABUS - 50 hours

CREDIT 1. Preconceptional care

Prerequisites for healthy progeny

Poorva Samyogavidhi - Shodhana

Grabhadhana vidhi

Genetic Counseling

Couple counseling

Specific case proforma

CREDIT 2. Pranayama & Asana during pregnancy

Sukshma vyayama during pregnancy

Pranayama during Pregnancy and Labor

Meditation during pregnancy

A-U-M chanting

OM meditation

Mudras used in meditation

Guidelines to practice Astanga yoga during pregnancy

Practice of Asanaas during pregnancy (Trimester wise)

CREDIT 3. Music & Mantra during pregnancy

Effect of mantra during pregnancy

Vedic chants during pregnancy

Specific mantras for healthy pregnancy

Effects of Stress on pregnancy

CREDIT 4. Diet during pregnancy

Masanumasika Gabhini Diet

Concept of balanced diet during pregnancy

CREDIT 5. Yoga / Post natal exercise and Postnatal diet

Assessment: Assessment will be done based on the Assignment submitted at the end of the course.

Module	Attendance score% (1 hour attendance =10%)	Performance score % (Based on Project evaluation 40%)
1		
2		
3		
4		
5		

OVERALL SCORE %	UP TO 39% D	40-59% C	60 -79% B	80% & above A

REFERENCE BOOKS

1. Daiva Vyapashraya Chikitsa (3rd Dimension Treatment Of Ayurveda) By Dr V N K Usha, Dr U. Govinda Raj, Choukhambha Orientalia, Varanasi
2. The Developing Human, Clinically Oriented Embrology 9 Th Edition By Keith L Moore, T V N Persaud, Mark G Torchia.
3. Clinical Obstetrics Case Based Approach, Editors Pushpa Mishra, Niharika
4. Dhiman, Anjali Tempe. An Official Publication Of (MAMC)
5. Clinical Cases in Obstetrics & Gynecology, By Haresh Udoshi., Arihant Publishers.
6. Care Of the Unborn Child with Yoga, By Shamanthakamani Narendran, 1st Edition: 2006, Jaypee Brothers Medical Publishers (P) Ltd.
7. A Handbook Of Theory, Practice And Application Of Yoga
8. A Practical Guide To 1 St Trimester Of Pregnancy, By Mala Arora , Ashok Sharma.
9. Ayurvediya Prasuti Tantra, Kendriya Bharatiya Chikitsa , New Delhi By Dr Shipra
10. Ayurvedic Garbha Sanskara, Tthe Art and Science of Pregnancy By Dr Balaji Tambe, 2nd Edition: 2011, Balaji Tambe Foundation.
11. Advanced Nutrition: Macronutrients, by Carolyn D Berdanier, 2nd Edition.
12. Obstetrics , 20th Edition , Edited By Luise C Kenny & Jenny E Myers
13. Essentials Of Obstetrics, Gita Arjun
14. Holistic Motherhood, By Shirin Venkataramani, 1st Edition: 2016, Jaypee Brothers Medical Publishers (P) Ltd.
15. Textbook of Physiotherapy for Obstetrics & Gynecological Conditions, By G.B. Madhuri, 1st Edition: 2007, Jaypee Brothers Medical Publishers (P) Ltd.



KAHE&R

Deemed to be University.Re-accredited 'A' Grade by NAAC (2nd cycle). Placed in Category 'A' by MHRD (GoI).

Shri B. M. Kankanawadi Ayurveda Mahavidyalaya

Post Graduate Studies and Research Centre,Shahapur,Belagavi-03

(India's only institution with NAAC &NABH Accreditation in AYUSH sector)

CHOICE BASED CREDIT COURSE

Single Drug Therapy

DEPARTMENT DRAVYA GUNA

KAHE&R

Deemed to be University.Re-accredited 'A' Grade by NAAC (2nd cycle). Placed in Category 'A' by MHRD (GoI).

Shri B. M. Kankanawadi Ayurveda Mahavidyalaya

Post Graduate Studies and Research Centre,Shahapur,Belagavi-03

(India's only institution with NAAC &NABH Accreditation in AYUSH sector)

KAHE&R
Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Post Graduate Studies and Research Centre,Shahapur,Belagavi-03
DEPARTMENT OF DRAVYA GUNA
CHOICE BASED CREDIT COURSE

Preamble:

- Need to Transform Ayurveda into dynamic, scientifically validated & Evidence based with extensive reorientations.
- To fulfill one of Trisutra of Ayurveda i.e Oushadha, Knowing the drug & Identifying the Drug is not sufficient. Applied aspect of a Drug is Utmost important for a clinician to claim result oriented practice & uplift Ayurveda.
- Lack of reliable and standardized drugs, cost effectiveness and uncertainty in the identity of the components used, are a few of the principal problems come across these days in the utilization of compound drugs in Ayurveda. There is thus an urgent need to re-stress the practice of single plant drug formulations recorded in the classical texts as well as recent drug research concern.
- To substantiate ethical practice principles-“Low Cost & High effective Therapy”.

Type of Course: Credit Course

Future -Prospects and Placements.

- Add on to Classical Orthodox Ayurveda Practice with LOW COST & HIGH EFFECTIVE THERAPY.
- Drug Counselor for Ayurveda pharmacy.

Eligibility:

- 2nd BAMS

Language:

English.

Intake Capacity:

Minimum 15. Maximum 35

Duration:

100 hrs

Evaluation:

Observation& Assignment Based Assessment.

Five Credits of each 20 hours (students will be awarded credits points after attending 80% of teaching and training schedule and after completion of the given Assignments).

Teaching Learning Methods:

Didactic Lectures, A.V lectures, Demonstration, Hands on training and Assignment.

Syllabus:

- Critical Analysis of Karmas of- PanchaMahabhoota Dravyas, RASA, GUNA, Vipak, VEERYA & Prabhava.
- Method Drug Selection, Probable mode of Action & Applied aspects according to different stages of Disease.

Karma Pradhan -

- | | |
|-----------------------------|--------|
| 1. Mootrala Dravyas- | 2drugs |
| 2. Medya Dravyas- | 2drugs |
| 3. Shothahara Dravyas- | 2drugs |
| 4. ShonitaSthapana Dravyas- | 2drugs |
| 5. Vedanasthapana Dravyas- | 2drugs |

Rasa Pradhaan-

- | | |
|-----------------|---------|
| 1. Madhur Rasa- | 2 drugs |
| 2. Amla Rasa- | 2 drugs |
| 3. Katu Rasa- | 2 drugs |
| 4. Tikta Rasa- | 2 drugs |
| 5. Kashya Rasa- | 2 drugs |

VeeryaPradhaan -

- | | |
|------------------|---------|
| 1. UshnaVeerya- | 2 drugs |
| 2. Sheetaveerya- | 2 drugs |

Guna Pradhaan -

1. Guru guna- 2 drugs
2. Laghuguna- 2 drugs
3. SnigdhaGuna 2 drugs
4. Rukshaguna- 2 drugs
5. Teekshnaguna- 2 drugs
6. SukshmaGuna- 2 drugs

VyadhiPradhan

- Jwarharadravyas. - 2 drugs
- Atisaarharadravyas. - 2 drugs
- Yoni Rogaharadravyas. - 2 drugs
- Swasaharadravyas.- 2 drugs.
- Arshohardravys 2 drugs

Critical analysis of Agryoushadhis of Charak&Vagbhat

(Drug Concern)

Examples;

- Vidanga Krimignanaam
- Kasekantakari.
- Vasa kasaswasraktapittaharanaam.
- Erandamoolavrusyavaathanam.
- Kahdirkustagnaanam.
- ShireeshVishgnanaam.

- VaatarsheChitrakaBhallataka.
- HaridraPramehaharanaam.

- **Knowledge of Drugs as per Recent Research concern.**

1. Rasona in Hyperlipidemia.
2. kapikachhu in Parkinsonisms.
3. SarpaGandha in Hypertension.
4. Chitraka&Bhallatak in cancer.
5. Lajjalu as nerve cell regenerator.
6. Pippali&haridra as Bioavalabililty booster.
7. Shatavari as phyto estrogen.
8. Vrukshamla for Obesity.
9. Draksha for Anemia

- **Knowledge of Single Drugs –Multiple actions**

1. Pippali
2. Shunti
3. Amlaki
4. Hareetaki
5. Aswgandha.
6. Eranda
7. Rasona
8. Hingu
9. Chitraka
10. Yastimadu

- Critical Analysis of karmas -mentioned in Charaka sutra sthan 4th chapter.
- Critical Analysis of SharngadharasamhitaPrathamKhanda 4th chapter

Credit No 1- 20 Hours

Sl.no	content	Teaching and learning methodology	Hours
1	Critical Analysis of PRUTHWI & AAP mahabhoota Dravyas – Guna & karmas	LECTURE & ASSIGNMENT	01 hours
2	Critical Analysis of AGNI, AAKASHA & VAYU mahabhoota Dravyas – Guna & karmas	LECTURE & ASSIGNMENT	01 hours
3	Critical Analysis Of MADHURA RASA- Guna, karma & Atisevan Janyavikara – as per Charak, Susruta, vagbhat	LECTURE & ASSIGNMENT	01 hours
4	Critical Analysis Of AMLA RASA- Guna, karma & Atisevan Janyavikara – as per Charak, Susruta, vagbhat	LECTURE & ASSIGNMENT	01 hours
5	Critical Analysis Of LAVAN RASA- Guna, karma & Atisevan Janyavikara – as per Charak, Susruta, vagbhat	LECTURE & ASSIGNMENT	01 hours
6	Critical Analysis Of KATU RASA- Guna, karma & Atisevan Janyavikara – as per Charak, Susruta, vagbhat	LECTURE & ASSIGNMENT	01 hours
7	Critical Analysis Of TIKTA RASA- Guna, karma & Atisevan Janyavikara – as per Charak, Susruta, vagbhat	LECTURE & ASSIGNMENT	01 hours
8	Critical Analysis Of KASHAY RASA – Guna, karma & Atisevan Janyavikara – as per Charak, Susruta, vagbhat	LECTURE & ASSIGNMENT	01 hours
9	Above Eight Assignments	Group Discussion (5 Groups-each Group-one Rasa & one Mahabhoota)	02 hours
10	Critical analysis of USHNA VEERYA-	Lecture	01 hours
11	Critical analysis SHEETA VEERYA-	Lecture	01 hours
12	Ushnaveerya Drugs & Sheetaveerya Drugs w.s.r to different rasas.	Assignment	01 hours
13	Understanding of VIPAKA- as per Ayurveda as well as contemporary perspective	Lecture	01 hours
14	Understanding of PRABHAV- as per Ayurveda as well as contemporary perspective	Lecture	01 hours
15	Critical analysis of GURU GUNA & LAGHU GUNA	Lecture	02 hours
16	Critical analysis of RUKSHA GUNA & SNIGDHA GUNA	Lecture	01 hours

17	Critical analysis of TEEKSHNA GUNA, SUKSHMA GUNA	Lecture	01 Hours
18	Assessment examination		01 Hours

Credit No 2- 20 Hours

Sl.no	content	Teaching and learning methodology	Hours
1	Basic applied concepts of Mootra, Medya & Shotha as per Ayurveda & contemporary.	Lecture & assignment	01 hours
2	Basic applied concepts of Rakta & Vedana as per Ayurveda & contemporary.	Lecture & assignment	01 hours
3	Applied aspect of Mootral Dravyas - Varun, Gokshur-	Lecture	01 hours
4	Applied aspect of Medya Dravyas - Brahmi, Jyotishmati	Lecture	01 hours
5	Applied aspect of Shothahara Dravyas - Gambhari, Agnimatnh	Lecture	01 hours
6	Applied aspect of Shonita Sthapana Dravyas - Lodhra, Sariva	Lecture	01 hours
7	Applied aspect of Vedana Sthapana Dravyas - Rasna, Guggulu	Lecture	01 hours
8	Applied aspect of other Mootral, Medya, Shothahara Drugs	Assignment & Discussion	02 hours
9	Applied aspect of other Vedana Sthapana & shonit Sthapana.	Assignment & Discussion	02 hours
10	Selection & application of Madhur Rasa drugs - Yastmadhu, Shatavari	Lecture	01 hours
11	Selection & application of Amla Rasa drugs - Vrukshamla, Nimbuka	Lecture	01 hours
12	Selection & application of Katu Rasa - Mareech, Shigru	Lecture	01 hours
13	Selection & application of Tikta Rasa Drugs - Nimba, Vasa	Lecture	01 hours
14	Selection & application of Kashya Rasa drugs - Kutaj, Aswatha	Lecture	01 hours
15	Selection & application of other Madhur rasa, Amla rasa & Katu rasa Drugs	Assignment & Discussion	01 hours
16	Selection & application of other Tikta & Kashay rasa drugs	Assignment & Discussion	01 hours
17	SKANDA Dravyaas - Madhura, Amla, Lavana, Katu, Tikta, Kashayaskanda	Assignment	01 hours
18	Assessment-Examination		01 Hours

Credit No 3- 20 Hours

Sl.no	content	Teaching and Learning Methodology	Hours
1	MOA by virtue of UshnaveeryaDravya-Bhallataka ,Trivrut	LECTURE	01 hours
2	MOA by virtue of Sheetaveeryadravya-ChandanaUshir	LECTURE	01 hours
3	Other Ushna&SheetaVeeryadrayvas-	Assignment &Discussion	02 hours
4	GURU GUNA PradhanDravya- Bala,Yastmadhu	LECTURE & ASSIGNMENT	01 hours
5	LAGHU GUNA PradhanDravya- Patha,Sariva	LECTURE & ASSIGNMENT	01 hours
6	RUKSHA GUNA PradhanDravya- Vata,Mareecha	LECTURE & ASSIGNMENT	01 hours
7	SNIGDHA GUNA PradhanDravya- Tila,Sarsapa	LECTURE & ASSIGNMENT	01 hours
8	TEEKSHNA GUNA PradhanDravya- Danti, Hingu	LECTURE & ASSIGNMENT	01 hours
9	SUKSMA GUNA PradhanDravya- ERANDA,Hareetaki	LECTURE & ASSIGNMENT	01hours
10	Identifying Guru, Laghu&rukshaGunapradhan Drugs	Assignment	02 hours
11	Identifying Snigdha, Teeksna&SuksmaGunapradhan Drugs	Assignment	02 hours
12	MOA of JwaraharaDravya s-Vatsanabh, Guduchi	LECTURE	01 hours
13	MOA of AtisaarharDravya s-Kutaj, Dadima	LECTURE	01 hours
14	MOA of Yoni rogaharaDravya s-Kumari, Ashok	LECTURE	01 hours
15	MOA of SwasharaDravyas –Tulasi,Bharangi	LECTURE	01 hours
16	MOA of ArshoharaDravyas- Suran,Triphala	LECTURE	01 hours
	Assessment examination		01 Hours

Credit 4- 20 Hours

Sl.no	content	Teaching and learning methodology	Hours
1	Justification -VidangaKrimignanaam-	LECTURE	01 hours
2	Justification –Kase kankari.	LECTURE	01 hours
3	Justification Vasa kasa wasraktapittaharanaam.	LECTURE	01 hours
4	Justification Erandamoolavrusyavaatharanam.	LECTURE	01 hours
5	Justification Kahdirkustagnaanam.	LECTURE	01 hours
6	Justification ShireeshVishgnanaam.	LECTURE	01 hours
7	Justification VaatarsheChitrakaBhallataka.	LECTURE	01 hours
8	Justification HaridraPrameharanaam	LECTURE	01hours
9	Justification VidangaKrimignanaam	LECTURE	01 hours
10	Justification of Other Agryoushadhis	Assignment & Group discussion.	03 hours
11	Updated Research Information & clinical practice-Rasona in Hyperlipidemia.	LECTURE	01 hours
12	Updated Research Information & clinical practice kapikachhu in Parkinsonisms.	LECTURE	01 hours
13	Updated Research Information & clinical practice SarpaGandha in Hypertension.	LECTURE	01 hours
14	Updated Research Information & clinical practice Chitraka&Bhallatak in Cancer.	LECTURE	01hours
15	Updated Research Information & clinical practice Shatavari as Phytoestrogen.	LECTURE	01 hours
16	Updated Research Information & clinical practice Pippali&Haridra as Bioavailability booster.	LECTURE	01 hours
17	Updated Research Information & clinical practice Vrukshamla for Obesity.	LECTURE	01 Hours
18	Assessment examination		01 Hours

Credit 5- 20 Hours

Sl.no	content	Teaching and Learning Methodology	Hours
1	Pippali&Rasona- Rationalization regarding multiple actions & multiple systems.	LECTURE	01 hours
2	Shunti&Hingu - Rationalization regarding multiple actions & multiple systems	LECTURE	01 hours
3	Amlaki&Chitraka - Rationalization regarding multiple actions & multiple systems	LECTURE	01hours
4	Hareetaki&Yastimadu - Rationalization regarding multiple actions & multiple systems	LECTURE	01 hours
5	Aswgandha&Eranda - Rationalization regarding multiple actions & multiple systems	LECTURE	01 hours
6	Critical Analysis of karmas & Drugs -mentioned in Charaka sutra sthan 4th chapter.	Assignment & Group discussion	06 hours
7	Critical Analysis of Contents of SharngadharasamhitaPrathamKhanda 4th chapter.	Assignment & Group discussion	04 hours
8	Bed side Clinical observations	Observation & Discussion	03 hours
9	Assessment Examination		01 hours

KLE University's
(RE-ACCREDITED 'A' GRADE BY NAAC & MHRD (GOI))
Shri.B.M.Kankanawadi Ayurveda Mahavidyalaya, Shahapur - Belagavi
(A Constituent Unit of KLE University, Belgaum)

Department of Swasthavritta & Yoga

CHOICE BASED CREDIT COURSE

Name of the course: The course shall be called “**Therapeutic Yoga**”

Aim:

1. Promoting positive health, prevention of stress related health problems and rehabilitation through Yoga.
2. Integral approach of Yoga Therapy to common ailments.
3. Imparting skills in students to introduce Yoga for health, holistic living and positive health.

Type of Course: Add on Course

Specific learning objectives:

1. To bring all round personality developments of the students at all levels and train them in Yogatherapy field.
2. To introduce basic concepts of preventive health and health promotion through Yoga
3. To train students on preventive health and promotion of positive health through Yoga
4. To assist the Medical Personnel / Physician to helping Patients undergo integrated health care systems.

Future Prospects & Placement:

With the rise in reputation of holistic & alternative medical care, a lot of weight is being given to Yoga Teachers & so it has resulted in becoming a great career choice. Fitness is the call of today's world, raising the need for a **Yoga Instructor or Teacher** on the global platform. After completing the course (BAMS), a student can look for jobs in the following areas.

- Yoga Instructor / Yoga Teacher / Yoga Trainer
- Yoga Therapist

Eligibility: BAMS 3rd Year Students

Language:The course language will be in English only.

Intake capacity: Minimum: 15 students;

Maximum: 35 students

Duration:The duration of the course will be 100 hours.

Evaluation: Assignment based Assessment

Five Credits of each 20 hours (students will be awarded credits points after attending 80% of teaching and training schedule and after completion of the given Assignments)

Teaching learning Methods:

1. Teaching aids – Chalk & Talk method
 - Audio-visual aid
 - Demo
2. Didactic Lectures
3. Journals (Research articles on Yoga)
4. Yoga practice (Hands on Training)
5. Clinics
6. Assignments

Credits:20 hrs x 5 Credits =100 hrs

Name of the Credits:

Sl.no	Name of the Credits	Total Hours / Credits
1	Yoga as a Lifestyle; Yoga Therapy – A Scientific view	20 hrs
2	Management of Diseases through Yogic Intervention	20 hrs
3	Personality development through Yoga	20 hrs
4	Advance Yoga Techniques	20 hrs
5	Counselling &Dietetics in Yoga Therapy	20 hrs

Theory classes:

100 hours & GSL + Assignments: 140 hours ----- 8 credits

Practical classes:

50 practical = 100 hours+ PBL / Project work: 140 hours ----- 8 credits

Total credits (Teaching & Learning) ----- 16 credits

Theory Syllabus:

Sl.no	Contents of the Credit	Topics	Sub-topics	Teaching & Learning Methodology	Hours
1.	Yoga as a Lifestyle	Concept of Yoga	Origin of Yoga; various Definitions of Yoga	Lecture	4hrs
			Pre-requisites of yoga practice		
			Yama & Niyama: Yogic Life Style		
2.	Yoga in Scientific View	Introduction to Asanas & Pranayama	Antiquity, Definition & Classification of Asanas & Pranayama	Lecture / Hands on Training	6hrs
		Concept of Shatkriyas	Importance of Shuddhi Kriyas in maintaining swaasthyata		
		Concept of Dhyana & Mudras	Technique & importance of Dhyana & Mudras		
3.	Yoga Therapy	Introduction to Therapeutic Yoga	Definition of Therapy; Need of Yoga as Therapy; Significance and Limitations of Yoga therapy	Lecture	2hrs
4.	Stress	Acute Stress	Definition of Stress- Modern View & Ayurveda view; Symptoms of Acute Stress; Signs described in Yoga-Sutras	Lecture / A-V Aid / Hands on Training	4hrs
		Yogic management of Acute stress	Breathing Techniques; Relaxative Asanas & Other Yogic Practices		
5.	Management of Diseases	Management of Depression	Symptoms and Signs; Yogic Management	Lecture / Demo / Hands on Training / Research based Published Journal articles	50hrs
		Schizophrenia	Signs and Symptoms; Yogic Management		
		Obesity Management	Signs and Symptoms; Yogic Management		
		Hypertension Management	Signs and Symptoms; Yogic Practices to manage the		

			Hypertension		
		Diabetes management	Signs and Symptoms; Yogic Practices to manage the Diabetes & its complications		
		Gout and other Arthritis	Signs and Symptoms; Yogic Practices to manage the Gout & other arthritis		
		Liver Problems and Management	Signs and Symptoms; Yogic Practices to manage the Liver problems		
		Management of Low Back Pain, osteo-arthritis, shoulder pain & cervical pain	Aetiologies, Signs and Symptoms; Yogic Practices to manage the Low Back Pain, osteo-arthritis, shoulder pain & cervical pain		
		Management of Digestive Problems	Yogic Practices to manage the Indigestion, Hyperacidity, Piles & Constipation		
		Management of Respiratory Problems	Yogic Practices to manage the sinusitis & allergic asthma		
		Management of Heart Disease	Yogic management of heart diseases		
		Management of Gynecological & Obstetrics Conditions	Yogic Practices to manage the menstrual irregularities, Polycystic Ovarian Disease, Pregnancy, Menopause		
		Management of Neurological problems	Yogic Practices to manage the Epilepsy, Parkinsonism, Dementia, Post Stroke Complications		
		Management of Immunological Diseases	Yogic Approach to boost the immunity		
		Management of Skin Diseases	Yogic Practices to manage the Skin allergies, Acne vulgaris, Psoriasis		

		Management of Endocrinological and Metabolic Disorder	Diabetes Mellitus (I&II) ii. Hypo and Hyperthyroidism iii. Obesity iv. Metabolic Syndrome		
6.	Yoga Injuries	Prevention and Management - Yoga Injuries	Causes of yoga practice related Injuries; Complications of Yoga Injuries Precaution during Asana, Pranayama To manage Yoga Schedule	Lecture / PBL / A-V Aids	2 hrs
7.	Personality development through yoga	Yogic Approach to various Personalities	Personality: Concept & Origin; Personality development through yoga at physical, mental, spiritual, emotional & Intellectual level.	Didactic lecture / Guest Lecture / Workshop	5hrs
8.	Counselling in Yoga Therapy	Yogic counselling	Techniques of Yogic Counselling	Lecture / Demo	3hrs
9.	Medical Implications of Abnormal Behaviour & Effect of Yogic Techniques	Research based practical yoga techniques for Stress, Anxiety & Emotional Disorders Therapeutic Implications of Shavasana & Dhyana (Meditation) Clinical evidences of Therapeutic role of Shatkriya in Yoga therapy	Role of Omkar & its implications in Yoga Therapy; Therapeutic effect of Shavasana & Dhyana (Meditation) Therapeutic role of Shatkriya (six purificatory measures in Yoga)	Hands on Training / Demo / Workshop / Guest Lecture	8hrs
10.	Advance Yoga Techniques	Various Relaxation Techniques	1. Cyclic Meditation 2. Various Relaxation techniques 3. MSRT (Mind Sound Resonance Technique)	Hands on Training / Demo / Workshop / Guest Lecture	8hrs

11.	Dietetics in Yoga Therapy	Concept of Yogic view on Diet	Pathyahara during Yoga practice; Concept of Mitahara in yoga	Lecture / Guest lecture / PBL	8hrs
			Importance of Satwikaahara in yogic practice for maintaining positive health		
			Detrimental effects of Raajasika&Taamasikaa hara in Yoga & overall health		

PRACTICALS:

1. **Loosening Exercises** (Shithilikarana Vyayama):[2 Hrs]

2. **Practice of Suryanamaskara**[2Hrs]

- Surya Namaskara – 12 rounds

3. **Practice of Therapeutic Yogasanas**[50Hrs]

Sl.no	Diseases	Practices of Therapeutic Asanas (Indications)
1.	Arthritis:	Shashankasana, Setu-Bandha Sarvangasana, Purna-Salabhasana, Setubandhasana, SkandhaKatiasana, Uttanatadasana, Katichalana
2.	Asthma:	Siddhasana, Shirshasana, Sarvangasana, Matsyasana, Ardha-Matsyendrasana, Supta-Vajrasana, Bhujangasana, Paschimottanasana, utthitapadmasana, Gomukhasana, Sasankasana, Halasana, SkandhaKatiasana, Chakrasana, Shavasana
3.	Backache:	Dhanurasana, Setu-Bandha-Sarvangasana, Marjalasana, Bhujangasana, Gomukhasana, Matsyasana, Shirshasana, Akarna-Dhanurasana, Sarvangasana, Chakrasana, Ardha-Matsyendrasana, Matsyendrasana, Supta-vajrasana, Ardha-Pavanmuktasana, Skandhakatiasana, Katichalana, Skandhasana, Hasta-parshvasana, Simhasana, Naukasana
4.	Bronchitis:	Bhujangasana, Matsyasana, Purna-Salabhasana, Padmasana, Sarvangasana, Lolasana, UttanTadasana
5.	Rhinitis(Cold)	Simhasana, Paschimatanasana, Ushtrasana, Shalabhasana, Dhanurasana, Matsyasana
6.	Constipation:	Hastapadasana, Shirshasana, Pavanamuktasana, Halasana, Akaran-Dhanurasana, Matsyendrasana, VajrasanaUttana-Padmasana, Halasana, Chakrasana, Sarvangasana, Pavanmuktasana, SkandhaKatiasana, Dhanurasana, Bhujangasana, Shalabhasana, Vajrasana Hasta-Parshvasana, Mandukasana, Shirshasana
7.	Depression:	Yogasana, Shavasana, Hasta-paadasana, Parvatasana, Shirshasana, Trikonasana
8.	Diabetes:	Shavasana, Bhujangasana, Mayurasana, Halasana, Sarvangasana, Matsyendrasana, Yogasana, Mandukasana, Utthita-Padmasana, Halasana, Skandha-Katiasana, Chakrasana, Shalabhasana, Dhanurasana, Ardha-matsyendrasana, Paschimatanasana, Mayurasana

9.	Gall Bladder disorders:	Dhanurasana, Bhujangasana, Mayurasana, Trikonasana
10.	Headache:	Shavasana
11.	Indigestion:	Lolasana, Kati-Chakrasana, Bhujangasana, Shavasana, Tadasana, Mayurasana, Halasana, Sarvangasana, Matsyendrasana, Yogasana, Vajrasana, UtthitPadmasana, Katichalana, Vajrasana, Mandukasana, Shirshasana, Ardha-matsyendrasana, Sarvangasana
12.	Insomnia:	Bhujangasana, Shavasana, Purna-Salabhasana, Tadasana, Halasana, Sarvangasana.
13.	Kidney Disorders:	Dhanurasana, Bhujangasana, Purna-Salabhasana, Sarvangasana, Matsyendrasana, Vakrasana
14.	Liver Disorders:	Pariipurna-Navasana
15.	Menopause Disorders:	Marjalasana, Bhujangasana, Shavasana, Ardha-Matsyasana, Halasana, Sarvangasana, Sitting series asana
16.	Menstrual disorders:	Marjalasana, Bhujangasana, Shavasana, Hastapadasana, Halasana, Shirshasana, Dhanurasana
17.	Neurological Disorders &	Shavasana, Shirshasana, Virasana-2, Siddhasana, Tadasana, Uttanasana, Sukhasana
18.	Obesity:	Dhanurasana, Bhujangasana, Hastapadasana, Halasana, Matsyendrasana, Mandukasana, Supta-Vajrasana, Paschimottanasana, Ardha-Matsyendrasana, Ardha-PavanMuktasana
19.	Piles:	Ardha-Matsyasana, Shirshasana, Halasana
20.	Defective Posture:	Dhanurasana, Ushtrasana, Bhujangasana, Gomukhasana, Tadasana, Tiryaka-Tadasana, Trikonasana
21.	Rectal & Uterine Prolapse:	Shirshasana, Sarvangasana
22.	Prostate problems:	Vajrasana, Shirshasana, Sarvangasana, Matsyendrasana
23.	Reproductive system disorders:	Bhujangasana, Shirshasana, Halasana, Sarvangasana, Shavasana,

		Vajrasana
24.	Rheumatoid Arthritis:	Dhanurasana, Gomukhasana, Matsyendrasana, Trikonasana
25.	Sciatica:	Gomukhasana, Setu-Bandha-Sarvangasana, Katishaktiasana, Setubandhasana
26.	Sexual Disability:	Kapalbhati, Dhanurasana, Bhujangasana, Marjalasana, Adho-Mukha-Svanasana, Balasana-1, Shirshasana, Sarvangasana, Yogasana, Matsyendrasana
27.	Skin diseases:	Suryanamaskara, Yogasana, Bhujangasana
28.	Thyroid Disorders:	Setubandha-Sarvangasana, Adva-matsyasana, Sarvangasana
29.	Varicose Veins:	Shirshasana, Sarvangasana, All Inverted Postures
30.	Flatulence:	Pavanmuktasana
31.	Spondylitis	Setubandhasana, Merudandasana, Katishaktiasana, Bhujangasana, Padmasana
32.	High Blood Pressure	Uttan-Tadasana, Shavasana, UttanPadasana, Shalabhasana, Bhujangasana, Matsyasana, Shavasana
	Low Blood Pressure	Paschimottanasana, Shashankasana, Pavanamuktasana, Matsyasana, Shavasana,
33.	Urinary disorders	Ardha-matsyendrasana, Matsyasana, Shavasana

4. Breathing practices:[4 Hrs]

- Breathing Practices – Dog breathing,
 - Lion Breathing,
 - Tiger Breathing

Practice of Shatkriyas: [10Hrs]

- Kapalabhati
- Dhauti - Vamanadhauti, Vastradhauti
- Neti - Jalaneti, Sutra neti
- Nauli – Vamanauli, Dakshinanauli, Madhya nauli
- Trataka - Jyotitrataka
- Basti: Jalabasti, LaghuShankhaPrakshalana (Vaarisara)
- Gajakarani

5. Practice of Pranayama:[15Hrs]

- Surya AnulomaViloma Pranayama
- Suryabhedhi pranayama
- Chandra AnulomaViloma Pranayama
- Chandrabhedhi pranayama
- Nadishuddhipranayama
- Sheetalī pranayama
- Shitkari pranayama
- Bhramari pranayama
- Bhastrika pranayama
- Ujjayi pranayama

6. Practice of Mudrās:[6 Hrs]

- Nasika Mudra
- Chin Mudra
- Chinmaya Mudra
- Adi Mudra
- Brahma Mudra
- Ashvini Mudra
- Vayu mudra
- Agni mudra
- Prithvi mudra
- Tadagi Mudra
- Kaki Mudra
- ShambhaviMudra
- VipareetakaraniMudra

7. Meditation : [4Hrs]

- Transcendental Meditation
- OM Dhyana

8. Relaxation Techniques:[6 Hrs]

- Instant Relaxation Technique (IRT)
- Deep Relaxation technique (DRT)
- Mind sound Relaxation Technique (MSRT)
- OM Meditation

Reference Books:

Sl. No	Name of Author/ commentators	Title of the book	Edition	Name of the publication
1.	MuktiBhodanand	HathayogaPradeepika	2011	Thomson Press India, Ltd; Bihar School of Yoga, Munger
2.	Shweta Bhat	Gheranda Samhita	2001	Krishnadas Academy
3.	James Mellinson	Shiva samhita	2007	Yogavidya.com; pobox.no-569; Wordstock, NY-12498- 05669 USA
4.	MaharshiPatanjali. Karambelkar	Patanjal Yoga Sutra	2002	Ramakrishna Mission, Vivekananda University, W.Bengal
5.	Dr- Indra Mohan Jha	SachitraYogasanDarshika	2002	Choukhambha Sanskrit Series
6.	Geeta S Iyengar	Yoga – A Game For Women	RP - 2002	Allied Publication Ltd.
7.	Shri. B.K.S. Iyengar	Light on Yoga	2004	Harper Collins
8.	Shri.B.K.S. Iyengar	Light on Pranayama	2008	Harper Collins
9.	Shri.B.K.S. Iyengar	Light on PatanjalaYogasutra	2007	Harper Collins
10.	R.H.Singh	Foundation of The Contemporary Yoga	1991	Choukambha Sanskrit Pratishthan, Varanasi
11.	Nilima Patel	Yoga and Rehabilitation	2008	Jaypee Brothers Medical Publishers Pvt. Ltd. No. 10587/A, Jawad Building Behind Ramdev Hotel, Nehru Nagar Belgaum, Karnataka, 590010
12.	DayanandDongaonkar	Yoga Application for Low Back Pain	2008	Jaypee Brothers Medical Publishers Pvt. Ltd. No. 10587/A, Jawad BuildingBehind Ramdev Hotel, Nehru Nagar Belgaum, Karnataka, 590010
13.	S Dutta Ray	Yogic Exercises	RP 2008	Jaypee Brothers Medical Publishers Pvt. Ltd. No. 10587/A, Jawad BuildingBehind Ramdev Hotel, Nehru Nagar Belgaum, Karnataka, 590010
14.	Gore, M.M. Practices	Anatomy and Physiology of Yogic	2007	New Age Books, New Delhi.
15.	Coulter,H. David	Anatomy of Hathayoga	2007	MLBD, New Delhi
16.	Gharote, ManmathM. and	Application in Yoga	2008	Kaivalyadhama, Lonavla

	others			
17.	Kuvalyananda Swami	Asana	2008	Kaivalyadhama, Lonavla
18.	Saraswati, Swami Satyananda	Asana Pranayama & Mudra Bandha	1969	Bihar School Of Yoga, Munger
19.	Tiwari, O.P.	Asana Why and How?	2008	Kaivalyadhama, Lonavla
20.	Saraswati, Swami Satyanand	Asana, Pranayama, Bandha, Mudra	1995	Bihar School of Yoga, Munger
21.	Sarswati, Swami Niranjananand	DharanaDarshan	1996	Yoga Publication Trust, Munger.
22.	Buhnemann, Gudaum	Eighty four Asanas in Yoga	2007	D.K. Printworld Pvt. Ltd., New Delhi
23.	Bassavaraddi, I.V. & Pathak, S.P.	Hatha Yoga keAdharAvamPrayoga	2011	MDNIY, New Delhi
24.	Burley, Mikel	Hatha Yoga, Its Context Theory and Practice	2000	M.L.B.D. Delhi
25.	Korpall, Nitin & Shankar, Ganesh	HathaYoga and Human Health	2005	Satyam Publishing House, New Delhi
26.	Nagarathna,R. & Nagendra, H.R.	Integrated Approach of Yoga therapy for positive health	2011	S-VYASA, Bangalore
27.	Nagendra, H.R.	New Perspectives in Stress Management	1988	Vivekananda Kendra, Bangalore,
28.	Sri Krishna	Notes on Structure & Functions of Human Body and Effects of Yogic Practice on it	2003	Kaivalyadhama, Lonavla
29.	Basavaraddi, I.V. & others	Description about Cleansing Process Shatkarma: A Comprehensive Guide	2014	MDNIY New Delhi
30.	Saraswati, Swami Satyananda	Surya Namaskar	2001	Bihar School of Yoga, Munger.
31.	Gharote, M.L.	Teaching Methods for Yogic practices	2000	Kaivalyadhama Ashram, Lonavla
32.	Stephens, Mark	Teaching Yoga, Essential Foundation & Techniques	2014	North Astantic Books, California
33.	SwamiVivekananda& Swami Tapasyananda	The Four Yogas of Swami Vivekananda	1966	AdvaitaAshrama, Calcutta
34.	Sturgess, Stephen	The Yoga Book:A practical	2007	MotilalBanarsidass, Delhi
35.	Hall, C.S. &Lindzey, Gardner	Theories of Personality	2006	Wiley Eastern Limited, New Delhi
36.	Gharote, M.M. & others	Therapeutic references in Traditional Yoga Texts	2010	The Lonavla Institute, Lonavla,
37.	Joshi, K.S.	Yoga and Personality	1967	Udayana Publication, Allahabad
38.	Robin, Nagendra, H.R & Ford-Kohne, N.	Yoga for Common Ailments	1990	Simon & Schuster, U.K,
39.	Nagendra, H.R. & Others	Yoga in Education	1994	V.K. Yogas, Bangalore

40.	Joshi, K.S and Ganesh Shankar	Yoga KeSiddhantAvamAbhyas	2004	Madhya Pradesh Hindi Granth Academy, Bhopal
41.	Bassavaraddi,I.V. & Others	Yoga Therapy Series (I-X)	2011	MDNIY, New Delhi
42.	Swami Karmanand	Yogic Management of common disease	2001	Yoga Publication Trust, Munger
43.	Joshi, K.S.	Yogic Pranayama	2010	Oriental paper back, New Delhi
44.	Joshi, K.S.	Yogic Pranayama	2009	Oriental paper back, New Delhi
45.	Swami DhirendraBhramhachari	Yogic Sukshma Vyayama	2009	Dhirendra Yoga Publications, New Delhi.
46.	Swami Kuvalyananda&Vinekar, S.L.	Yogic Therapy	1963	Central Health Education Bureau, Govt. of India
47.	Swami Kuvalayananda&Vinekar S.L.	Yogic Therapy	1963	Central Health Education Bureau, Govt. of India.

Choice Based Credit Course

Ayur-Toxico-Dermatology

Department of Agadatantra

**KLE University's
Sri. B.M.K Ayurveda
Mahavidyalaya, PG Studies
& Research center, Belagavi**

KLE University's
(RE-ACCREDITED 'A' GRADE BY NAAC & MHRD (GOI))
Shri.B.M.Kankanawadi Ayurveda Mahavidyalaya, Shahapur - Belagavi
(A Constituent Unit of KLE University, Belgaum)
Department of Agadatantra

CHOICE BASED CREDIT COURSE

Name of the course: *Ayur-Toxicodermatology*

Aim:

1. To update the current etiology of dermatological manifestation.
2. To establish the significance of Agadatantra in the management of current day dermatological manifestations.
3. To enable the students to diagnose and manage the dermatological manifestations caused by the exposure to toxins.

Type of Course: Add on Course

Specific learning objectives:

1. To understand current etiology of dermatological manifestations.
2. To understand the role of Agadatantra in the management of skin diseases.
3. To impart the clinical diagnostic skills of skin diseases.
4. To train students on simple and easy therapeutic procedures used in the management of Skin diseases.

Future Prospects & Placement:

Due to urbanization and modern day life style the prevalence of skin diseases is increasing. The conventional line of treatment approach is not giving expected results as the current day etiology has show sea change from the conventional etiology. Hence the students getting trained under this course will be enabled to get thorough diagnostic and management skills using the concepts of Agadatantra. This course will enable the students to practice Ayur-Toxicodermatology with more precision and better outcome.

Eligibility: Those who have passed I BAMS and taken admission to II BAMS

Language: The course language will be in English only.

Intake capacity: Minimum: 15 students;

Maximum: 35 students

Duration: The duration of the course will be 100 hours.

Evaluation: Assignment based Assessment

Five Credits of each 20 hours (students will be awarded credits points after attending 80% of teaching and training schedule and after completion of the given Assignments)

Teaching learning Methods:

1. Teaching aids – Chalk & Talk method
 - Audio-visual aid
 - Demo
2. Clinics & Examination of Skin patients
3. Hands on training on Lepa, Pracchanna etc. procedure.
4. Case presentation and case evaluation and theory related assignments.

Credits: 20 hrs x 5 Credits =100 hrs

Name of the Credits:

Sl.no	Name of the Credits	Total Hours / Credits
1	Fundamentals (Basics and Etio-pathogenesis)	20 hr
2	Ayurvedic perspective of Skin disorders	20 hr
3	Diagnosis of Skin Manifestation	20 hr
4	Ayurvedic Management of Skin Manifestations	20 hr
5	Clinical posting for Skill development	20 hr

Syllabus of Ayur-Toxico-Dermatology

I. Fundamentals (Basics and Etio-pathogenesis)

A. Introduction and Basics of Skin in Ay

B. urveda and Modern Science:

1. Scope of Ayurvedic Dermatology
2. Anatomy and Physiology of Skin- Ayurvedic and Modern
3. Applied anatomy and Applied physiology of Skin – Ayurvedic and Modern
4. Relation of Dosha, Dhatu, Mala, Ahaara, Vihara, Prakruti and Mana with Skin
5. Knowledge of Varna, Chaya and Prabha.

C. Detailed Study of Etiology and classification of Skin Diseases (Both Ayurvedic and Modern):

1. Detailed knowledge of Various Etiologies of Skin manifestations-
 - a. Aaharaja Nidana, Viharaja Nidana, Manasika nidana,
 - b. Genetic Causes, Occupational Causes and Medicinal causes
 - c. Toxicological causes: Insect bites and stings, Contact poisoning etc
 - d. Hypersensitivity
2. Detailed understanding of Pathology of Skin manifestations
3. Detailed understanding of individual Signs and Symptoms of Skin manifestation – Ayurvedic and Modern
4. Classification of Skin manifestation
5. Prognosis of Skin diseases
6. Arishtas related with skin diseases
7. Introduction to study of Skin manifestations as Upadrava to other diseases

II. Ayurvedic perspective of Skin disorders

A. Detailed study of Kushta:

1. Brief knowledge of etiology, pathology and prognosis of individual Kushta
2. Detailed study of Vataja, Pittaja, Kaphaja, Dvandvaja and Sannipataja Kushta along with their modern understanding

B. Detailed Study of Visarpa:

1. Brief knowledge of etiology, pathology and prognosis of different types of Visarpa
2. Detailed study of Individual visarpa along with their modern understanding

C. Detailed Study of Shwitra:

1. Detailed study of Shwitra along with its etiology, pathology, types (Stages) clinical presentation and prognosis

D. Detailed Study of Kshudra rogas:

1. Detailed knowledge of individual Kshudra rogas along with their Etiology, Clinical presentation, Prognosis and their modern understanding

E. Detailed study of Skin manifestations due to Occupation and Contact Poisoning:

1. Role of Contact poisoning and Occupation in skin manifestation
2. Detailed study of Paaduka visha, Abhara visha, Lepa visha, Vastra visha etc
3. Detailed study of Contact dermatitis and Occupational skin disorders
4. Detailed study of Skin manifestations due to Insect bites and stings

III. Diagnosis of Skin Manifestation:

1. Ayurvedic Diagnosis of various skin manifestations
2. Modern diagnosis of various skin manifestations
3. Laboratory investigations helpful in the diagnosis of skin manifestations

IV. Ayurvedic Management of Skin Manifestations:

1. Detailed knowledge of various Shodhana in the management of Skin manifestations
2. Detailed study of Bahya parimarjana chikitsa in the management of Skin manifestations
3. Detailed study of Shamana chikitsa in the management of various skin manifestations
4. Detailed study of Shastra and Anushastra karma in the management of various skin manifestations Like Kshara karma, Agni karma, Shastra karma etc.
5. Detailed study of Visha chikitsa in the management of various skin manifestation
6. Detailed study of various Rasayanas in the management of various skin manifestations
7. Detailed study of various ganas useful in the management of skin manifestations like Varnya, Kandughna, Kushtaghna etc.
8. Detailed study of Manasika swasthya in the management of Various skin manifestations
9. Detailed study of Pathya and Apathya in the management of Various Skin manifestations
10. Detailed study of preventive measures in case of skin disorders

V. Clinical posting for Skill development

1. Practical demonstration of various skin presentations
2. Case taking and case paper writing
3. Practical demonstration of various external therapies like Lepa, Abhyanag, Raktamokshana etc.



Department of Roga Nidana

Naadi – Ayurvedic Approach for Diagnosis

Credential course

Aim: To understand the concept of Naadi in scientific manner.

Type of course: Credit course

Objectives:

- Method of examination of Naadi.
- To understand the pathological states of Naadi.
- Early diagnosis and prognosis in relation to pathological conditions.

Future prospects:

- To be a competent Naadi Vaidya.
- To ensure Naadi practice as a profession.

Eligibility:

Second year BAMS students

Language: English

Intake Capacity: Minimum 20. Maximum 35

Duration: 50 hours

Evaluation: Assignment based Assessment

Five Credits of each 10 hours (students will be awarded credits points after attending 80% of teaching and training schedule and after completion of the given Assignments)

Teaching Learning Methods:

Didactic Lectures, A.V lectures, Demonstration, Hands on training and Assignment

Syllabus:

1. Introduction to Naadi Pareeksha.
2. Synonyms of Naadi.
3. Naadi Shareeram
4. Panchabhautika and Doshika importance in Naadi.
5. Jeeva Naadi pareeksha.- Location, Holding, Duration
6. Physiological variations of Naadi.
7. Eligibility for Naadi pareeksha.
8. Naadi in various pathological states.
 - Vata prakopa
 - Pitta prakopa
 - Kapha prakopa
 - Sannipataja prakopa
 - Dwandva prakopa
9. Pathological conditions of Naadi in various diseases.
10. Naadi indicating prognosis.

1ST - Credit Hours: theory and practical 4 hrs and 6 hrs assignments

Sl No	Content	Teaching & Learning Methodology	Hours
1	• Introduction to Naadi Pareeksha	Lecture	1 hr
2	• Synonyms of Naadi and their importance	Lecture	1 hr
3	• Naadi Shareeram (peripheral pulses)	Lecture	2 hr
4	• Naadi Shareeram (peripheral pulses)	Demo/ Hands on training	6 hr

2nd - Credit Hours: theory and practical 4 hrs and 6 hrs assignments

Sl No	Content	Teaching & Learning Methodology	Hours
1	• Panchabhautika, Doshika importance in Naadi.	Lecture	1 hr
2	• Jeeva Naadi pareeksha.- Location, Holding, Duration	Lecture / Demo/ Hands on training	4 hr
3	• Physiological variations of Naadi.	Lecture/ Hands on training/ Discussion/ Assignment	5 hr

3rd - Credit Hours: theory and practical 2 hrs and 8 hrs assignments

Sl No	Content	Teaching & Learning Methodology	Hours
1	<ul style="list-style-type: none">Eligibility for Naadi pareeksha.	Lecture	1 hr
2	<ul style="list-style-type: none">Naadi in various pathological states.	Lecture/ Demo/ Hands on training	5 hr
3	<ul style="list-style-type: none">Naadi in various pathological states.	Discussion /Assignment	4 hr

4th - Credit Hours: theory and practical 2 hrs and 8 hrs assignments

Sl No	Content	Teaching & Learning Methodology	Hours
1	<ul style="list-style-type: none">Pathological conditions of Naadi in various diseases- Jwara , Ajeerna, Agnimandya, Shwasa,	Lecture / Demo/ Hands on training/ Assignment	6 hr
2	<ul style="list-style-type: none">Pathological conditions of Naadi in various diseases- Pandu, Atisara, Hridroga, Pakshaghata	Lecture / Demo/ Hands on training/ Assignment	4 hr

5th - Credit Hours: theory and practical 3 hrs and 7 hrs assignments

Sl No	Content	Teaching & Learning Methodology	Hours
1	<ul style="list-style-type: none">Naadi indicating prognosis.	Lecture	2 hr
2	<ul style="list-style-type: none">Naadi assessment in sadhya and Yasya roga	Lecture / Assignment	4 hr
3	<ul style="list-style-type: none">Naadi assessment in asadhya roga	Lecture / Assignment	4 hr

SCORE CARD

CREDIT	Attendance Score % (1 Hour attendance =1%) 10%	Performance Score % Theory Internal Evaluation =1- 20% MCQ	Performance Score % Practical Internal Evaluation =1- 20%
1			
2			
3			
4			
5			

OVER ALL SCORE %	Upto 39% D	40-59% C	60-79% B	80% & Above A
-----------------------------	-------------------	-----------------	-----------------	--------------------------

KAHE&R

Deemed to be University.Re-accredited 'A' Grade by NAAC (2nd cycle). Placed in Category 'A' by MHRD (GoI).

Shri B. M. Kankanawadi Ayurveda Mahavidyalaya
Post Graduate Studies and Research Centre,Shahapur,Belagavi-03
(India's only institution with NAAC &NABH Accreditation in AYUSH sector)

CHOICE BASED CREDIT COURSE

Prakriti Credential Course



DEPARTMENT SHAREERA KRIYA

KAHE&R

Deemed to be University.Re-accredited 'A' Grade by NAAC (2nd cycle). Placed in Category 'A' by MHRD (GoI).

Shri B. M. Kankanawadi Ayurveda Mahavidyalaya
Post Graduate Studies and Research Centre,Shahapur,Belagavi-03
(India's only institution with NAAC &NABH Accreditation in AYUSH sector)

KAHE&R
Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Post Graduate Studies and Research Centre,Shahapur,Belagavi-03
DEPARTMENT SHAREERA KRIYA
CHOICE BASED CREDIT COURSE

AIM: Proficient to

- Self assessment of prakruti.
- Assess the prakruti of a healthy individual
- Assess the prakruti of a patient.

Type of Course: Add on course.

Future Prospects

- Enhance the diagnostic & treatment skills

Eligibility: First BAMS students

Language: English.

Intake Capacity: Minimum 15. Maximum 35

Duration: 50hrs

Evaluation :Assignment based Assessment

Five Credits of each 10

Teaching Learning Methods:

Didactic Lectures, A.V lectures, Demonstration, and Assignment

Syllabus:

- Concept of prakriti
- Preparation of the specific tables and charts
- Preparation of the specific questionnaire
- Assessment of self prakriti
- Assessment of patient prakriti
- Assessment of prevalence of diseases in healthy and diseased.

KAHE&R
Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Post Graduate Studies and Research Centre, Shahapur, Belagavi-03
DEPARTMENT SHAREERA KRIYA

1ST - Credit Hours: 10 hrs

Sl No	Content	Teaching & Learning Methodology	Time
1	Introduction to Prakruti	Lecture	2 hrs
2	<ul style="list-style-type: none"> • Concept of Constitution- Prakruti • Types & synonyms of Prakruti • Factors affecting Prakruti/constitution formation • Relation between Prakruti&Dosha, Prakruti&Dhatu, Prakruti& Mala Prakruti&Aahara, Prakruti&Nidra , Prakruti& Desha 	Lecture and AV	1:30Hrs 00: 30Hrs
3	Group discussion on development of constitution	Group discussion	2 Hrs
4	Guided self learning on prakruti types Demonstration of tables & charts on prakruti Problem based learning on prakruti	Guided self learning A-V classes and Problem based learning	2 Hrs
5	Review/ Assessment on Prakruti	MCQ	2 Hrs

II- Credit Hours: 10 hrs

Sl No	Content	Teaching & Learning Methodology	Time
1	Introduction to Vataprakruti in detail according to Sarangadhara.	Lecture	2 hrs
2	Introduction to Vataprakruti in detail according to Charaka Samhita.	Lecture/ AV	1:30Hrs 00: 30Hrs
3	Guided self learning on Vataprakruti	Guided self learning	2 Hrs
4	Demonstration of tables & charts on Vataprakruti	A-V classes PBL	2 Hrs
5	Review on PrakrutiAssesment		2 Hrs

KAHE&R
Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Post Graduate Studies and Research Centre,Shahapur,Belagavi-03
DEPARTMENT SHAREERA KRIYA

III- Credit Hours: 10 hrs

Sl no	Content	Teaching & learning methodology	Time
1	Introduction to Pitta prakruti in detail according to Sarangadhara.	Lecture	2 hrs
2	Introduction to Pitta prakruti in detail according to Charaka Samhita.	Lecture/ AV	1:30Hrs 00: 30Hrs
3	Guided self learning on Pitta prakruti	Guided self learning	2 Hrs
4	Demonstration of tables & charts on Pitta prakruti	A-V classes	2 Hrs
		PBL	2 Hrs
5	Review on Prakruti Assesment		2 hrs

IV- Credit Hours: 10 hrs

Sl no	Content	Teaching & learning methodology	Time
1	Introduction to Kapha prakruti in detail according to Sarangadhara.	Lecture	2 hrs
2	Introduction to Kapha prakruti in detail according to Charaka Samhita.	Lecture/ AV	1:30Hrs 00: 30Hrs
3	Guided self learning on Kapha prakruti	Guided self learning	2 Hrs
4	Demonstration of tables & charts on Kapha prakruti	A-V classes	2 Hrs
		PBL	2 Hrs
5	Review on Prakruti Assesment		2 hrs

KAHE&R
Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Post Graduate Studies and Research Centre,Shahapur,Belagavi-03
DEPARTMENT SHAREERA KRIYA

V- Review on Prakruti Assesment- 10 Hrs

Sl No	Content	Teaching & Learning Methodology	Time
1	Introduction to Manas Prakruti	Lecture	2 hrs
2	Types of manas prakruti	Lecture/ AV	1:30Hrs 00: 30Hrs
3	Guided self learning on manas prakruti	Guided self learning	2 Hrs
4	Demonstration of tables & charts on manas prakruti	A-V classes	2 Hrs
		Problem based learning	2 Hrs
5	Review on Prakruti Assesment		2 hrs

Assessment Criteria

Sl No	Name of the course	Durati on	Total teaching contents	Total theory class	Total practica l class	Evaluation methods
1	Prakruti Assessment Techniques	50 HRS	Introduction To Prakruti	15		Objective type of questionnaires'
2			Assesment Of Shareera Prakriti	10	5	Objective Type Of Questionnaires' Hands On Training
			Assesment Of Manasika Prakriti	10	5	Objective Type Of Questionnaires' Hands On Training
4			Assessment of Prakriti		10	Survey Study

KAHE&R
Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Post Graduate Studies and Research Centre,Shahapur,Belagavi-03
DEPARTMENT SHAREERA KRIYA

SCORE CARD

CREDIT	Attendance Score % (1 Hour attendance =1%) 20%	Performance Score % Theory Internal Evaluation =40%MCQ	Performance Score % Assessment of Prkriti=40%
1			
2			
3			
4			

OVER ALL SCORE %	40-59% C	60-75% B	75%& Above A
-----------------------------	-----------------	-----------------	-------------------------

KAHER

Deemed to be University.Re-accredited 'A' Grade by NAAC (2nd cycle). Placed in Category 'A' by MHRD (GoI).

Shri B. M. Kankanawadi Ayurveda Mahavidyalaya

Post Graduate Studies and Research Centre,Shahapur,Belagavi-03

(India's only institution with NAAC &NABH Accreditation in AYUSH sector)

DEPARTMENT OF SAMHITA AND SIDDHANTA

CHOICE BASED CREDIT COURSE

SAMHITA ADHYAYANA KRAMA



KAHER

Deemed to be University.Re-accredited 'A' Grade by NAAC (2nd cycle). Placed in Category 'A' by MHRD (GoI).

Shri B. M. Kankanawadi Ayurveda Mahavidyalaya

Post Graduate Studies and Research Centre,Shahapur,Belagavi-03

(India's only institution with NAAC &NABH Accreditation in AYUSH sector)

K.L.E B.M.Kankanawadi Ayurveda Mahavidyalaya

Belagavi

Department of Samhita Siddhanta

Samhita Adhyayana Krama

Credential Course

INTRODUCTION :

Ayurveda Samhitas are written in Sanskrit. To understand and interpret verses, basic language skills in Sanskrit are essential. Hence to get the real and pure knowledge of Ayurveda, proper Samhita Adhyayana is introduced through a credit course. Through this credit course students will be efficient to comprehend the meaning of texts without any external help.

AIM:

After completing the credit course students will be able to:

- understand original texts with the help of the Samhita Adhyayana Krama.

OBJECTIVES :

1. To apply तन्त्रयुक्ति at appropriate context.
2. To demonstrate the संहिता knowledge properly.
3. To chant hymns properly.

Type of course: Add on course.

Advantages:

Students who are enrolled in this course will be able to

- read and understand samhitas more efficiently.

- **Eligibility:**

First BAMS Students.

- **Language :** English.
- **Intake capacity :** Minimum 20, Maximum 35.
- **Duration :** 50 Hrs
- **Evaluation :** Assignment based assessment
- **Five credits of each 10 hours.**

- **Teaching learning methods :**

Didactic lectures, A.V Lectures, Assignment, Samhita Adhyayana Recitation and writing verses from the samhita.

Name of the Credit course Samhita Adhyayan through vadatu Samskr̥tam

Total Hours-50

1st credit विषयानुक्रम

SL NO.	NAME OF THE MODULE	CONTENTS	HOURS	Teaching and learning methodology
1	अर्थान्वय (semantic analysis)	प्रथम अध्याय of the अष्टाङ्गहृदय	5 hours.	Word by word comprehension of the संहिता
2	व्याकरण (analysis of samhita)	, सुबन्त, तिङन्त, कारक, सन्धि	5 hrs	Practice of व्याकरण in संहिता & assignment

2nd credit विषयानुक्रम

Total Hours-10

SL NO.	NAME OF THE MODULE	CONTENTS	HOURS	Teaching and learning methodology
1	संहिता अध्ययन through comprehension reading	अष्टमाध्यायः मात्राशितीयमध्याय of अष्टाङ्गहृदय	5 hrs	Word by word comprehension of the संहिता अधिकरण & प्रकरण
2	Compound analysis	Identification of compounds in the 8 th chapter.	2 hrs	Lecture
3	Assessment	Debate & Grammatical analysis of important श्लोकs.	3 hrs	assessment

3rd credit विषयानुक्रम

Total Hours-10

SL NO.	NAME OF THE topic	CONTENTS	HOURS	Teaching and learning methodology
1	ज्ञानोपायमार्गs	अध्ययन अध्यापन तद्विध्यसम्भाषा	2 hrs	Lecture
2	ज्ञानोपायमार्ग	अध्यापन (Presentations by students)	3 hrs	Lectures
3	संहिता अध्ययन through तन्त्रयुक्ति	तन्त्रयुक्तिs & its application	5hrs	Lecture & assignment

4th credit विषयानुक्रम

Total Hours-10

SL NO.	NAME OF THE topic	CONTENTS	HOURS	Teaching and learning methodology
1	संहिता अध्ययन through सिद्धान्तस	एकादशाध्याय Dosha Dhatu Mala	3 hrs	Layered understanding of each of the concept in the chapter (from grammar to medical)
2	संहिता अध्ययन Through सिद्धान्तस	एकादशाध्याय: ढज्जcitation of important श्लोकस	3 hrs	Training in recitation
3	Assessment	श्लोकस recitation competition	4 hrs	Assessment & श्लोक recitation competition

5th credit विषयानुक्रम

Total Hours-10

SL NO.	NAME OF THE topic	CONTENTS	HOURS	Teaching and learning methodology
1	Introduction to छन्दस्	अनुष्टुभ, त्रिष्टुभ etc. important meters	5 hrs	Lecture
2	संहिता अध्ययन through chanddhas	द्वादशाध्याय	4 hrs	Memorizing important verses and proper recitation of chanddhas
3	Reciting according to the छन्दस्	अनुष्टुभ, त्रिष्टुभ	1 hr	Recitation

. Reference Book for Samhita adhyayana Program

1. अष्टाङ्गहृदय with सर्वाङ्गसुन्दरी टीका
2. Higher Sanskrit Grammar by M. R. Kale

SECTION - II

REGULATIONS

1. Short Title and Commencement

These regulations shall be called as “The Revised Regulations for the B. Pharm. Degree Program (CBCS) of the Pharmacy Council of India, New Delhi”. They shall come into effect from the Academic Year 2016-17. The regulations framed are subject to modifications from time to time by Pharmacy Council of India.

2. Minimum qualification for admission

2.1 First year B. Pharm:

Candidate shall have passed 10 + 2 examination conducted by the respective state/central government authorities recognized as equivalent to 10 + 2 examination by the Association of Indian Universities (AIU) with English as one of the subjects and Physics, Chemistry, Mathematics (P.C.M) and or Biology (P.C.B / P.C.M.B.) as optional subjects individually. Any other qualification approved by the Pharmacy Council of India as equivalent to any of the above examinations.

2.2. B. Pharm lateral entry (to third semester):

A pass in D. Pharm. course from an institution approved by the Pharmacy Council of India under section 12 of the Pharmacy Act.

3. Duration of the program

The course of study for B.Pharm shall extend over a period of eight semesters (four academic years) and six semesters (three academic years) for lateral entry students. The curricula and syllabi for the program shall be prescribed from time to time by Pharmacy Council of India, New Delhi.

4. Medium of instruction and examinations

Medium of instruction and examination shall be in English.

5. Working days in each semester

Each semester shall consist of not less than 100 working days. The odd semesters shall be conducted from the month of June/July to November/December and the even semesters shall be conducted from December/January to May/June in every calendar year.

6. Attendance and progress

A candidate is required to put in at least 80% attendance in individual courses considering theory and practical separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.

7. Program/Course credit structure

As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, tutorial hours, practical classes, etc. are measured in terms of credits. On satisfactory completion of the courses, a candidate earns credits. The amount of credit associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly, the credit associated with any of the other academic, co/extra-curricular activities is dependent upon the quantum of work expected to be put in for each of these activities per week.

7.1. Credit assignment

7.1.1. Theory and Laboratory courses

Courses are broadly classified as Theory and Practical. Theory courses consist of lecture (L) and /or tutorial (T) hours, and Practical (P) courses consist of hours spent in the laboratory. Credits (C) for a course is dependent on the number of hours of instruction per week in that course, and is obtained by using a multiplier of one (1) for lecture and tutorial hours, and a multiplier of half (1/2) for practical (laboratory) hours. Thus, for example, a theory course having three lectures and one tutorial per week throughout the semester carries a credit of 4. Similarly, a practical having four laboratory hours per week throughout semester carries a credit of 2.

7.2. Minimum credit requirements

The minimum credit points required for award of a B. Pharm. degree is 208. These credits are divided into Theory courses, Tutorials, Practical, Practice School and Project over the duration of eight semesters. The credits are distributed semester-wise as shown in Table IX. Courses generally progress in sequences, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester-wise schedule of courses given in the syllabus.

The lateral entry students shall get 52 credit points transferred from their D. Pharm program. Such students shall take up additional remedial courses of 'Communication Skills' (Theory and Practical) and 'Computer Applications in

Pharmacy' (Theory and Practical) equivalent to 3 and 4 credit points respectively, a total of 7 credit points to attain 59 credit points, the maximum of I and II semesters.

8. Academic work

A regular record of attendance both in Theory and Practical shall be maintained by the teaching staff of respective courses.

9. Course of study

The course of study for B. Pharm shall include Semester Wise Theory & Practical as given in Table – I to VIII. The number of hours to be devoted to each theory, tutorial and practical course in any semester shall not be less than that shown in Table – I to VIII.

Table-I: Course of study for semester I

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP101T	Human Anatomy and Physiology I– Theory	3	1	4
BP102T	Pharmaceutical Analysis I – Theory	3	1	4
BP103T	Pharmaceutics I – Theory	3	1	4
BP104T	Pharmaceutical Inorganic Chemistry – Theory	3	1	4
BP105T	Communication skills – Theory *	2	-	2
BP106RBT BP106RMT	Remedial Biology/ Remedial Mathematics – Theory*	2	-	2
BP107P	Human Anatomy and Physiology – Practical	4	-	2
BP108P	Pharmaceutical Analysis I – Practical	4	-	2
BP109P	Pharmaceutics I – Practical	4	-	2
BP110P	Pharmaceutical Inorganic Chemistry – Practical	4	-	2
BP111P	Communication skills – Practical*	2	-	1
BP112RBP	Remedial Biology – Practical*	2	-	1
Total		32/34^{\$}/36[#]	4	27/29^{\$}/30[#]

#Applicable ONLY for the students who have studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology (RB) course.

\$Applicable ONLY for the students who have studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics (RM) course.

* Non University Examination (NUE)

Table-II: Course of study for semester II

Course Code	Name of the course	No. of hours	Tutorial	Credit points
BP201T	Human Anatomy and Physiology II – Theory	3	1	4
BP202T	Pharmaceutical Organic Chemistry I – Theory	3	1	4
BP203T	Biochemistry – Theory	3	1	4
BP204T	Pathophysiology – Theory	3	1	4
BP205T	Computer Applications in Pharmacy – Theory*	3	-	3
BP206T	Environmental sciences – Theory *	3	-	3
3BP207P	Human Anatomy and Physiology II –Practical	4	-	2
BP208P	Pharmaceutical Organic Chemistry I– Practical	4	-	2
BP209P	Biochemistry – Practical	4	-	2
BP210P	Computer Applications in Pharmacy – Practical*	2	-	1
Total		32	4	29

*Non University Examination (NUE)

Table-III: Course of study for semester III

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP301T	Pharmaceutical Organic Chemistry II – Theory	3	1	4
BP302T	Physical Pharmaceutics I – Theory	3	1	4
BP303T	Pharmaceutical Microbiology – Theory	3	1	4
BP304T	Pharmaceutical Engineering – Theory	3	1	4
BP305P	Pharmaceutical Organic Chemistry II–Practical	4	-	2
BP306P	Physical Pharmaceutics I – Practical	4	-	2
BP307P	Pharmaceutical Microbiology – Practical	4	-	2
BP 308P	Pharmaceutical Engineering –Practical	4	-	2
Total		28	4	24

Table-IV: Course of study for semester IV

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP401T	Pharmaceutical Organic Chemistry III– Theory	3	1	4
BP402T	Medicinal Chemistry I – Theory	3	1	4
BP403T	Physical Pharmaceutics II – Theory	3	1	4
BP404T	Pharmacology I – Theory	3	1	4
BP405T	Pharmacognosy and Phytochemistry I– Theory	3	1	4
BP406P	Medicinal Chemistry I – Practical	4	-	2
BP407P	Physical Pharmaceutics II – Practical	4		2
BP408P	Pharmacology I – Practical	4	-	2
BP409P	Pharmacognosy and Phytochemistry I–Practical	4	-	2
Total		31	5	28

Table-V: Course of study for semester V

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP501T	Medicinal Chemistry II – Theory	3	1	4
BP502T	Industrial PharmacyI– Theory	3	1	4
BP503T	Pharmacology II – Theory	3	1	4
BP504T	Pharmacognosy and Phytochemistry II– Theory	3	1	4
BP505T	Pharmaceutical Jurisprudence – Theory	3	1	4
BP506P	Industrial PharmacyI – Practical	4	-	2
BP507P	Pharmacology II – Practical	4	-	2
BP508P	Pharmacognosy and Phytochemistry II – Practical	4	-	2
Total		27	5	26

Table-VI: Course of study for semester VI

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP601T	Medicinal Chemistry III – Theory	3	1	4
BP602T	Pharmacology III – Theory	3	1	4
BP603T	Herbal Drug Technology – Theory	3	1	4
BP604T	Biopharmaceutics and Pharmacokinetics – Theory	3	1	4
BP605T	Pharmaceutical Biotechnology – Theory	3	1	4
BP606T	Quality Assurance –Theory	3	1	4
BP607P	Medicinal chemistry III – Practical	4	-	2
BP608P	Pharmacology III – Practical	4	-	2
BP609P	Herbal Drug Technology – Practical	4	-	2
Total		30	6	30

Table-VII: Course of study for semester VII

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP701T	Instrumental Methods of Analysis – Theory	3	1	4
BP702T	Industrial PharmacyII – Theory	3	1	4
BP703T	Pharmacy Practice – Theory	3	1	4
BP704T	Novel Drug Delivery System – Theory	3	1	4
BP705P	Instrumental Methods of Analysis – Practical	4	-	2
BP706PS	Practice School*	12	-	6
Total		28	5	24

* Non University Examination (NUE)

Table-VIII: Course of study for semester VIII

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP801T	Biostatistics and Research Methodology	3	1	4
BP802T	Social and Preventive Pharmacy	3	1	4
BP803ET	Pharma Marketing Management	3 + 3 = 6	1 + 1 = 2	4 + 4 = 8
BP804ET	Pharmaceutical Regulatory Science			
BP805ET	Pharmacovigilance			
BP806ET	Quality Control and Standardization of Herbals			
BP807ET	Computer Aided Drug Design			
BP808ET	Cell and Molecular Biology			
BP809ET	Cosmetic Science			
BP810ET	Experimental Pharmacology			
BP811ET	Advanced Instrumentation Techniques			
BP812ET	Dietary Supplements and Nutraceuticals			
BP813PW	Project Work	12	-	6
Total		24	4	22

Table-IX: Semester wise credits distribution

Semester	Credit Points
I	27/29 [§] /30 [#]
II	29
III	26
IV	28
V	26
VI	26
VII	24
VIII	22
Extracurricular/ Co curricular activities	01*
Total credit points for the program	209/211[§]/212[#]

* The credit points assigned for extracurricular and or co-curricular activities shall be given by the Principals of the colleges and the same shall be submitted to the University. The criteria to acquire this credit point shall be defined by the colleges from time to time.

[§]Applicable ONLY for the students studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics course.

[#]Applicable ONLY for the students studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology course.

course completion certificate until all the courses of I, II, III, IV, V and VI semesters are successfully completed.

A student shall be eligible to get his/her CGPA upon successful completion of the courses of I to VIII semesters within the stipulated time period as per the norms specified in 26.

A lateral entry student shall be eligible to carry forward all the courses of III, IV and V semesters till the VI semester examinations. However, he/she shall not be eligible to attend the courses of VII semester until all the courses of III and IV semesters are successfully completed.

A lateral entry student shall be eligible to carry forward all the courses of V, VI and VII semesters till the VIII semester examinations. However, he/she shall not be eligible to get the course completion certificate until all the courses of III, IV, V and VI semesters are successfully completed.

A lateral entry student shall be eligible to get his/her CGPA upon successful completion of the courses of III to VIII semesters within the stipulated time period as per the norms specified in 26.

Any student who has given more than 4 chances for successful completion of I / III semester courses and more than 3 chances for successful completion of II / IV semester courses shall be permitted to attend V / VII semester classes ONLY during the subsequent academic year as the case may be. In simpler terms there shall NOT be any ODD BATCH for any semester.

Note: Grade AB should be considered as failed and treated as one head for deciding academic progression. Such rules are also applicable for those students who fail to register for examination(s) of any course in any semester.

17. Grading of performances

17.1. Letter grades and grade points allocations:

Based on the performances, each student shall be awarded a final letter grade at the end of the semester for each course. The letter grades and their corresponding grade points are given in Table – XIV

Table – XIV: Letter grades and grade points equivalent to Percentage of marks and performances

Percentage of Marks Obtained	Letter Grade	Grade Point	Performance
90.00 – 100	O	10	Outstanding
80.00 – 89.99	A	9	Excellent
70.00 – 79.99	B	8	Good
60.00 – 69.99	C	7	Fair
50.00 – 59.99	D	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

A learner who remains absent for any end semester examination shall be assigned a letter grade of AB and a corresponding grade point of zero. He/she should reappear for the said evaluation/examination in due course.

18. The Semester grade point average (SGPA)

The performance of a student in a semester is indicated by a number called 'Semester Grade Point Average' (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester. For example, if a student takes five courses(Theory/Practical) in a semester with credits C₁, C₂, C₃, C₄ and C₅ and the student's grade points in these courses are G₁, G₂, G₃, G₄ and G₅, respectively, and then students' SGPA is equal to:

$$SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4G_4 + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F and AB grade awarded in that semester. For example if a learner has a F or AB grade in course 4, the SGPA shall then be computed as:

$$SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4 * ZERO + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

Ordinance Governing

Bachelor of Science in Nutrition and Dietetics

Syllabus / Curriculum



Accredited 'A' Grade by NAAC (2nd Cycle)

Placed in Category 'A' by MHRD (GoI)

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH

JNMC Campus, Nehru Nagar, Belagavi – Karnataka, India

Phone: +91 0831-2472777, 2493779, FAX: +91 0831 – 249377

E-mail: info@kledeemeduniversity.edu.in Website: kledeemeduniversity.com

CONTENTS

Section	Topics	Page No
Section I	Preamble	3
Section II	Vision, Mission and Objectives	4-5
Section III	Regulations Governing B.Sc. Nutrition and Dietetics Semester Course	6 – 16
Section IV	Course content 1 st Semester B.Sc. Nutrition and Dietetics	17- 26
Section V	Course contents and 2 nd Semester B.Sc. Nutrition and Dietetics	27 - 38
Section VI	Course contents and scheme of examination of 3 rd B.Sc. Nutrition and Dietetics	39 – 47
Section VII	Course contents and scheme of examination of 4 th B.Sc. Nutrition and Dietetics	48 – 58
Section VIII	Course contents and scheme of examination of 5 th B.Sc. Nutrition and Dietetics	59 – 67
Section IX	Course contents and scheme of examination of 6 th B.Sc. Nutrition and Dietetics	68 – 81

SECTION I

Preamble:

Nutrition science is the study of nutrients that are essential for growth, development and maintenance of good health throughout life. In the present scenario, society needs the awareness regarding their diet and also, people are becoming more nutrition conscious. The common man is gradually switching towards nutrition scientists and dietitians for scientifically proved information on Nutrition and Dietetics. Nutrition-related chronic diseases are the most common cause of death in the world and present a great burden for society, particularly diseases such as obesity, diabetes, cardiovascular disease, cancer, dental disease, and osteoporosis. Making improvements in terms of diet and physical activity can help reduce the risk of these chronic diseases.

Currently food industry is shifting its focus from taste to nutrition. The curriculum will provide robust academic and experiential opportunities across the health spectrum to address the health of individuals and populations from prevention to palliation.

SECTION II

VISION

To be an outstanding KAHER of excellence ever in pursuit of newer horizons to build self reliant global citizens through assured quality educational programs.

MISSION

- To promote sustainable development of higher education consistent with statutory and regulatory requirements.
- To plan continuously provide necessary infrastructure, learning resources required for quality education and innovations.
- To stimulate to extend the frontiers of knowledge, through faculty development and continuing education programs.
- To make research a significant activity involving staff, students and society.
- To promote industry / organization, interaction/collaborations with regional/national/international bodies.
- To establish healthy systems for communication among all stakeholders for vision oriented growth.
- To fulfill the national obligation through rural health missions.

OBJECTIVES:

- To understand the functions and role of nutrients, their requirements and the effect of deficiency and excess (in brief)
- To understand the concept of an adequate diet and the importance of nutrients in recommended Dietary Allowances
- To provide scientific training that encompasses all aspects of the nutritional and food sciences
- To develop skills and attitudes required for working in the broad field of nutrition and dietetics.
- To train students in the field of food service management.
- Prepare students for a just and healthy society by advancing the range of roles and settings in human nutrition.
- Amplify the contribution of dietetics and nutrition practitioners and expand workforce capability and capacity.
- Collaborate to resolve the greatest nutrition and food challenges of present and the future.

SECTION III

Regulations Governing B.Sc. Nutrition and Dietetics Course (BND)

3.1 Course Duration: Three Years

3.2 Eligibility: Candidate for admission to BND course should have completed higher secondary level or Pre-University College (10+2) in any stream with as basic courses or equivalent course established under law considered equivalent thereto by KAHER, a candidate who has scored a minimum of 50% of the marks.

3.3 Yearly Intake: 20 students per year

3.4 Expected Program Outcomes: By the end of the programme students can

- Communicate effectively and professionally medical team, staff members, patients/clients, and peers
- Integrate the broad aspects of food into dietetics practice. Apply all areas of the nutrition care process and model to clinical practice.
- Programme will make students knowledgeable and competent to make a prospective career in Industry as well as in research in the area of Food, Nutrition & Dietetics.

3.5 Medium of instruction: The medium of instruction and examination shall be in English.

3.6 Requirement to Complete the Course:

B.Sc. Nutrition and Dietetics: 3 years,

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

Sem I	+	Sem II	+		Sem III	+	Sem IV	+	Sem V	+	Sem VI	+	Internship for 2 months in VI Semester	=	B.Sc. Nutrition and Dietetics
-------	---	--------	---	--	---------	---	--------	---	-------	---	--------	---	--	---	-------------------------------

3.7. Training, Teaching and Learning Activities:

A candidate pursuing the course shall work in the Department as a full time candidate. No candidate shall join any other course of study or appear for any other examination conducted by this university or any other university in India or abroad during the period of study.

Every candidate shall take part in seminars, group discussions etc. Every candidate shall attend teaching and learning activities during each semester as prescribed by the Department and not absent himself /herself without valid reasons.

A list of teaching and learning activities designed to facilitate acquiring of essential knowledge and skills outlined is given below:

Books are the best teachers but experience makes man perfect. The proficient and lively theory classes shall be equally blended with various practical applications and group activities such as:

1. Assignment
2. Group Discussions
3. Role Plays
4. Workshops
5. Hospital Visits (Studies)

All these are aimed for the overall development of the emerging health workers, critical analysis and assessment of situations, creative thinking and proactive measures towards system management

Lectures: For all subjects lectures shall be conducted by the faculty.

Visits : PHC, subcenter, anganwadi, DHO office, KLE Hospital, Sewage treatment plant, Water purification plant, milk dairy, HLL Industry, Campbell factory, Pollution Control Board, CDPO office, IDSP, and other institutions of Nutrition and Dietetics importance.

3.8. Attendance and Monitoring Progress:

3.8.1 Attendance:

3.8.1.1 A candidate pursuing BND Course shall study for the entire period as full time candidate. No candidate shall join any other course of study or appear for any other examination conducted by this University or any other University in India or abroad during the period of registration.

3.8.1.2 Each semester shall be considered as a unit for the purpose of calculating attendance.

3.8.1.3 Every candidate shall attend symposia, seminars, conferences, project review meetings and lectures during each year as prescribed by the Department/College/University and not absent himself / herself without valid reasons.

3.8.1.4 Candidate who has put in a minimum of 75% of attendance in the theory and practical assignments separately shall be permitted to appear for University examination at the end of each semester. They should also complete Internship (mini project) report submission.

3.8.1.5 Any candidate who fails to complete the course in the manner stated above will not be eligible for university Degree.

3.8.2 Monitoring Progress of Studies

3.8.2.1 *Log Book:* Every candidate shall maintain a log diary and record his/her participation in the training programs conducted by the Department such as workshop, field visits, hospital visit etc. Special mention shall be made of the scientific presentations in conference by the candidate as well as details of assessment works like essay writing, etc. submitted by the candidate. The work diary shall be scrutinized and certified by the Head of the Department

3.8.2.2 *Sessional Examination:* Records and marks obtained in sessional test shall be maintained by the Head of the Department and sent to the University, when called for.

3.8.2.3 *Records:* Records and marks obtained in sessional tests, field activities and weekly written assignments which shall be maintained by the Head of the Department and shall be made available to the University.

3.9. Internship (Mini Project):

Every candidate shall undergo hospital training for a period of two months in the sixth semester in which they will do mini project and submit the report duly signed by the Head of the Department.

3.10 Schedule of Examination

There shall be a University examination at the end of each semester for all six semesters.

3.11. Scheme of Examination

3.11.1 Sessional Examination

FORMATIVE ASSESMENT

There shall be a minimum of two sessional examinations in each subject conducted by the Department at midterms and before term end in theory and viva-voce.(formative assessments)The sessional marks shall be awarded out of a maximum of 80 for theory separately and shall be calculated out of 20 marks.

Theory

Written examination 80 marks

The total marks obtained have to be calculated out of 10.

Reports of field visits 10 marks

Models/Essay writing/Project work 10 marks

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

Camps/ Group activities 10 marks

Assignments 10 marks

The total marks obtained have to be calculated out of 10.

A cumulative total will be calculated out of 20 as “Internal Assessment” (IA) marks

3.11.2 University Examinations: SUMMATIVE ASSESMENT

3.11.2.1 Theory:

There shall be six University examinations for the all core subjects in I, II, III, IV, V and VI semester examination. The examination will be conducted at the end of each semester. Internal Assessment Exam will be conducted for each Elective Subject. Each Semester will have one Each theory paper shall be of 3 hours duration carrying 80 marks each and Practical Exam for 3 hours for 80 Marks

Semester I			
Theory	Subjects	Theory + IA	Total
BND –I-1 T	Introduction to Food Science	80 + 20	100
BND –I-2 T	Principles of Nutrition	80 + 20	100
BND –I-3 T	Nutritional Biochemistry I	80 + 20	100
BND –I-4 T	English	80 + 20	100
Total			400
PRACTICALS			
Practical's	Subjects	Practical's + Viva Voce + IA	Total
BND –I-1 P	Introduction to Food Science	60 + 20 +20	100
BND –I-2 P	Principles of Nutrition	60 + 20 +20	100
BND –I-3 P	Nutritional Biochemistry I	60 + 20 +20	100
Total			300
Grand Total (Theory + Practical)			700 each Semester

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

Semester II			
Theory	Subjects	Theory + IA	Total
BND –II-1 T	Human Physiology	80 + 20	100
BND –II-2 T	Nutritional Biochemistry-II	80 + 20	100
BND –II-3 T	Nutrition in the Lifecycle -I	80 + 20	100
BND –II-4 T	Environmental Studies	80 + 20	100
Total			400
PRACTICALS			
Practical's	Subjects	Practical's + Viva Voce + IA	Total
BND –II-1 P	Human Physiology	60 + 20 +20	100
BND –II-2 P	Nutritional Biochemistry-II	60 + 20 +20	100
BND –II-3 P	Nutrition in the Lifecycle –I	60 + 20 +20	100
Total			300
Grand Total (Theory + Practical)			700 each Semester

Semester III			
Theory	Subjects	Theory + IA	Total
BND –III-1 T	Assessment of Nutritional status	80 + 20	100
BND –III-2 T	Basic Dietetics	80 + 20	100
BND –III-3 T	Nutrition in the Lifecycle –II	80 + 20	100
BND –III-4 T	Communication Skills	80 + 20	100
Total			400
PRACTICALS			
Practical's	Subjects	Practical's + Viva Voce + IA	Total
BND –III-1 P	Assessment of Nutritional status	60 + 20 +20	100
BND –III-2 P	Basic Dietetics	60 + 20 +20	100
BND –III-3 P	Nutrition in the Lifecycle –II	60 + 20 +20	100
Total			300

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

Grand Total (Theory + Practical)			700 each Semester
Semester IV			
Theory	Subjects	Theory + IA	Total
BND –IV-1 T	Advanced Dietetics	80 + 20	100
BND –IV-2 T	Diet and Nutritional Counseling	80 + 20	100
BND –IV-3 T	Fundamentals of Food Microbiology	80 + 20	100
BND –IV-4 T	Law – Indian Constitution	80 + 20	100
Total			400
PRACTICALS			
Practical's	Subjects	Practical's + Viva Voce + IA	Total
BND –IV-1 P	Advanced Dietetics	60 + 20 +20	100
BND –IV-2 P	Diet and Nutritional Counseling	60 + 20 +20	100
BND –IV-3 P	Fundamentals of Food Microbiology	60 + 20 +20	100
		Total	300
Grand Total (Theory + Practical)			700 each Semester

Semester V			
Theory	Subjects	Theory + IA	Total
BND –V-1 T	Ayurveda Concepts of Diet	80 + 20	100
BND –V-2 T	Community Nutrition	80 + 20	100
BND –V-3 T	Food Preservation & Adulteration	80 + 20	100
BND –V-4 T	Fundamentals of Computer	80 + 20	100
Total			400
PRACTICALS			
Practical's	Subjects	Practical's + Viva Voce + IA	Total
BND –V-1 P	Ayurveda Concepts of Diet	60 + 20 +20	100
BND –V-2 P	Community Nutrition	60 + 20 +20	100
BND –V-3 P	Food Preservation & Adulteration	60 + 20 +20	100
		Total	300
Grand Total (Theory + Practical)			700 each Semester

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

Semester VI			
Theory	Subjects	Theory + IA	Total
BND –VI-1 T	Food Service and Management	80 + 20	100
BND –VI-2 T	Bakery And Confectionery	80 + 20	100
BND –VI-3 T	Institutional Food Management	80 + 20	100
BND –VI-4 T	Human Values & Professional Ethics	80 + 20	100
Total			400
PRACTICALS			
Practical's	Subjects	Practical's + Viva Voce + IA	Total
BND –VI-1 P	Food Service and Management	60 + 20 +20	100
BND –VI-2 P	Bakery And Confectionery	60 + 20 +20	100
BND –VI-3 P	Internship + Mini Project	60 + 20 +20	100
Total			300
Grand Total (Theory + Practical)			700 each Semester

All Six Semester - Type of Questions and Distribution of Theory Examination

Sr.no	Question	Question Asked	Question to Attempt	Marks	Minimum Marks	Internal Assessment	Total Marks
1.	Long Essays	3	2	2 X 10	20	20	(80 +- 20) 100
2.	Short Essays	9	8	8 X 5	40		
3.	Short Answers	10	10	10 X 2	20		

All Practical will have University examinations.

Sr. no	Theory	Practical + IA + Viva	Grand Total
1	Practical (Major 40 + Minor 20)	60 + 20 + 20	100

3.12. Criteria for Declaring Pass

3.12.1 A candidate shall be declared to have passed BND if all the conditions below are fulfilled:

BND-Semester I:

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together

BND-Semester II

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together
- Candidate shall further obtain Grade B

BND -Semester III

- Candidate who secures Grade B or above in each subject in theory of University & Sessional examinations considered together

BND -Semester IV

- Candidate who secures Grade B or above in each subject in theory University & Sessional examinations considered together
- Candidate shall further obtain Grade B

BND -Semester V

- Candidate who secures Grade B or above in each subject in theory University & Sessional examinations considered together
- Candidate shall further obtain Grade B

BND -Semester VI

- Candidate who secures Grade B or above in each subject in theory University & Sessional examinations considered together
- Candidate shall further obtain Grade B

3.12.2 Carry over:

At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he is appearing for. e.g:

- If the candidate has not passed semester I, he/she can appear for semester II and pending subjects of semester I simultaneously.
- Appearing for semester III he/she should have passed semester I and can appear for papers pending from semester II along with semester III subjects.
- Appearing for semester IV he/she should have passed semester II completely and can appear pending papers of semester III simultaneously.
- Appearing for semester V he/she should have passed semester III completely and can appear pending papers of semester IV simultaneously.
- Appearing for semester VI he/she should have passed semester IV completely and can appear pending papers of semester V simultaneously.

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

Letter Grades and Grade Points equivalent to percentage of marks and performances

10 Point Grade Scale

Percentage of marks obtained	Letter Grade	Grade Point	Performance
90.00 - 100	O	10	Outstanding
80.00 -89.99	A+	9	Excellent
70.00-79.99	A	8	Good
60.00-69.99	B+	7	Fair
50.00-59.99	B	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

1. Conversion of Grades in to GPA:

GPA= Credits x Grade Points / Total Credits

2. Cumulative Grade Point Average (CGPA) of all 4 Semester will be calculated as:

Total No. GPA / No. of Semester

SECTION IV

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH**B.Sc. NUTRITION AND DIETETICS****Semester I**

Sl no	Code	Core Subjects	Theory/Practical	Hours	Credits
1	BND –I-1 T	Introduction to Food Science	Theory	30	4
2	BND –I-2 T	Principles of Human Nutrition	Theory	30	4
3	BND –I-3 T	Nutritional Biochemistry I	Theory	30	4
4	BND –I-1 P	Introduction to Food Science	Practical	15	4
5	BND –I-2 P	Principles of Human Nutrition	Practical	15	4
6	BND –I-3 P	Nutritional Biochemistry I	Practical	15	4
7.	BND –I-4 T	English (Electives)	Theory	30	4

SEMESTER I

Course Content

BND –I-1 T

THEORY

INTRODUCTION TO FOOD SCIENCE:

Total 30 Hours

UNIT 1

06 Hour

Definitions: Food Science, Food, Nutrients, Nutritional Status, Malnutrition- Under – nutrition, over nutrition, Balanced diet, Hunger- Hollow Hunger, Hidden Hunger, Appetite, Satiety, Health, Meal, Menu.

Food Groups: Basic five, Nutritional classification of foods – Energy yielding, Body building and protective foods. c. Cooking: Objectives, cooking methods- Moist and Dry heat methods of cooking, merits and demerits.

UNIT II

08 Hours

Cereals and Cereal products: Structure and Nutritive value of rice and wheat, nutritional importance of millets– maize, jowar, ragi, bajra, Milling of rice and wheat, Parboiling of rice, Products of wheat and rice, Enrichment and fortification of cereals and flours, Batters and doughs; Malting of cereals.

Pulses and Nuts: Nutritive value, factors affecting cooking quality of pulses, germination – process, advantages

UNIT III

04 Hours

Vegetables: Botanical classification, Nutritive value, Pigments- fat soluble, water soluble, selection of vegetables, cooking of vegetables- changes during cooking, nutrient loss, effect of cooking on the pigments

Fruits: Classification, Nutritive value, changes during ripening of fruits, enzymatic browning and prevention, storage.

UNIT IV

06 Hours

Milk and Milk Products: Composition and Nutritive value, Different types of milk, pasteurization of milk, milk products- dry milk, cheese.

Egg: Structure, Composition and Nutritive value. Measures of egg quality, role of egg in cookery.

Meat- structure, composition, a list of different types of meat, cuts of meat, post mortem changes in meat, and tenderness of meat.

Poultry- composition and classification.

Fish- structure, composition, nutritive value, selection of fish.

UNIT V

06 Hours

Fats and oils- composition processing and refining of fats, refined oils, plasticity, hydrogenation, winterization. Smoking point, factors that lower smoking point, absorption of fat during cooking.

Sugar- nutritive value, sugar related products, stages of sugar cookery, crystallization, factors affecting crystallization.

Spices and condiments- types and uses in Indian cookery, medicinal value.

BND –I-1 P

PRACTICAL

INTRODUCTION TO FOOD SCIENCE

Total 15 Hours

1. Different types of cereals, pulses, vegetables, fruits and nuts and oil seeds – Observation
2. Guidelines to be followed in laboratory.
3. Method of Measuring Ingredients.
4. Demonstration of Cooking Methods Food preparation, understanding the principles involved, nutritional quality and portion size
 - Cereals – Preparation of rice by steaming, absorption method, Straining and Pressure cooking. Batters and dough. Preparation of Idli, Dosa, Upma, Kichadi, Chapathi, Poori, Fried Rice, Briyani and variety rice.
 - Pulses – Factors affecting the cooking quality of pulses. Preparation of Sambar, Sundal, Bholi, Mysore-pak, Vada, Channa Masala, Thuvaiyal, Green gram payasam, Besan omlette, Sprouted salad and koottu.
 - Vegetables – Selecting, cleaning, coring, pitting and chopping of fruits and vegetables. Avial, porriyal, pugath, stew, kuruma, cutlet, fry, chips, podimas, pachadi, stuffed chapathi, koottu.
 - Fruits – Fritters, Halwa, Salad, Stuffed items, Jelly, Payasam, Thokku, Sauce and Jams.
 - Milk – Cottage Cheese, Paneer, Phirnee, Payasam, Ice cream, kova, Buttermilk curry, Basanthi and Jamun.
 - Egg – Boiled, Scrambled, Poached, Curry, Masala, Omelette.
 - Three Course, Five Course and Seven Course menu planning.
 - Score card preparation and sensory evaluation.
5. Visit to a modern rice mill
6. Visit to a Dairy farm/ Milk processing unit

Recommended Books:

1. Potter, N. and Hotchkiss, J.H. Food Science, 5th Ed., CBS Publications and Distributors, Daryaganji, New Delhi, 1998.
2. Shakuntala Manay, Shadaksharaswamy. M (2000) Foods, Facts and Principles, New Age International Pvt Ltd Publishers, 2nd Edition
3. Usha Chandrasekhar, Food Science and Application in Indian Cookery, Phoenix Publishing House P. Ltd., New Delhi, 2002.
4. Srilakshmi, B. Food Science, New Age International Publishers, New Delhi, 2010
5. Swaminathan, M, Hand Book of Food Science and Experimental Foods, BAPPCO, Bangalore, 1992
6. Brow, A., Understanding Food, Thomson Learning Publications, Wadsworth, 2000.
7. Mehas, K.Y. and Rodgers, S.L. Food Science and You, McMillan McGraw Company, New York, 2000. 3. Parker, R. Introduction to food Science, Delmer, Thomson Learning Co., Delma, 2000.

BND –I-2 T

THEORY

Total 30 Hours

PRINCIPLES OF HUMAN NUTRITION:

Unit 1

03 Hours

Introduction to Nutritional Science: Definitions, History, Nutrition research in India, Global Food History, Food Changes as Evolution of Human - stone age, Paleolithic age (old stone age), the Mesolithic age (middle stone age), and the Neolithic age (new stone age), Geographical Distribution of Food Grains in India

Unit 2

02 Hours

Recommended Dietary Allowances: Factors affecting RDA, general principles, determination of RDA, Requirements and RDA, Reference man and reference woman

Unit 3

03 Hours

Energy Metabolism and basics of nutrition: Energy requirement in humans: Basal metabolic rate (BMR), physical activity, and thermic effect of food (formerly termed specific dynamic action), Basal metabolic rate: Definition, factors affecting and measurement

Unit 4

Classification, Functions, Recommended Dietary Allowances, effects of deficiency and/ or excess consumption on health of the following nutrients: **20 Hours**

- Carbohydrates and Dietary fibers
- Lipids.
- Proteins
- Vitamins – Water and Fat Soluble
- Minerals: Calcium, Iron, Iodine and Zinc

Unit 5

02 Hours

Water and electrolytes in diet: Intake and output of water, Distribution of water in the body (ICF & ECF), Electrolyte composition of body fluids, Isotonic/hypotonic/hypertonic contraction and expansion of ECF

BND –I-2 P

PRACTICAL

PRINCIPLES OF HUMAN NUTRITION:

Total 15 Hours

1. Standardized Recipes
2. Calculation of BMR -Harris Benedict Equation
3. Planning of Protein and Energy rich dish.
4. Planning of Vitamin A rich dish.
5. Planning of Vitamin B1 rich dish.
6. Planning of Vitamin B2 rich dish.
7. Planning of Vitamin B3 rich dish.
8. Planning of Vitamin C rich dish.
9. Planning of Calcium rich dish.
10. Planning of Iron rich dish.
11. Planning of Zinc Rich Dish
12. Planning of Fiber rich dish
13. Geographical Distribution of Good Grains in India
14. Identification of Staple Food from all the states from India along with their Importance

Suggested Readings:

1. Agarwal, A and Udipi, S. (2014). Text Book of Human Nutrition. Jaypee Medical Publication, Delhi.
2. Sehgal, S. and Raghuvanshi, R.S. (2007). Text Book of Community Nutrition. ICAR Publication.
3. Wardlaw and Insel MG, Insel PM (2004). Perspectives in Nutrition. Sixth Edition, McGraw Hill.
4. Srilakshmi B (2012). Nutrition Science.4th Revised Edition, New Age International Publishers.
5. Khanna K, Gupta S, Seth R, Passi SJ, Mahna R, Puri S (2013). Textbook of Nutrition and Dietetics. Phoenix Publishing House Pvt. Ltd.

BND –I-3 T

THEORY

NUTRITIONAL BIOCHEMISTRY I

Total 30 Hours

Unit 1

06 Hours

Introduction to Biochemistry: Definition, objectives, scope and inter relationship between biochemistry and other biological science. Structure and functions of cell with special reference to Plasma membrane (Fluid Mosaic Model), Mitochondria, Ribosome, Endoplasmic reticulum. Nucleus (nuclear membrane, nuclear chromatin and nucleolus).Nucleotide, Brief Introduction of biological membranes to understand molecular transport, Transport of Large molecules, Receptor mediated endocytosis, exocytosis, Molecular aspects of transport; Passive diffusion, facilitated diffusion, active transport.

Unit 2

04 Hours

Enzymes: Definition, types and classification of enzymes, definition and types of coenzymes, Functions of coenzymes and cofactors, Specificity of enzymes, Isozymes, enzyme Kinetics including factors affecting enzyme action, velocity of enzyme catalysed reactions, regulations of enzyme activity, zymogen, allosteric enzymes, enzyme inhibition.

Unit3

10 Hours

Chemistry and Metabolism of Carbohydrates: Definition, Classification, Biological role. Metabolism - Digestion and absorption, Glycolysis, Krebs cycle, Electron Transport System, Gluconeogenesis, Glycogenesis, Glycogenolysis, HMP pathway, Galactose Metabolism, Fructose Metabolism. Regulation of Blood Glucose.

Unit 4

10 Hours

Chemistry and Metabolism of Lipids: Definition, Classification, Biological Role of Fatty Acids and Lipids Metabolism- Digestion and Absorption, Oxidation of Fatty Acids (saturated & unsaturated), Metabolism of Lipoproteins and Ketone Bodies and Their Significance,, Synthesis

KLE ACADEMY of HIGHER EDUCATION AND RESEACH

B.Sc. NUTRITION AND DIETETICS

and utilization of ketone bodies, Ketosis, fatty livers, Essential Fatty acids, Cholesterol and its clinical significance.

BND –I-3 P

PRACTICAL'S

Total 15 Hours

NUTRITIONAL BIOCHEMISTRY I

1. Identification of carbohydrates (Qualitative Tests)
2. Quantitative estimation of Sugars (Glucose, lactose, starch)
3. Estimation of glucose in urine by Benedict's methods
4. Urine analysis - normal & abnormal constituents of urine.
5. Estimation of blood Glucose
6. Saponification value of fats
7. Estimation of serum cholesterol

Suggested Readings

1. Test Book of Bio Chemistry Vasudevan (DM), & Jaypee Brothers, New Delhi. for Medical Students Sree Kumari (S)
2. Biochemistry U. Satyanarayan Books and Allied (P) Ltd. Kolkata-700009. India)
3. Clinical Chemistry Varley William Heinemann Medical Books Ltd & Inter Science Book.Inc. New York.
4. Clinical Chemistry TEITZ W.B. Saunders Company Harcourt (India) Pvt. Ltd. New Delhi-11004

**BND –I-4 T
ELECTIVE
ENGLISH**

Total 30 Hours

Course description: It is designated to help the students to acquire a good command over English language for common and medical terminology used in medical practice.

Behavioral objectives:

Ability to speak and write proper English

Ability to read and understand English

Ability to understand and practice medical terminology.

Paragraph, Letter writing, Note making, Description. The use of paragraphs, Essay writing, Telegrams, Precise-writing and abstracting, Report writing, Medical Terminology, Use of dictionary

Scheme of examination

Theory: 80 Marks

Duration: 3 hours

- | | |
|---|----------|
| 1) Fill in the blanks - | 10 marks |
| 2) Articles (Passage/fill in the blanks) - | 10 marks |
| 3) Tense (Sentence identification/rewriting a sentence) - | 10 marks |
| 4) Voice (Rewrite) - | 10 marks |
| 5) Speech (Rewrite) - | 10 marks |
| 6) Linkers (Paragraph) - | 10 marks |
| 7) Paragraph writing - | 10 marks |
| 8) Letter writing - | 10 marks |

Text Books Recommended (Latest Edition)

KLE ACADEMY of HIGHER EDUCATION AND RESEACH

B.Sc. NUTRITION AND DIETETICS

Sl. No.	Name of the Book & Title	Author	Publisher's Name Place of Publication
1.	Sharma Strengthen your writing	V. R. Narayana	New Delhi, Orient Longman
2.	Grammer and composition	Wren and Martin	Delhi, Chand & Co.
3.	Spoken English	Shashikumar V. D'Souza P. V.	New Delhi, Tata Mergaw Hill
4.	Medical dictionary	Dorland's pocket IBH Publishing Co.	New Delhi; Oxford &

SECTION V

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH**B.Sc. NUTRITION AND DIETETICS****Semester II**

Sl no	Code	Core Subjects	Theory/Practical	Hours	Credit
1	BND –II-1 T	Human Physiology	Theory	30	4
2	BND –II-2 T	Nutritional Biochemistry-II	Theory	30	4
3	BND –II-3 T	Nutrition in the Lifecycle – I	Theory	30	4
4	BND –II-1 P	Human Physiology	Practical	15	4
5	BND –II-2 P	Nutritional Biochemistry-II	Practical	15	4
6	BND –II-3 P	Nutrition in the Lifecycle	Practical	15	4
7.	BND –II-4 T	Environmental Studies (Electives)	Theory	30	4

BND –II-1 T

THEORY

HUMAN PHYSIOLOGY

Total: 30 Hours

Unit 1

4 Hours

Blood: Blood and its composition, formed elements, Blood groups, Mechanism of blood coagulation, Introduction to immune system, Erythropoiesis and anaemia,

Unit 2

4 Hours

Cardiovascular System: Structure and functions of heart, Cardiac cycle, cardiac output, blood pressure and its regulation.

Unit 3

3 Hours

Digestive System: Structure and functions of G.I. tract, Process of digestion and absorption of food, Structure and functions of liver, gallbladder and pancreas.

Unit 4

3 Hours

Respiratory System: Structure of Lungs and gaseous exchange (oxygen and carbon dioxide transport).

Unit 5

2 Hours

Musculoskeletal System: Formation and functions of muscles, bones. Mechanism of muscle contraction, isometric and isotonic muscle contraction

Unit 6

3 Hours

Excretory system: Structure and function of skin, regulation of temperature of the body, Structure and functions of kidney in special reference to nephron, Physiology of urine formation.

Unit 7

4 Hours

Reproductive system: Structure and functions of gonads, concept on menstrual cycle, Brief idea of pregnancy, parturition, lactation and menopause. Brief concept on spermatogenesis and Oogenesis process.

Unit 8

3 Hours

Nervous System: Functions of Various parts of Brain- Cerebellum, Basal ganglia, Hypothalamus, Thalamus, Autonomic Nervous System.

Unit 9

4 Hours

Endocrine system: Structure and functions of pituitary, thyroid, parathyroid., pancreas and adrenal gland.

**BND –II-1 P
PRACTICAL'S**

HUMAN PHYSIOLOGY II

Total 15 Hours

1. Detection of Blood group (Slide method).
2. Determination of Bleeding Time (BT) and Clotting Time (CT).
3. Measurement of Haemoglobin level (Sahli`s or Drabkinmethod)
4. Determination of pulse rate in Resting condition and after exercise
5. Determination of blood pressure by Sphygmomanometer (Auscultatory method).
6. Auscultation for Heart Sounds
7. Spirometry - Description of Normal Findings
8. Artificial Respiration

Suggested Reading:

Sl. No.	Name of the Book & Title	Author	Publisher's Name, Place of Publication
1	Textbook of Physiology for MLT	Prof A. K. Jain	Avichal Publishing Company
2	Textbook of Medical Physiology	D. Venkatesh & H. H. Sudhakar	Wolters Kluwers
3	Concise Medical Physiology	Sujit K. Choudhari	New Central Books, Calcutta.
4	Textbook of Physiology	Arthur C. Guyton	Prism Publishers, Bangalore.
5	Practical Physiology	Prof. A. K. Jain	Arya Publication.

**BND –II-2 T
THEORY**

NUTRITIONAL BIOCHEMISTRY II

Total: 30 Hours

Unit 1

02 Hours

Introduction to Nucleic acids: Structure, replication, transcription, genetic code (in brief) elementary knowledge of biosynthesis of proteins.

Unit 2

08 Hours

Chemistry and Metabolism of Proteins: Definition, Classification, Biological Role of Amino Acids and Proteins. Biological Value of Protein, Metabolism -Digestion and Absorption, Transamination, Deamination, Metabolism of Ammonia, Urea Cycle, Disorders Related to Protein/Amino Acid Metabolism. Lipoproteins: Types, composition, role and significance in disease

Unit 3

05 Hours

Vitamins: Definition, Classification, Absorption and Role of Vitamins in Metabolism, Chemistry and biochemical role of fat-soluble vitamins. A. D. E. and K. Water soluble vitamins – B1, B2, B6 niacin and C. Deficiency Diseases.

Unit 4:

05 Hours

Minerals: Definition, Types, Absorption and Function and Role of Minerals in Metabolism, Deficiency Diseases.

Unit 5

05 Hours

Water and Electrolyte balance: Distribution of Body Water, Electrolyte Composition of Body Fluids, Regulation of Electrolyte Balance , Dehydration and Over hydration, Acid Base balance , Role of Buffers, Role of Lungs and Kidney in Maintaining Acid Base Balance and Related Disorders

Unit 6

05 Hours

Organ Function Tests: Liver Function Tests,Kidney Function Tests, Gastric Function Tests, Pancreatic Function Tests,Thyroid Function Tests,

**BND –II-2 P
PRACTICALS**

NUTRITIONAL BIOCHEMISTRY II

Total 15 Hours

1. Qualitative analysis of amino acids
2. Qualitative analysis of proteins
3. Estimation of serum Protein
4. Estimation of serum creatinine
5. Estimation of serum Urea
6. Estimation of serum Iron, phosphorus, calcium

Reading References:

- Dasgupta, S. K., Biochemistry Vol. I; n & III, Mc Millan Co. of India Limited
- Das, Debajyoti, Biochemistry 2nd ed., 1980, Academic Publishers, India.
- Harper, H. A. et al, A review of physiological chemistry, Los Altos, Lange medical publications, 1985.
- Lehninger, A. L., Principles of Biochemistry
- Orten J. M. & Newhaus O. V, Human Biochemistry, C. V Mosby Co. S1. Lois, JSA 1982.
- Chatterjee Textbook of Medical Biochemistry
- Biochemistry, U Satyanarayna, U.Chakrapani 4th edition,

**BND –II-3 P
THEORY**

NUTRITION IN THE LIFECYCLE - I

Total 30 Hours

Unit I

10 Hours

Nutrition during Pregnancy and lactation: Physiological stages of pregnancy , Effect of Nutritional status on Pregnancy outcome, Nutritional Requirements, Guide for eating during pregnancy) Complications of pregnancy and their dietary Implications. Lactation: Physiology, Nutritional Requirements, breast feeding an infant.

Unit 2

08 Hours

Nutrition during Infancy: Physiological Development, Nutritional Requirements, Milk for Infants-Composition of human and cow's milk, formulas, Complimentary foods-weaning pattern, composition, general principles in feeding infants, special feeding problems. Nutritional requirements of Toddlers (1-3years) , Nutrition in the Care of the Low-Birth weight Infant: Characteristics of low-birth weight Infant, small for date babies, pre-term babies Use of growth chart.

Unit 3

06 Hours

Nutrition In Childhood Pre-School (1 to 6 years): Growth and Development, Nutritional Requirement's, Factors influencing food intake, Nutritional Concerns

Unit 4

06 Hours

Nutrition in School Children: Nutritional Requirements of School Children (7-12 years). School lunch Programmes. Diet related problems.

BND –II-3 P

PRACTICALS

NUTRITION IN THE LIFECYCLE I

Total 15 Hours

1. Planning a day's diet for Pregnant Woman
2. Planning of low cost nutritious recipe for pregnant women.
3. Planning of high cost nutritious recipe for pregnant women.
4. Planning of low cost nutritious recipe for lactating mothers
5. Planning of high cost nutritious recipe for lactating mothers
6. Planning of weaning food for Infants (6-12 months)
7. Planning of Mid day Meal for preschool children (1-6 years)
8. Planning of Mid meal for school Children (6-12 years)
9. Planning and preparation of a day's diet for a school going child with special emphasis on Packed Lunches.

Reading Reference

1. Antia, F.P. (2005): Clinical Nutrition and Dietetics, Oxford University Press, Delhi
2. Gordon M Ward law (1999) Perspectives in Nutrition 4th ed.WCB/Mcgraw Hill.
3. Chadha R and Mathur P eds. Nutrition: A Lifecycle Approach. Orient Blackswan, New Delhi. 2015
4. International edition. Mahan, L.K., Arlin, M.T. (2000): Krause's Food, Nutrition and Diet therapy, 11th edition, W.B.Saunders Company, London. Passmore, R and Davidson S
5. Shubhangini A Joshi (2002): Nutrition and Dietetics 2nd edition, Tata Mc Graw-Hill Publishing Company Limited, New Delhi.
6. Srilakshmi,B.(2005):Dietetics,5th edition, New Age International(P) Limited Publishers, New Delhi

BND –II-2 P

THEORY

ENVIRONMENTAL STUDIES

The students should gain knowledge to understand the multidisciplinary nature of the environment and the awareness of the eco system, which maintains the natural environment.

OBJECTIVES:

a) KNOWLEDGE

At the end of the II Phase 1st term MBBS Course the student is expected to know:

1. The natural resources like forest, water, mineral, food, energy and land.
2. Functions of the eco system.
3. Bio-diversity and its conservation.
4. Environmental pollution & its prevention.
5. Social issues.

b) SKILLS

At the end of the IIInd term Course the student is expected to:

1. Visit local areas to understand and document environmental assets like river, forest, grassland, hill and mountain.
2. Visit an industrial area or agricultural area to know about local pollutants.
3. Identify common plants, insects and birds in their local areas.
4. Identify rivers, hills and mountains in their local areas.
5. To make use of the knowledge to protect natural resources.

COURSE CONTENTS

Theory and Field work: 50 Hours

- **Theory - 45 hours**
- **Field work - 5 hours**

1: Multi-disciplinary nature of environmental studies: Definition, scope and importance, need for public awareness. 2 hours

2: Natural Resources:

Renewable and non-renewable resources:

Natural resources and associated problems.

- a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
- b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
- f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- g) Role of an individual in conservation of natural resources.
- h) Equitable use of resources for sustainable lifestyles **8 hours**

3: Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following

ecosystems:-

- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) **6 hours**

4: Biodiversity and its conservation

8 hours

- Introduction - Definition : genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

5: Environmental Pollution

8 hours

Definition

Cause, effects and control measures of:-

- a. Air pollution
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution
- g. Nuclear hazards

Solid waste Management : Causes, effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution.

Pollution case studies.

Disaster management : floods, earthquake, cyclone and landslides.

6: Social Issues and the Environment

7 hours

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case Studies

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and control of Pollution) Act.
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation.

7: Human Population and the Environment 6 hours

- Population growth, variation among nations.
- Population explosion - Family Welfare Programme.
- Environment and human health.
- Human Rights.
- Value Education.
- HIV/AIDS
- Women and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies.

8: Field work

- Visit to a local area to document environmental assets
river/forest/grassland/hill/mountain
- Visit to a local polluted site - Urban / Rural/ Industrial/Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)

Scheme of Examination

A. Theory: 80 Marks

- Long Essay 2 X 10 = 20
- Short Essay 8 X 5 = 40
- Short Answers 5 X 4 = 20

B. IA: 20 Marks

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

Recommended Books

Sl. No.	Title	Author	Edition & Year	Publisher
1	Environmental Biology	Agarwal, K.C.	2001	Nidi Publication Ltd. Bikaner
2	The Biodiversity of India	Bharucha Erach		Mapin Publishing Pvt. Ltd., Ahmedabad - 380 013
3	Environmental Encyclopedia	Cunningham W.P., Copper T.H., Gorhani E. & Hepworth M.T.	2001	Jaico Publication House, Mumbai.
4	Global Biodiversity Assessment	Heywood V. H. & Waston R.T.	1995	Cambridge University Press 1140p
5	Environmental Protection and Laws	Jadhav H. & Bhosale V. M.	1995	Himalaya Publishing House, Delhi 284p
6	Environmental Science Systems & Solutions	Mckinney M. L. & School R.M.	1996	

SECTION VI

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH**B.Sc. NUTRITION AND DIETETICS****Semester III**

Sl no	Code	Core Subjects	Theory/Practical	Hours	Credit
1	BND –III-1 T	Assessment of Nutritional status	Theory	30	4
2	BND –III-2 T	Basic Dietetics	Theory	30	4
3	BND –III-3 T	Nutrition in Lifecycle II	Theory	30	4
4	BND –III-1 P	Assessment of Nutritional status	Practical	15	4
5	BND –III-2 P	Basic Dietetics	Practical	15	4
6	BND –III-3 P	Nutrition in Lifecycle II	Practical	15	4
7.	BND –III-4 T	Communication Skills (electives)	Theory	30	4

BND –III-1 T

THEORY

ASSESSMENT OF NUTRITIONAL STATUS

Total Hours 30

Unit 1

5 Hours

Method and Assessment of Nutritional Status, Identification of risk groups (random and purposive). Define Anthropometry.

Requirement for measuring anthropometric data. Anthropometry and reference values for Newborn, Infant, Children, Adolescent, Adult and Elderly.

Unit 2:

5 Hours

Nutritional Indices: Weight for Age, Height for Age, Weight for Height, BMI, BMI for Age, Mid arm circumference for age and height, Skin fold thickness, Head Circumference, Waist Hip Ratio: Various tools used, measurements, and Reference Range and Interpretations. Plotting and interpretation of growth charts for children below 5 years

Identification of clinical signs of common nutritional disorders

Unit 3:

10 Hours

Nutritional Assessment Systems: Surveys, Surveillance, Screening Intervention, and assessment system in clinical system.

Nutritional Assessment Methods:

Nutritional Indirect assessments: Anthropometric, Laboratory methods, Clinical Methods, Dietary Factory and Ecological Methods.

Nutritional Indirect assessments- Food balance sheets and Agricultural Data. Use of growth charts.

Use of Nutritional Diagnosis at Clinic and at the community

Unit 4:

10 Hours

Dietary assessment – Food Frequency Questionnaires and 24-hour diet recall Method.

Clinical assessment and signs of nutrient deficiencies – Protein Energy Malnutrition (Kwashiorkor, marasmus)

Vitamin A deficiencies, Anaemia, Rickets, B-Complex deficiencies.

Methods of Extension used in community- a) Preparation of visual aids-charts, posters models, etc. for exhibition. b) Lecture and Method Demonstrations to target groups.

BND –III-1 P

PRACTICAL

ASSESSMENT OF NUTRITIONAL STATUS

Total 15 Hours

1. Assessment of Nutritional status

- Anthropometric Measurement - Height, weight, skinfold thickness, Mid - upper arm circumference.
- Comparison and interpretation of the nutritional assessment data and its significance - body Mass Index (BMI), fat mass, Waist - Hip Ratio (WHR).
- Estimation of food and nutrient intake - 24 hours dietary recall, food frequency
- Planning, calculation and preparation of diets for different age groups –
 - (a) Infant, with reference to weaning foods.
 - (b) Children
 - (c) Adolescents—boys and girls
 - (d) Adults— Men and women engaged in sedentary, moderate and heavy work.
 - (e) Pregnant and lactating women.

2. Diet and nutrition survey- Identifying vulnerable and at risk groups

3. Hospital visits to observe nutritional deficiencies

Suggested Readings :

1. Wadhwa A and Sharma S (2003). Nutrition in the Community-A Textbook. Elite Publishing House Pvt. Ltd. New Delhi.
2. Park K (2011). Park's Textbook of Preventive and Social Medicine, 21st Edition. M/s Banarasidas Bhanot Publishers, Jabalpur, India.
3. Bamji MS, Krishnaswamy K and Brahmam GNV (Eds) (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
4. ICMR (2011) Dietary Guidelines for Indians – A Manual. National Institute of Nutrition, Indian Council of Medical Research, Hyderabad.
5. Jelliffe DB, Jelliffe ERP, Zerfas A and Neumann CG (1989). Community Nutritional Assessment with special reference to less technically developed countries. Oxford University Press. Oxford.
6. World Health Organization (2006). WHO Child Growth Standards: Methods and development: Length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age.

BND –III-2 T

THEORY

BASIC DIETETICS

Total Hours 30

Unit 1

03 Hours

Therapeutic Diets: Basic Concept, Therapeutic Adaptation of Normal Diet, Factors Considered, Routine Hospital Diets, Mode of feeding methods, Role of dietitian in the Hospital and Community, Patient Care and Counseling

Unit 2

02 Hours

Diet in Weight Imbalance and Counseling: Obesity and Underweight- Causes, Health risks, Dietary Treatment, Psychotherapy

Unit 3

05 Hours

Diet, Nutrient and Drug Interaction: Effect of drugs on ingestion, digestion, absorption and metabolism of nutrients. Effect of food, nutrients and nutritional status on drug dosage and efficacy.

Unit 4

05 Hours

Diet in Fever: Nutrition and Infection, Metabolic changes during Infection, Typhoid fever, Tuberculosis, HIV Infection and AIDS

Unit 5

05 Hours

Anemia: Resulting from Acute Hemorrhage, Nutritional anemia, Sickle cell anemia, Thalassemia, Pathogenesis and dietary management in the above conditions

Food Intolerances and Food Allergy: Adverse food reactions, Treatment and Management, Prevention

Unit 6

05 Hours

Diet in Diseases of Gastro Intestinal Tract: Upper GI Tract Disorders- Disorders of Esophagus, Disorders of Stomach. Lower GI Tract Disorders- Common Intestinal Disorders, Disorders of Small Intestine. Intestinal Brush Border Enzyme Deficiencies, Inflammatory Bowel Diseases, Disorders of Large Intestine

**BND –III-2 P
PRACTICAL
BASIC DIETETICS**

Total Hours 15

1. To plan a Clear Liquid diet.
2. To plan a Full Liquid Diet.
3. To plan a Soft Diet.
4. To plan a diet for Obesity.
5. To plan a diet for Underweight.
6. To plan a diet for Typhoid fever.
7. To plan a diet for Tuberculosis.
8. To plan a diet for Nutritional Anemia
9. To plan a diet for Lactose Intolerance.
10. To plan a diet for Coeliac Disease.

Suggested Readings:

1. Raghuvanshi, R.S. and Mittal, M. (2014). Food Nutrition and Diet Therapy. Westvills Publication Delhi.
2. Agarwal, A and Udipi, S. (2014). Text Book of Human Nutrition. Jaypee Medical Publication Delhi.
3. Robinson. Basic Nutrition And Diet Therapy (8th Edition)
4. Mahan L. K., Escott- Stump, S. and Raymond J. L. (2012): “Krause’s Food and the Nutrition Care Process”, 13th Edition, Elsevier.
5. Ross, A.C., Caballero B., Cousins R. J., Tucker K.L. and Ziegler T. (2014) Modern Nutrition in Health and Disease. Wolters Kluwer Health/ Lippincott Williams and Wilkins. Ed 11th
6. Garrow, J. S., James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietetics. 10th Edition, Churchill Livingstone.

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

BND –III-3 T

THEORY

NUTRITION IN LIFECYCLE II

Total Hours 30

Unit 1

8 Hours

Nutrition in Adolescents: Nutritional Problems in adolescence (Obesity, Anorexia Nervosa, Bulimia), Nutritional Requirement in Adolescence, Low Cost Balanced Diets

Unit 2

8 Hours

Nutrition in Adults: Nutritional need of adults, Concept of Balanced Diet, Additional requirements

Unit 3

7 Hours

Nutritional and Food Requirements of Elderly: Process of Ageing, Nutritional Requirements, , Nutritional Related Problems of old age, Degenerative Diseases.

Unit 4

7 Hours

Physical Activity in different age group (child, adolescence, adult and elderly) and specific nutritional requirement. Introduction to Lifestyle Disorders (Obesity, Type 2 Diabetes Mellitus and Hypertension). Role of nutrition and physical activity in these lifestyle disorders.

BND –III-3 P

PRACTICALS

NUTRITION IN LIFECYCLE II

Total Hours 15

1. Planning of mid-day meal for Adolescents (13- 17 years).
2. Planning and preparation of Days Diet for Adoloscent girl and boy
3. Planning and preparation of Days for Normal Adult Men and women
4. Planning and preparation of Days Diet for Old Age Person.
5. Planning of low cost nutritious recipe for: Adolescence, Adult and Elderly.

6. Planning and preparation of Days Diet for Sedentary, Moderate and Heavily worker:
Adult women and men – 6 diets)

Suggested Readings:

1. B. Srilakshmi- Dietetics(8th multicolour ed.), New Age International (P) limited, Publishers
2. Briggs, G. M. & Doirs K. Collaway: Bogery Nutrition And Physical Fitness (9th Ed.) Saunders, Philadelphia, 1979.
3. Chaney, M. S. Rose M.L. & Wischi J. C. Nutrition, Houghton Mifflim, Boston, 1979.
4. Guthrie H.: Introductory Nutrition (6th Ed.) Times Mirror/Mostry College Publishing, 1986.
5. Robinson, Lawler: Normal & Therapeutic Nutrition (17th Ed.) Macmillan Publishing Co. 1986.
6. Swaminathan S.: Advanced Textbook On Food & Nutrition Vol. 1 & N (2nd Ed. Revised _ Enlarged) Bapp Co. 1985.
7. Robinson. Basic Nutrition And Diet Therapy (8th Edition)
8. Krause' s Food and Nutrition Therapy 2010, 12th Edition

BND –III-4 P

THEORY

COMMUNICATION SKILLS

Total Hours 30

Unit 1

- Communication, its types and significance: Communication, Process of communication its kinds, channels and role in the society.
- Methods of Communication (Oral, Written, One way, two way communication skills).
- Reading skills: - Process of reading, reading purpose, models, strategies methodologies, reading activities, structure of meaning techniques.

Unit- 2

- Précis and Communication. • Writing skills :- Elements of effective writing, writing styles, scientific and technical writing. • Grammar: - Transformation of sentences, words used as different parts of speech, one word substitution, abbreviations, technical terms etc.

Unit-3

- Listening skills: - Process of listening, barriers to listening, effective listening skills, feedback skills. • Speaking skills :- Speech mechanism, organs of speech, production and classification of speech sounds, phonetic transcription, skills of effective speaking components of an effective talk, oral presentation and the role of audio visual aids in it. • Reading of text book.

Unit 4

Barriers of communication and technique to overcome those. • Meaning of effective communication. • Technical Report writing. • Practice of writing personal resume and writing application for employment. Theory: 80 Marks IA: 20 Marks

SECTION VII**Semester III**

Sl no	Code	Core Subjects	Theory/Practical	Hours	Credit
1	BND –IV-1 T	Advanced Dietetics	Theory	30	4
2	BND –IV-2 T	Diet and Nutritional Counseling	Theory	30	4
3	BND –IV-3 T	Fundamentals of Food Microbiology	Theory	30	4
4	BND –IV-1 P	Advanced Dietetics	Practical	15	4
5	BND –IV-2 P	Diet and Nutritional Counseling	Practical	15	4
6	BND –IV-3 P	Fundamentals of Food Microbiology	Practical	15	4
7.	BND –IV-4 T	Law – Indian Constitution (electives)	Theory	30	4

BND –IV-1 T

THEORY

ADVANCED DIETETICS

Total 30 Hours

Unit 1

04 Hours

Diet in liver diseases and counseling: functions of liver, hepatitis, cirrhosis of liver, hepatic coma, diseases of gall bladder, diseases of pancreas

Unit 2

04 Hours

Diet in kidney diseases and counseling: functions of kidney, glomerulonephritis, nephrotic syndrome, acute renal failure, chronic renal failure, end stage renal diseases, urolithiasis

Unit 3

03 Hours

Nutrition in eating disorders: introduction, anorexia nervosa, bulimia nervosa, binge eating disorders

Unit 4

04 Hours

Nutrition and neurological disorders: Parkinson's disease, Alzheimer's disease, epilepsy, migraine, multiple sclerosis, neurotrauma, spine trauma, feeding problems of patients with neurological disorders

Unit 5

06 Hours

Diseases of metabolic disorder and counseling: diabetes mellitus and gout

Unit 6

05 Hours

Diet in cardiovascular diseases and counseling: coronary heart diseases (chd) - prevalence, risk factors, pathophysiology. Dyslipidemia, atherosclerosis, hypertension, angina pectoris, myocardial infarction, congestive cardiac failure

Unit 7

04 Hours

Diet in cancer and counseling: risk factors, metabolic alterations and nutritional problems related to cancer, nutritional requirements of cancer patients related to cancer therapy, cancer prevention

**BND –IV-1 P
PRACTICALS**

ADVANCED DIETETICS

Total 15 Hours

1. To plan a diet for Hepatitis.
2. To plan a diet for Cirrhosis of Liver.
3. To plan a diet for Hepatic coma.
4. To plan a diet for Nephrotic Syndrome.
5. To plan a diet for Acute Renal Failure.
6. To plan a diet for Diabetes Mellitus.
7. To plan a diet for Gout.
8. To plan a diet for Hypertension.
9. To plan a diet for Myocardial infarction.
10. To plan a diet for Cancer.

SUGGESTED READINGS:

1. Dietetics: B. Srilaxmi(2012). Nutrition Science.4th Revised Edition, New Age Interntional Publishers.
2. Raghuvanshi, R.S. and Mittal, M. (2014). Food Nutrition and Diet Therapy. Westvills Publication Delhi.
3. Agarwal, A and Udipi, S. (2014). Text Book of Human Nutrition. Jaypee Medical Publication Delhi.
4. Robinson. Basic Nutrition And Diet Therapy (8th Edition)
5. Mahan L. K., Escott- Stump, S. and Raymond J. L. (2012): “Krause’s Food and the Nutrition Care Process”, 13th Edition, Elsevier.
6. Ross, A.C., Caballero B., Cousins R. J., Tucker K.L. and Ziegler T. (2014) Modern Nutrition in Health and Disease. Wolters Kluwer Health/ Lippincott Williams and Wilkins. Ed 11th
7. Garrow, J. S., James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietetics. 10th Edition, Churchill Livingstone.
8. Nix Staci (2013) William’s Basic Nutrition and Diet Therapy. Elsevier Ed. 14th.

BND –IV-2 T

THEORY

DIET & NUTRITIONAL COUNSELLING

Total 30 Hours

Unit 1

Basics of Diet Counseling:

10 Hours

- Diet Counselling-meaning, significance, process, types
- Goals of counselling, individuals, group and family counselling
- Basic sequence in counselling.
- Materials needed for counselling –models, charts, posters, AV aids, Handouts etc
- Communication process in counselling and linguistics in clinical dietary practices, problems in communication
- Role of Counsellor & Counselee
- Techniques of obtaining relevant information- 24 Hour Dietary recall, List of food likes and dislikes, Lifestyle
- Dietician as a part of medical team and research team
- Impact of counselling on health and disease of individuals – discussion of hospital case studies

Unit 2

10 Hours

Diet Counseling at Hospital and Community Level

- Role of counselling in hospital
- Role of counselling in community
- Organizing health camps and patient feedback – at hospital level
- Organizing health camps and patient feedback – at community level
- Diet counselling for obese people
- Diet counselling for Diabetics
- Diet counselling for CVD
- Diet counselling for mother and child care

- Diet counselling for adolescent
- Patient follow up / home visit

Unit 3:

Introducing to Psychology and Counseling

06 Hours

- Introduction to psychology – Definition, Nature and Scope
- Attention and perception – Types of attention and factors influencing attention, principles of perceptual organization and abnormalities in perception
- learning and memory- Types of learning, Types of memory, Forgetting and its causes
- motivation and emotion- Types of motives, types of emotions, emotional expression
- Personality- nature and definition, factors influencing personality, Psycho analytic theory of personality
- Nature and goals of counseling
- Principles of counseling
- Characteristics of a good counselor
- Ethical principles of counselling
- Special areas of counselling: Educational, Family, Health, Community and Counselling of Alcoholic and Drug Addicts

Unit 4.

04 Hours

Counseling Skills

- Approaches to counselling – Psycho analytic approach, Behaviouristic Humanistic approach
- Pre – Helping phase: Rapport building skills, Attending and listening skills.
- Stage I skills: Empathy, respect, Genuineness and concreteness.
- Stage II skills: Advanced empathy, self-disclosure, Immediacy and Confrontation.
- Stage III skills : Goal setting, Action plan Programme and Brainstorming

**BND –IV-2 P
PRACTICAL**

DIET & NUTRITIONAL COUNSELLING

Total 15 Hours

1. Motivational Interviewing
2. Communication Influencers
3. Cases -Identifying need to a change
4. Cases -Identifying Barrier to a change
5. Behavioral Modification
6. Mindful Characteristics of a Counsellor
7. Mock Counselling – Minimum 10 Cases

Suggested Readings:

- Counselling Skills for Dietitians: Blackwell Publication, Judy Gable (2nd edition)
- Gibson, R.L., Mitchell, M.H. (2005). Introduction to counselling and guidance (6th Ed)
- Gelso, C.J., Fretz, B.R. (1995). Counselling Psychology, Bangalore, Prism Books Pvt Ltd.
- Sharma, T.C. (2002). Modern Methods of Guidance and Counseling, New Delhi, sarup & sons.
- Beena and Parweshwaran- Invitation to Psychology, Neel Kamal Publications.

**BND –IV-3 T
THEORY**

FUNDAMENTALS OF FOOD MICROBIOLOGY

Total 30 Hours

Unit 1

05 Hours

Introduction to Microbiology and Structure of Microorganisms Definition and History: Microscopy, Light and electron Microscopy, Listing other Types. General Morphology of Microorganisms Bacteria, Fungi, Algae, Yeast and Virus Bacteriophage

Unit 2

05 Hours

Growth and Multiplication Growth Curve, Definition of Batch and Continuous culture, Factors Affecting Growth: Intrinsic Factors, Nutrient Content, pH, Redox Potential, Antimicrobial Barrier and Water Activity. Extrinsic Factors: Relative Humidity, Temperature and Gaseous Atmosphere Unit

Unit 3

05 Hours

Microbiology of Perishable Foods Outline of Contamination- Spoilage and Preservation of Vegetables and Fruits, Milk and Milk Products and Canned Foods, Meat and Meat Products, Egg and Poultry

Unit 4

05 Hours

Microbiology of Non-Perishable Foods Outline of Contamination- Spoilage and Preservation of Cereal and Cereal Products and Sugar and Sugar Products Unit V Beneficial Effects of Microorganisms Fermented Foods – Curd, Cheese, Sauerkraut, Meat, Soy Based Foods, Alcoholic Beverages and Vinegar, Microbial Biomass

Unit 5:

02 Hours

Microbiology of water: Bacterial flora of water, Indicators of faecal pollution and their advantages, Bacteriological determination of water- Standard plate count, Total plate count, Qualitative test- Standard multiple tube fermentation & IMVIC test, Quantitative test- Most probable number test.

Unit 6:

05 Hours

Food-Borne illness: Bacterial and Non-bacterial

- Food Borne Intoxications – Staphylococcal poisoning, Botulism
- Food Borne Infections – Salmonellosis, Shigellosis
- Food Borne Toxic Infections – Cholera, Listeriosis
- Mycotoxins – Aflatoxin, Patulin, Ochratoxin
- Food – Borne Parasites – Trichinosis
- Seafood Toxicants – Shellfish Poisoning, Scombroid Food Poisoning

Unit 7:

03 Hours

Food Fermentations

- Role of micro-organisms in fermentation
- Fermented Meat & Fish Products – Sausages, Fermented Fish
- Fermented Fruit & Vegetable Products – Sauerkraut, Kimchi, Vinegar, Citric acid
- Fermented Cereal Products – Idli, Vada, Dosa, Bhatara, Dhokla, Miso, Tempeh, Soy Sauce
- Economically important fermented foods- Beer, Ale, Wine, Distilled Liquor Products

BND –IV-3 P

PRACTICAL

FUNDAMENTALS OF FOOD MICROBIOLOGY

Total 15 Hours

1. Instrumentation in Microbiology laboratory and their function (Microscope, Autoclave, Hot air oven)
2. Preparation of Culture media
3. Pure culture techniques (spread plate, streak plate and pour plate methods)
4. Staining techniques-simple and differential.
5. Microbiological evaluation of milk and milk products.
6. Microbiological analysis of water and air.
7. Isolation of spoilage organisms from different food commodities

Suggested Readings:

1. M.R. Adams and M.O. Moss, Food Microbiology, New Age International (P) Ltd., New Delhi, 2005.
2. Vijaya Ramesh, K. Food Microbiology, MJP Publishers, Chennai, 2007
3. James G. Cappuccino and Natalie Sherman, Microbiology – A Laboratory Manual, Pearson Education Publishers, USA, 2008.
4. James M. Jay Modern Food Microbiology, Fourth Edition, CBS Publishers and Distributors, New Delhi, 2005.
5. Adams Tamine, Probiotic Dairy Products, Blackwell Publishing, USA, 2005.

BND –IV-4 T

THEORY

LAW AND CONSTITUTION

Total 30 Hours

Unit-I: Meaning of the term 'Constitution' making of the Indian Constitution 1946-1940.

Unit-II: The democratic institutions created by the constitution Bicameral system of Legislature at the Centre and in the States.

Unit-III: Fundamental Rights and Duties their content and significance.

Unit - IV: Directive Principles of States Policies the need to balance Fundamental Rights with Directive Principles.

Unit - V: Special Rights created in the Constitution for: Dalits, Backwards, Women and Children and the Religious and Linguistic Minorities.

Unit-VI: Doctrine of Separation of Powers legislative, Executive and Judicial and their functioning in India.

Unit - VII: The Election Commission and State Public Service commissions.

Unit - VIII: Method of amending the Constitution.

Unit - IX: Enforcing rights through Writs:

Unit - X: Constitution and Sustainable Development in India.

Books:

1. J.C. Johari: The Constitution of India- A Politico-Legal Study-Sterling Publication, Pvt. Ltd. New Delhi.
2. J.N. Pandey: Constitution Law of India, Allahbad, Central Law Agency, 1998.
3. Granville Austin: The Indian Constitution - Corner Stone of a Nation-Oxford, New Delhi, 2000.

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

SECTION VIII

Semester V

Sl. no	Code	Core Subjects	Theory/Practical	Hours	Credit
1	BND –V-1 T	Ayurveda Concepts of Diet	Theory	30	4
2	BND –V-2 T	Community Nutrition	Theory	30	4
3	BND –V-3 T	Food Preservation and Adulteration	Theory	30	4
4	BND –V-1 P	Ayurveda Concepts of Diet	Practical	15	4
5	BND –V-2 P	Community Nutrition	Practical	15	4
6	BND –V-3 P	Food Preservation and Adulteration	Practical	15	4
7.	BND –V-4 T	Fundaments of Computer (Electives)	Theory	30	4

BND –V-1 T

THEORY

AYURVEDA CONCEPTS OF DIET

Total Hours 30

Unit 1

07 Hours

Concept of Prakruti(Constitution), Tridosha and Panchamahabhoota theory in Ayurveda
Types of Tastes as per Ayurveda and Modern science and Shadrasas and its importance
Concept of Whole some and unwholesome diet. Incompatibility of food as per classics
Classification of food as per Ayurveda Classics and their relevance
Vegetarian and Non vegetarian food as per Ayurveda classics and their importance

Unit 2

07 Hours

Concept of Agni (Digestive capacity), Relation of food and Agni
Asta vidhi ahara vidhi visheshayatana – Ayurveda classical dietetics
Daily consumable foods as per classics and their nutritional relevance
Standards of Quantity of serving as per Ayurveda and Food serving standards
Concept of balanced diet in Ayurveda classics

Unit 3

08 Hours

Seasonal foods mentioned in classics and its importance
Understanding the chemical composition, physical and chemical properties, nutritive value, bioavailability of Classical mentioned foods
Food processing in Ayurveda
Ayurveda Pathya Kalpana – krutanna varga, Manda, peya vilepi, yusha, yavagu and krushara kalpana and their nutritive importance

Unit 4

08 Hours

Nutraceuticals in Ayurveda
Nutritional assessment in Ayurveda classics
Diet planning in Ayurveda

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

BND –V-1 P

PRACTICALS

AYURVEDA CONCEPTS OF DIET

Total Hours 15

Practical's

Sl no	Topic
1	Identification, nutritional importance of foods as per classics
2	Preparation of selected food items as per classics
3	Visit to Pathyahara section (Diet section) of Ayurveda Hospital and observing preparation and serving protocol
4	Diet history taking and Diet counselling techniques
5	Preparation of balanced diet by various available food stuffs

Reference Books:-

S No.	Name of the Author / Commentators	Title of the book	Edition	Name of the publication
1	Agnivesh	CharaksamhitawithChakrapani commentary	RP-2011	Rashtriya Sanskrit Sansthan New Delhi
2	Sushruta	Sushrutasamhita with Dalhan commentary	I ST -2012	ChoukhambaSurabharati
3	Vagbhata	AshtangHrudaya with Arunadatta&Hemadri commentary	3 RD -2012	Choukhamba Sanskrit seriesi
4	VruddhaVagbhata	AshtangSamgraha with Indu commentary	RP-2000	Krishnadas Academy Varanasi
5	Sharangadhara	Sharangadharasamhita	I ST -2010	ChoukhambaSurabharati
6	Bhavamishra	Bhavaprakasha	I ST -2006	ChoukhambaOrientalia
7	Vijayarakshit	Madhavanidana		
8	VaidyaPtRajesarDuttaShastri	SwasthavrittaSamuchaya	4 th -2005	SanjeevaniAushadhalaya
9	Dr.B.G.Ghanekarshastri	SwasthyaVignyana	6 th -2005	Choukhamba Sanskrit series
10	Dr.L.P.Gupta	Positive Health	1 st 2000	Choukambha Sanskrit Pratishtan

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

BND –V-2 T

THEORY

COMMUNITY NUTRITION

Total Hours 30

Unit 01

06 Hours

Community Nutrition: Concept, Scope, Future Projections, Health Care, Role of Public Nutritionists In Health Care Delivery

Nutritional Problems in India: Protein Energy Malnutrition, Micronutrient Deficiencies: Iron Deficiency Anaemia (IDA), Iodine Deficiency Disorders (IDD), Zinc Deficiency, Flurosis Vitamin A Deficiency

Unit 2:

04 Hours

Social health problems : Smoking , Alcoholism, Drug addiction and AIDS including AIDS Control Programme

Unit 3

08 Hours

Nutrition Monitoring And Nutrition Surveillance: Nutrition Monitoring And Its Current Programmes Nutrition Surveillance System

Nutrition Policy and Programmes: Integrated Child Development Services (ICDS) Programme, Nutrient Deficiency Control Programme, Supplementary Feeding Programme, Food Security Programme, Self-Employment and Wage Employment Schemes

Unit 4

08 Hours

Strategies to Combat National Nutritional Problems: Introduction, Diet Or Food Based Strategies, Nutrient Based Strategies, Immunization. Nutrition and Health Education: Definition, Importance, Nutrition Education Methods, Teaching aids used in Nutrition Education, Mass communication media used in Nutrition Education, Nutrition Education through Educational Institutions, Role Of Nutrition Education Programs In Eradication Of Malnutrition

Unit 5

04 Hours

Nutrition for special conditions : Feeding problems in children with special needs , Considerations during natural and man-made disasters e.g. floods, war.- basic guidelines in disaster management.

**BND –V-2 P
PRACTICAL**

COMMUNITY NUTRITION

Total Hours 15

1. Visit to local health centre to identify clinical signs and symptoms of nutritional problems.
2. Visit to an ICDS Block (Integrated Child Development Services)
3. Planning and preparation of snacks for PEM,
4. Planning and preparation of snacks Vitamin A Deficiency
5. Planning and preparation of snacks Iron Deficiency Anemia
6. Visit to any national Program and Make a Report
7. Creative Work on development of Nutrition and health Education messages
8. Development of nutrition education material
9. Development of suitable teaching aids for community
10. Planning, implementation and evaluation of nutrition education for a target group.

Suggested Readings:

1. Sehgal, S. and Raghuvanshi, R.S. (2007) Text Book of Community Nutrition. ICAR, New Delhi.
2. Beaton GH and Bengoa JM. Nutrition in Preventive Medicine. WHO (1976).
3. FAO/WHO. Preparation and use of food based dietary guidelines. Report of a joint FAO/WHO consultation: Nicosia, Cyprus. Nutrition Programme, WHO, Geneva (1996).
4. Gibney M. J., Margetts B. M., Kearney J. M. and Arab L. Public Health Nutrition. Blackwell Publishing Company (2013).
5. National Nutrition Policy. Department of Women and child Development. Ministry of Human Resource Development, New Delhi, Government of India, 1993.
6. Park.K. (2017) Park's Textbook of Preventive and Social Medicine, 24th ed. M/s Banarsida Bhanot, Jabalpur.
7. Jelliffe, D. B and Jelliffe, E.F.P. (1989) Community Nutritional Assessment, Oxford University Press.
8. Wadhwa, A. and Sharma, S. (2003) Nutrition in the Community - A text book SCN News, UN ACC/SCN Subcommittee on Nutrition

BND –V-3 T

THEORY

FOOD PRESERVATION & ADULTERATION

Total Hours 30

Unit 1

05 Hours

Food preservation: Definition, objectives and principles of food preservation. Different methods of food preservation.

Unit 2

10 Hours

Food Preservation using food spoilage, method of preservation by low temperature, high temperature, dehydration, food irradiation technology. Preserved Products: Jam, Jelly, Marmalade, Sauces, Pickles, Squashes, Syrups-types, composition and manufacture, selection, cost, storage, uses and nutritional aspects. Preservation by addition of external ingredient, Preparation of Various Food

Unit 3

06 Hours

Food Adulteration, Health hazards of food adulterants, Effect of food adulteration- food quality and nutritive value of foods.

Unit 3

09 Hours

Food Standards: Bureau of Indian Standards (ISI), Agmark, Govt. of India, Food Products Order by Ministry of Food processing Industry (FPO), The Meat Product Order (MPO), Prevention of Food Adulteration (PFA), Food Safety and Standards Authority of India (FSSAI) and International Standardization Organization (ISO)

BND –V-3 P

PRACTICALS

FOOD PRESERVATION & ADULTERATION

Total Hours 15

1. Different methods of Food preservation – Drying, Freezing, Frying, canning, bottling etc.
2. Aseptic handling: Sources of contamination of foods.
3. Preparation of
 - Pickles
 - Tomato sauce
 - Chili sauce
 - Jelly
 - Tomato puree
 - Squashes
4. Detection of Vanaspati in Ghee/Butter.
5. Detection of Khesari flour in besan.
6. Detection of Metanil yellow in turmeric/colourd sweet products.
7. Detection of Argemon oil in edible oil
8. Detection of artificially colour / foreign matter in tea (dust/leaves).
9. Detection of adulterants in milk 10. Visit to canning industry and dairy firm etc

Suggested Readings:

- 1.Subalakshmi, G and Udipi, SA(2006):Food processing and preservation, 1st Ed. New Age International (P)Ltd.
- 2.SrilakshmiB(2018): Food Science, 7th Colour Ed. New Age International (P) Lt
3. Potter NN and Hotchkiss JH(1999): Food science,5th Ed , Spinger.
- 4.Srivastava RPO and Kumar S (2014): Fruit and Vegetable Preservation Principles and Practices, 3rd Ed. International Book distribution Company.
- 5.McWilliamsM and Paine H(1984): Modern Food preservation. Surjeet Publications,.
- 6.CruessWV(2004):Commercial Fruits and Vegetable Products, Agrobios India.
- 7.Desrosier NW and Desrosier JN(2006):The Technology Of Food Preservation, 4th Ed. CBS Publishers and Distributors, New Delhi.
- 8.Adams M and NoutMJR(2001): Fermentation and Food Safety, Spinger

**BND –V-4 T
THEORY**

FUNDAMENTALS OF COMPUTER

Total Hours 30

- Introduction to computer: introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages. Input output devices: input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices),output devices(monitors, pointers, plotters, screen image projector, voice response systems).
- Processor and memory: The Central Processing Unit (CPU), main memory. Storage Devices: sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices. Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge. Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs. Introduction to power-point: introduction, creating and manipulating presentation, views formatting and enhancing text, slide with graphs.
- Introduction of Operating System: introduction, operating system concepts, types of operating system. Introduction to MS-DOS: History of DOS, features of MS-DOS, MS-DOS Commands (internal and external). Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

- Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree hybrid), components of network. Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet. Application of Computers in various fields: Medical, Education, Railway, Defense, Industry, Management, Sports, Commerce, Internet. Introduction to installation of different software and introduction about different software related to MLS.
- Learning to use MS Office: MS WORD, MS EXCEL & MS PowerPoint
- Examination: 80 Marks and IA : 20 Marks

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

SECTION IX

Semester VI

Sl. no	Code	Core Subjects	Theory/Practical	Hours	Credit
1	BND –VI-1 T	Food Service and Management	Theory	30	4
2	BND –VI-2 T	Bakery And Confectionery	Theory	30	4
3	BND –VI-3 T	Institutional Food Management	Theory	30	4
4	BND –VI-1 P	Food Service and Management	Practical	15	4
5	BND –VI-2 P	Bakery And Confectionery	Practical	15	4
6	BND –VI-3 P	Internship + Mini Project	Practical	15	4
7.	BND –VI-4 T	Human Values and Professional Ethics (Electives)	Theory	30	4

BND –VI-1 T

THEORY

FOOD SERVICE AND MANAGEMENT

Total 30 Hours

Unit 1

04 Hours

Organization of food service management: Definition, Various types of Food Service institutions, their characteristics and functions

Unit 2

06 Hours

Planning a food service unit, layout design, planning of different work areas – preparation, cleaning, storing, serving and dining areas. Lighting and ventilation, working heights in relation to equipment.

Unit 3

04 Hours

Institutional Menu Planning: Factors influencing menu planning, principles of menu planning, different kinds of menus.

Unit 4

06 Hours

Menu Planning, Delivery and Service of Foods, Food service systems. Quality food Service – types-Centralized, de-centralized objectives. Styles of service.

Unit 5

05 Hours

Importance of sanitation and hygiene in food, kitchen hygiene, Hygienic handling of Food, employee's health, hygiene of food service unit. Food Purchase, Selection and Storage

Unit 6

05 Hours

Personnel Management- selection, training and supervision of personnel, criteria for selection of Dietitian and Food Service staff

BND –VI-1 P

PRACTICAL

FOOD SERVICE AND MANAGEMENT

Total 15 Hours

1. Preliminary Planning Survey of types of units, identifying clientele, menu, operations and delivery
2. Planning the set up:
 - a) Identifying resources
 - b) Developing Project plan
 - c) Determining investments
3. Market survey for food items both raw and processed, Survey of food service units
4. Standardization of a recipe
5. Preparing Quick Foods for scaling up for quantity production
6. Planning menus for the following:
 - a) Packed meals for office employees
 - b) Nutritious tiffins for school children
 - c) School/college canteens
7. Develop a checklist for good hygiene practices

Suggested Reading

- 1.Khan MA (1987):Food Service Operations, Avi Publication Co.
- 2.Tompkins D(1969):Table Layout and Decoration, Ward Lock Co. Ltd.
- 3.Kinton R and CaseraniV(1989): The Theory of Catering, 6th Ed. ELBS.
- 4.Edward K(1997): Food Service Facilities Planning 3rd Ed, John Wiley & Sons.
5. Sethi M (2015):Catering Management: An Integrated Approach,3rd Ed. New Age International(P) Ltd.
- 6.RodayS(2017): Food Hygiene and Sanitation with Case Studies, 2nd Ed. McGraw Hill Education.

BND –VI-2 T

THEORY

BAKERY AND CONFECTIONERY

Total 30 Hours

Unit 1

04 Hours

Introduction to bakery. Classification of Baked Foods.

Principles of Baking

Structure and Composition of the Wheat Kernel, Steps and By Products of Wheat Milling, Enrichment of Flour and Bread. Methods of making batters and doughs and Nutritive Values.

Unit 2

06 Hours

Baking ingredients Role of Ingredients – Flour, Water, Yeast, Sugar, Shortening, Milk, Egg, Butter, Salt, Chemical Leavening Agents, Spices, Flavorings, Fruits and Nuts, Food Colors, Setting Materials, Cocoa and Chocolate, recipe balance, storage of baked products, selection of packaging materials.

Unit 3

10 Hours

Leaving agents: Definition, physical, chemical and biological leavening agents, role of these in baking and their Nutritive Values:

- a. Sugars: Types of sugars, role in baking. Fats: Types of fats in baking, role in baking.
- b. Milk and Milk products: Role and nutritional contribution in baking Salt, flavorings and spices: Role in baking.
- c. Bread: Ingredients, procedures for bread making, types of bread, common defects in bread making, bread improvers. Cakes: Ingredients, types of cakes, preparation of cakes, causes of variation in cake quality.
- d. Biscuits: Ingredients, essentials to get good biscuits, preparation of biscuits, nutritive values.
- e. Pastries: Ingredients, types, nutritive values, essentials in making a good pastry, preparation of pastry
- f. Cookies: Ingredients, types, preparation of sandwiches, nutritive values.

Unit 4

05 Hours

Icings and filling: Ingredients, types

Sandwiches: Ingredients, types. Preparation of sandwiches, nutritive values

Baking ovens: Side-flue and similar ovens, steam-pipe ovens, hot air ovens, advantages and disadvantages, maintenance of sanitation and hygiene in a bakery unit

Unit 5

05 Hours

Confectionery Processing of Raw Materials-Cocoa and Chocolate. Making of Toffee, Chocolates, Fruit Drops, Hard Boiled Candies(clear, hard, pulled, grained, filled), Soft candies (basic fondant, modified fondant like toffee, fudge, marshmallows, gums, jellies, chocolates) Bars, Chewing Gums, Special Confectionery Foods, role of major components, factors affecting quality of the product.

BND –VI-2 P

PRACTICALS

BAKERY AND CONFECTIONERY

Total 15 Hours

- 1) Quality testing of flour and yeast
- 2) Preparation of simple cake (with egg and eggless) and labelling nutritive value
- 3) Preparation of Chocolate Muffins and labelling nutritive value
- 4) Preparation of Marie Biscuits and labelling nutritive value
- 5) Preparation of White bread and labelling nutritive value
- 6) Preparation of Buns and labelling nutritive value
- 7) Preparation of Simple cookies and labelling nutritive value
- 8) Preparation of Drop cookies and labelling nutritive value
- 9) Formulation of Khoa Burfi and labelling nutritive value
- 10) Preparation of Kalakand and labelling nutritive value

SUGGESTED READINGS

1. Vijaya khader, Text book of food science and technology, Indian council of Agricultural Research, New Delhi, 2001
2. Kumud Khanna et al, The art and science of cooking, A student manuum, 3rd edition,, Published by Pr.Ouseph for phoenix, publishing House Pvt Ltd, 1998
3. Earl R.Palan, Judith A.Studler, preparing for the service industry, An introductory approach, AVI publishing co Ltd, 2000
4. William C practical in baking, 2000
5. Lilian Hiagland Meyer, Food chemistry CBS publishers and Distributors, 2004
6. Dubey, S.C. (2007). Basic Baking 5th Ed. Chanakya Mudrak Pvt. Ltd. • Raina et.al. (2010). Basic Food Preparation-A Complete Manual. 4rd Ed. Orient Black

7. Swan Ltd. • Khanna K, Gupta S, Seth R, Mahna R, Rekhi T (2004). The Art and Science of Cooking: A Practical Manual, Revised Edition. Elite Publishing House Pvt Ltd.

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

BND –VI-3 T

THEORY

INSTITUTIONAL FOOD MANAGEMENT

Total 30 Hours

Unit 1

04 Hours

Institutional Food Management: Evolution of food service industry, Principles of Management, Functions of Management, Organization Chart, Leadership

Unit 2

06 Hours

Management of Spaces: Kitchen Spaces, Storage Spaces, Service Spaces
Classification of equipment, factors involved in selection of equipments; purchase of equipment, operational know-how, care and maintenance of equipments; dining room furnishings. b.
Materials Used: Base materials used in the manufacture of equipments, materials used for finishes, materials used in the manufacture of dining room furnishings.

Unit 3

04 Hours

Food Management: Characteristic of foods: Food Purchasing, Menu Planning. Principles involved in menu Planning: Indian and Western, menu planner; techniques in writing menu card.

Unit 4

06 Hours

Financial Management: Definition and Scope, Cost Concepts, Cost Control, Pricing. Principles of food cost control, why good cost control, elements of cost-food cost, labour cost and overhead expenses; factors responsible for losses in a food service industry; methods of controlling foods costs leading to profit; costing of dishes, meals and events; methods of pricing items.

Unit 5

06 Hours

Definition, Sources of personnel, Criteria for selection of personnel orientation, training, motivation, supervision, importance of good human relations, employee facilities fringe benefits : Labour policies and legislation – labour laws governing food service establishments; Performance appraisal of employees. Definition, application of Management Accounts of

KLE ACADEMY of HIGHER EDUCATION AND RESEACH

B.Sc. NUTRITION AND DIETETICS

catering operators, cost concepts, book keeping and accounting – systems of book keeping, book of account maintenance of account books, balance sheets and inventor budgetary control.

Unit 6

04 Hours

Hygiene, Sanitation and Safety and Food Standards in India

KLE ACADEMY of HIGHER EDUCATION AND RESEARCH

B.Sc. NUTRITION AND DIETETICS

**BND –VI-3 P
PRACTICAL
DIETARY INTERNSHIP**

Total 15 Hours

It is compulsory for all the students to complete the 2 given institutional training programs in KLE Dr.. Prabhakar Kore Charitable Hospital and research Centre for a period of 15 days each. At the end of the Sixth Semester, each student has to submit a report of the training and undergo a viva voce examination. Marking system is as follows:

Internal Marking	a. 10 marks- Performance appraisal report given by training institution b. 10 Marks for Log Book	20 Marks
External Marking (University Exam)	Evaluation of given case study a. Major Case Study: 40 Marks b. Major Case Study: 20 Marks c. Viva voce: 20 marks	80 Marks
Total		100 Marks

Aspects to be covered in the institutional training programs

- i. Visits to the different wards to observe patients requiring special diets.
- ii. Experience in calculating and planning modified diets.
- iii. Supervising and handling the food preparation and service in the dietary department of the hospital
- iv. Case study- Selecting and observing 5 patients requiring a therapeutic diet in relation to Patient's dietary history - income, occupation, food habits and social factors.
- v. Calculating the diet according to medical prescription.
- vi. Accompanying the doctor while visiting the patient.

vii. Counselling and patient education Preparation of the report should include

- History of the hospital
 - Location
 - Facilities provided
 - Layout of the kitchen
 - Work organization and Organization structure
 - Duties of the dietitian
 - Special dietary preparation
 - Storage of food
 - Handling of leftovers and shortages
- xiii. Sanitation and hygiene

Suggested Readings:

1. Park, A. Park's Textbook of Preventive and Social Medicine, XIX Edition M/S Banarasidas, Bharat Publishers, 1167, Prem Nagar, Jabalpur, 428 001(India), 2007.
2. Bamji M.S, Prahlad Rao N, Reddy V., Textbook of Human Nutrition, II Edition, Oxford and PBH Publishing Co. Pvt. Ltd , New Delhi, 2004.
3. Bhatt D.P, Health Education, Khel Sahitya Kendra, New Delhi, 2008.
4. Gibney, M.J., Margetts, B.M., Kearney, J.M., Arab, L., Public Health Nutrition, Blackwell Publishing Co. UK, 2004.

BND –VI-4 T

THEORY

INSTITUTIONAL FOOD MANAGEMENT

Total 30 Hours

1. Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

- Understanding the need, basic guidelines, content and process for Value Education.
- Self Exploration–what is it?- its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self exploration.
- Continuous Happiness and Prosperity- A look at basic Human Aspirations Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority
- Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

2. Understanding Harmony in the Human Being - Harmony in Myself!

- † Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’
- † Understanding the needs of Self (‘I’) and ‘Body’ - Sukhand Suvidha
- † Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer)
- † Understanding the characteristics and activities of ‘I’ and harmony in ‘I’
- † Understanding the harmony of I with the Body: Sanyamand Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail
- † Programs to ensure Sanyamand Swasthya

3. Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

- † Understanding harmony in the Family- the basic unit of human interaction

- † Understanding values in human-human relationship; meaning of Nyayaand program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship
- † Understanding the meaning of Vishwas; Difference between intention and competence
- † Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship
- † Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitvaas comprehensive Human Goals
- Visualizing a universal harmonious order in society- Undivided Society (AkhandSamaj),
- Universal Order (Sarvabhaum Vyawastha)- from family to world family

4. Understanding Harmony in the Nature and Existence - Whole existence as Co- existence

- † Understanding the harmony in the Nature
- † Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature
- † Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space
- † Holistic perception of harmony at all levels of existence

5. Implications of the above Holistic Understanding of Harmony on Professional Ethics

- † Natural acceptance of human values
- † Definitiveness of Ethical Human Conduct
- † Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
- Competence in professional ethics:
- Ability to utilize the professional competence for augmenting universal human order
- Ability to identify the scope and characteristics of people-friendly and eco- friendly production systems
- Ability to identify and develop appropriate technologies and management patterns for above production systems.

- Case studies of typical holistic technologies, management models and production systems
- Strategy for transition from the present state to Universal Human Order:
- At the level of individual: as socially and ecologically responsible engineers, technologists and managers
- At the level of society: as mutually enriching institutions and organizations

Text Book:

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Value Education.
2. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, US.
3. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
4. A Nagraj, 1998, Jeevan Vidyaek Parichay, Divya Path Sansthan, Amarkantak
5. Susan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
6. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
7. A.N. Tripathy, 2003, Human Values, New Age International Publishers
8. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
9. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome’s report, Universe Books.
10. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press
11. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd
12. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
13. B L Bajpai, 2004, Indian Ethos and Modern Management, New

Ordinance Governing B.Sc. Critical care Technology Degree Course (Semester System) Syllabus/Curriculum 2021-22



Accredited 'A' Grade by NAAC (2nd Cycle) Placed in
'A' Category by Government of India (MHRD)

KLE Academy of Higher Education & Research

(Deemed-to-be-University)

[Declared as Deemed-to-be-University u/s 3 of the UGC Act, 1956 vide Government of India Notification
No. F.9 -19/2000-U.3 (A)]

J. N. Medical College Campus, Nehru Nagar, Belagavi-590 010, Karnataka, India.
Phone : +91-0831-2444444 Fax : 0831-2493777
web : <http://www.kledeemeduniversity.edu.in>
E-mail : coe@kledeemeduniversity.edu.in

Edition Year: 2021-22

© Registrar

Director, Academic Affairs

Email: diracademic@kledeemeduniversity.edu.in

KLE Academy of Higher Education & Research

JNMC Campus, Nehru Nagar, Belagavi-590 010.

Phone : 0831-2444444

e-mail:info@kledeemeduniversity.edu.in

Price Rs: 275/-only

Printed at:

Omega Offset

4574, Shetty Galli, Belagavi.

Ph: 0831-2424124 E-mail: customerservice@omegaoffset.com



VISION

To be an outstanding KAHER of excellence ever in pursuit of newer horizons to build self-reliant global citizens through assured quality educational programs.

MISSION

- To promote sustainable development of higher education consistent with statutory and regulatory requirements.
- To plan continuously provide necessary infrastructure, learning resources required for quality education and innovations.
- To stimulate to extend the frontiers of knowledge, through faculty development and continuing education programs.
- To make research a significant activity involving staff, students and society.
- To promote industry / organization, interaction/collaborations with regional/national/international bodies.
- To establish healthy systems for communication among all stakeholders for vision oriented growth. To fulfill the national obligation through rural health missions.

OBJECTIVES

The objectives are to realize the following at KAHER and its constituent institutions:

- To implement effectively the programs through creativity and innovation in teaching, learning and evaluation.
- To make existing programs more careers oriented through effective system of review and redesign of curriculum.
- To impart spirit of enquiry and scientific temperament among students through research oriented activities.
- To enhance reading and learning capabilities among faculty and students and inculcate sense of life long learning.
- To promulgate process for effective, continuous, objective oriented student performance evaluation.
- To ordinate periodic performance evaluation of the faculty.
- To incorporate themes to build values, Civic responsibilities & sense of national integrity.
- To ensure that the academic, career and personal counseling are in-built into the system of curriculum delivery.
- To strengthen, develop and implement staff and student welfare programs.
- To adopt and implement principles of participation, transparency and accountability in governance of academic and administrative activities.
- To constantly display sensitivity and respond to changing educational, social, and community demands.
- To promote public-private partnership.

INSIGNIA



The Emblem of the **KAHER** is a Philosophical statement in Symbolic.

The Emblem...

A close look at the emblem unveils a pillar, a symbol of the "KAHER of Excellence" built on strong values & principles.

The Palm and the Seven Stars...

The Palm is the palm of the teacher- the hand that acts, promises & guides the students to reach for the Seven Stars...

The Seven Stars signify the 'Saptarishi Dnyanamandal', the Great Bear-a constellation made of Seven Stars in the sky, each signifying a particular Domain. Our culture says: The true objective of human birth is to master these Knowledge Domains.

The Seven Stars also represent the Saptarishis, the founders of KLE Society whose selfless service and intense desire for "Dnyana Dasoha" laid the foundation for creating the knowledge called KLE Society.

Hence another significance of the raised palm is our tribute to these great Souls for making this KAHER a possibility.

Empowering Professionals...

'Empowering Professionals', inscription at the base of the Emblem conveys that our Organization with its strength, maturity and wisdom forever strive to empower the student community to become globally competent professionals. It has been a guiding force for many student generations in the past, and will continue to inspire many forth coming generations.

Notification

CONTENTS

Section	Topics	Page Nos.
I	Preamble, Objective, Name of the Course Duration, Eligibility	1-2
II	Course contents and scheme of examination of 1 st Semester B.Sc. Critical Care Technology	3-16
II I	Course contents and scheme of examination of 2 nd Semester B.Sc. Critical Care Technology	17-31
I V	Course contents and scheme of examination of 3 rd to 6 th Semester B.Sc. Critical Care Technology	32-73
V	Internal Assessment	74-75

B.Sc. CRITICAL CARE TECHNOLOGY

PREAMBLE

The B.Sc. Critical Care Technology Course is of 3 years(6 semesters) and 6 months internship duration aimed at training students in the critical care aspects of medical care with a good scientific foundation. The BSc critical care Technology course offered at faculty of Allied Health Sciences, KLE Academy of Higher Education and Research will prepare competent technologist with adequate knowledge and skills necessary for bedside monitoring, setting up equipment, and assist in the clinical decision making process in critical care. They will also be trained in record keeping and data collection in the ICU. Along with the basic knowledge and advanced training in the latest technologies in critical care, these graduates will play an important role in determining the quality of health care provided.

OBJECTIVE

The objective is to impart the basic knowledge & technical skills of critical care and its application in the health care delivery system.

I. ELIGIBILITY FOR ADMISSION

A candidate seeking admission to the Bachelor of Science – **Critical Care Technology** Course shall have passed:

- 1) The two year Pre-University examination or equivalent as recognized by KAHER with Physics, Chemistry and Biology as principal subjects of study.

OR

- 2) Pre Degree Course from a recognized university (two years after ten years of schooling) with Physics, Chemistry and Biology as principal subjects of study.

OR

- 3) Any equivalent examination recognized by KAHER for the above purpose with Physics, Chemistry and Biology as principal subjects of study.

OR

- 4) Pre university vocational course from an approved Board with laboratory technology as vocational subject.

II. DURATION OF COURSE

The duration of the Course shall be for period of three years and six months compulsory Rotatory internship

III. MEDIUM OF INSTRUCTION

The medium of instruction and examination shall be English.

IV. SCHEME OF EXAMINATION

There shall be six examinations during the course, each at the end of the first, second, third, fourth, fifth and sixth semester.

V. ATTENDANCE

Every candidate shall attend at least 80% of the total number of classes conducted in a calendar year from date of commencement of the term to the last working day as notified by the University in each of the subjects prescribed for that year separately in Theory and Practical. Only such candidates are eligible to appear for the University examinations in their first attempt. Special classes conducted for any purpose shall not be considered for the calculation of percentage of attendance for eligibility. A Candidate lacking in prescribed percentage of attendance in any one or more subjects either in Theory or Practical in the first appearance will not be eligible to appear the University Examination either in one or more subjects. Failed candidates should have attended at least 80% of the total number of classes conducted in that term in individual subjects separately in Theory and Practical to become eligible to appear for the University Examination in that subject in the supplementary or subsequent Examination. However, this is not applicable in case of carryover subjects.

Job opportunities and prospects

On finishing this course you are easily placed in the hospitals. You work in hospitals in ICUs, emergency rooms, trauma centres and similar healthcare settings requiring emergency and critical care. Hospitals working in both the private and public sector will be in need of your services. Other places to look for employment are government hospitals, military hospitals, railway hospitals and so on. You can undertake a post graduate program like M.Sc in Intensive care technology. You may also get to do research work in the field by opting for a doctoral program.

Employment:

Those who successfully complete the course will have very good opportunities in all leading hospitals in India and abroad.

COURSE STRUCTURE

First year

Theory classes and practical of following subjects:

Anatomy

Physiology

Biochemistry

Microbiology

Introduction to Computer application

Quality Assurance & Accreditation

English & Soft Skills

Second year

Theory class and posting in the clinical area:

Pharmacology

Applied anatomy and physiology in critical care

Applied microbiology and Pharmacology in critical care

Basics of Intensive Care Technology part 1 and part 2

Third year

Theory class and posting in the clinical area:

Intensive Care Technology– Clinical

Intensive Care Technology– Applied

Intensive Care Technology– Advanced

Fourth Year

Fourth year is internship in the clinical area.

CUMULATIVE GRADE POINT AVERAGE (CGPA)

Letter grades and grade points equivalent to percentage of mark and performance

10 Point Grade Scale

Percentage of Marks obtained	Letter Grade	Grade Point	Performance
91.00-100	O	10	Outstanding
80.00-89.99	A+	9	Excellent
70.00-79.99	A	8	Good
60.00-69.99	B+	7	Fair
50.00-59.99	B	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

1. Conversion of Grades into GPA

$$\text{GPA} = \frac{\text{Credits} \times \text{grade points}}{\text{Total Credits}}$$

2. Cumulative Grade Point Average (CGPA) of all six semesters will be calculated as: Total No. of GPA / No. of Semester

FIRST SEMESTER

Sr.No	Subject code	Course	Hours			Credits
			L	P	Total	
1	CRCT01	Anatomy	2	2		3
2	CRCTS02(A)	Physiology	1	2		2
3	CRCTS02(B)	Biochemistry	1	2		2
4	CRCTS03(A)	Pathology	1	2		2
5	CRCTS03(B)	Microbiology	1	2		2
6	ELS01	English (Subsidiary)	1			1
		Clinical Posting			18	08
		Total				20

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	CRCT01	Paper 1	Human Anatomy	60 + 20 + 20	100
2	CRCT02	Paper 2 Section A	Human Physiology	30 + 10 + 10	50
		Section B	Basics of Biochemistry	30 + 10 + 10	50
3	CRCT03	Paper 3 Section A	Pathology Basic Hematology	30 + 10 + 10	50
		Section B	Microbiology	30 + 10 + 10	50
4	ELS01	Paper 4 Subsidiary	English	80 + 20	100
Grand Total					400

Sr. No.	Subject Code	Practical	Subjects	Practical + IA	Total
5	CRCT04	Practical 1	Human Anatomy	80 + 20	100
6	CRCT05	Practical 2A	Human Physiology	40 + 10	50
		2B	Basics of Biochemistry	40 + 10	50
7	CRCT06	Practical 3A	Hematology & Clinical Pathology	40 + 10	50
		3B	Microbiology	40 + 10	50
Grand Total					300

Semester I

PAPER 1: CRCT01

Human Anatomy

Theory 25 Hours

The human body as a whole:

Definitions, Subdivisions of Anatomy, Terms of location and position, Fundamental Planes, Vertebrate structure of man, Organization of the Body cells and Tissues.

Locomotion and support:

The Skeletal system: Types of bones, structure and growth of bones, Divisions of the skeleton, Appendicular skeleton, Axial skeleton, name of all the bones and their parts, joint- classification, types of movements with examples.

Anatomy of the Nervous System:

Central nervous system: Brain and Spinal cord, functions, meninges.

The Brain- Brief structure of Hind Brain, Midbrain and Forebrain, Location, gross features, parts, functional areas, cerebral blood circulation and coverings, Functions of peripheral nervous system, Organization and Structure of Typical Spinal Nerve Spinal Cord: Gross features, extent, blood supply and coverings, reflex- arc. Applied Anatomy of spinal cord and brain.

Anatomy of circulatory system:

Heart: Size, location, external features, chambers, pericardium and valves, Blood supply and Nerve supply.

Right and Left Atrium: Structural features, venous area, septum and appendages, structural features inflow and outflow characteristics.

The study of blood vessels, General plan of circulation, pulmonary and systemic circulation.

Names of arteries and veins and their positions, general plan of lymphatic system. Coronary Circulation, Lymphatic drainage of heart in brief Applied aspects of heart and pericardium.

Anatomy of the Respiratory system:

Organization of Respiratory System, Gross structure and interior of Nose, Nasal cavity, Para nasal air sinuses,

Gross structure and interior of Pharynx, Larynx, trachea, bronchial tree, Pleura

Gross structure and Histology of Lungs, Pulmonary Circulation, Pulmonary Arteries, Pulmonary Veins and Bronchial Arteries.

Nerve Supply of Respiratory System and Applied aspect of Respiratory System.

Histology

General Slides:

Hyaline cartilage, Fibro cartilage, Elastic cartilage, T.S & L.S of bone, Blood vessels, Tonsils, Spleen, Thymus, Lymph node, Epithelial tissue, Skeletal and cardiac muscle, Peripheral nerve and optic nerve.

Systemic Slides

1. G.I.T
2. Lung-Trachea

3. Kidney, Ureter, Urinary bladder
4. Endocrine- Adrenal, pancreas, pituitary, thyroid and parathyroid
5. Uterus, Ovary, testis

Type of questions and distribution of marks for Theory examination in each subject in First Semester.

Sr. No.	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	20	20	100
2	Short Essay Question	7	5	5 X 5	25			
3.	Short Answers	5	5	5 x 3	15			

Suggested Readings:

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Human Anatomy Regional and Applied. Vol. 1, Vol.2 & Vol.3	B.D.Chaurasia	C.B.S.Publishers, New Delhi
2. Hand Book of General Anatomy	B.D.Chaurasia	C.B.S.Publishers, New Delhi
3. Text Book of Human Histology	Inderbir Singh	Jaypee Brothers, Medical Publishers, Delhi
4. Clinically Oriented Anatomy	Keith L. Moore	Williams and Wilkins, Baltimore
5. Gray's Anatomy	Susan Standring	Elsevier Churchill Livingstone, Edinburg

PRACTICAL 1: CRCTS04

Practical 20 Hours

Anatomy

1. General Histology Slides:
 - Epithelial Tissue,
 - Connective Tissue,
 - Hyaline Cartilage,

- Fibro Cartilage,
 - Elastic Cartilage,
 - T.S. & L.S. of Bone,
 - Blood Vessels,
 - Tonsil,
 - Spleen,
 - Thymus,
 - Lymph node,
 - Skeletal and Cardiac Muscle
 - Peripheral Nerve and Optic Nerve
2. Systemic Histology Slides:
 - RS -Lungs and Trachea
 - Cerebrum
 3. Demonstration of all bones - Showing parts, joints,
 4. X-rays of all normal bones and joints.
 5. Demonstration of heart and normal angiograms.
 6. Demonstration of Brain
 7. Demonstration of different parts of respiratory system and normal X-rays

PRACTICAL ASSESSMENT

Scheme of Practical Examination for First Semester.

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical 1	80	20	100

Scheme of Exam for Practicals:

Practical Histology Spotters: 10 X 2 Marks = 20 marks

Gross Anatomy Discussion: 2 X 20 Marks = 40 marks

Potter: 10 X 2 Marks = 20 marks

IA Marks 20 marks

Total: 100 Marks

Suggested Readings:

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Human Anatomy Regional and Applied. Vol. 1, Vol.2 & Vol.3	B.D.Chaurasia	C.B.S.Publishers, New Delhi
2. Hand Book of General Anatomy	B.D.Chaurasia	C.B.S.Publishers, New Delhi
3. Text book of Histology - A	J.P. Gunasegaran	Elsevier Publication, Gurgaon, Hariyana

Practical Guide		
4. Practical manual of Histology for Medical students	Neelkanth Kote	Jaypee Brothers, Medical Publishers, Delhi.

SEMESTER I

PAPER 2: CRCT02

Section A- Human Physiology

Theory: 35 Hours

GENERAL PHYSIOLOGY

Structure of Cell membrane and Cell Organelles, intercellular junctions,

Classification of Body fluid compartments & composition, Homeostasis

Transport across cell membrane –Definition and Classification

NERVE MUSCLE PHYSIOLOGY

Definition of Resting Membrane Potential, Action Potential - Phases & ionic basis

Classification and structure of Nervous Tissue

Structure, Classification and Properties of Skeletal Muscle

Neuromuscular Junction - Definition, Structure and Mechanism of neuromuscular transmission, Myasthenia gravis

Excitation Contraction Coupling

BLOOD

Composition and functions of blood and plasma proteins

Red Blood Cells: Morphology & functions, Erythropoiesis, types & functions of hemoglobin, Definition and Classification of Anemia & Jaundice.

White blood cells: Morphology, functions & variation, Definition of Leucopoiesis, Immunity – definition, and classification

Platelets and Blood Coagulation: Morphology & functions of platelets, Mechanism of Hemostasis, Anticoagulants, Bleeding disorders.

Blood Groups: Classification of Blood Groups, ABO and Rh blood group systems, uses of blood grouping test and Cross matching, Blood Transfusion and its hazards.

CENTRAL NERVOUS SYSTEM

Organization of CNS

Introduction, Structure of neuron, Properties of nerve fiber, Axonal Transport, Classification of nerve fibers

Synapse, Receptor & Reflex

Definition of synapse, receptor & reflex, Classification of Synapse, Structure & properties of synapse, Classification of receptor, adaptation, properties of receptor, Components of reflex arc, classification of reflex.

The sensory system

Overview of sensory system, Structure of Spinal Cord, Ascending tracts – Anterior Column, Lateral Column and Posterior Column Tract – Course, termination and function

The motor system

Overview of motor system, cortical motor areas, pyramidal and extra pyramidal, tract– Course, termination and function, Upper & Lower Motor Neuron, Lumbar Puncture.

Functions of Various parts of Brain

Cerebellum, Basal ganglia, Hypothalamus, Thalamus, Autonomic Nervous System

Temperature Regulation

Normal temperature of body, Regulation of body temperature & Fever

SPECIAL SENSES

Vision

Structure of Eye, Functions of rods and cones, accommodation, visual pathway, near, distant & color vision, light reflex, Refractory errors of eye & correction.

Hearing

Structure and functions of external, middle and inner ear, Mechanism of hearing & important Tests of Hearing

Taste, Olfaction-

Taste – Receptors, pathway and primary taste sensations, Olfaction- olfactory mucosal receptors and pathway

PRACTICAL 2A - CRCT05

Section: Physiology

30 Hours

- 1) Study of Microscope and its use
- 2) Collection of Blood and study of Haemocytometer
- 3) Haemoglobinometry
- 4) White Blood Cell count
- 5) Red Blood Cell count
- 6) Determination of Blood Groups
- 7) Leishman's staining and Differential WBC Count
- 8) Determination of Bleeding Time
- 9) Determination of Clotting

Practical Total 50 Marks

Major- 25 Marks

Minor- 15 Marks

Internal-Assessment- 10 Marks

Total - 50 Marks

Scheme of Examination

Theory Total 50 Marks

No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Internal Assessment	Viva 10	Total Marks
1.	Long Essay Question	2	1	1 x 10	10	10	10	50
2.	Short Essay Question	3	2	2 x 5	10			
3.	Short Answers	5	5	5 x 2	10			

Suggested Readings:

Recommended Text Books (Latest Edition)

Sl. No.	Name of the Book & Title	Author	Publisher's Name, Place of Publication
1	Textbook of Physiology for MLT	Prof A.K.Jain	Avichal Publishing company
2	Textbook of Medical Physiology	D.Venkatesh & H.H.Sudhakar	Wolters Kluwers
3	Concise Medical Physiology	Sujit K Choudhari	New Central Books Calcutta
4	Textbook of Physiology	Arthur C Guyton	Prism Publishers Bangalore
5	Practical Physiology	Prof. A.K.Jain	Arya Publication

Biochemistry

PAPER 2: CRCT02

Section B: Basics of Biochemistry

Theory 35 Hours

1. Introduction to Medical lab Technology:

(a) Role of Medical lab Technologist (b) Ethics, Responsibility (c) Safety measures (d) First aid. (e) Cleaning and care of general laboratory glass ware and equipment.

2. Introduction to Apparatus- Chemical Balance: Different types, Principles and applications.

3. Units of Measurements: Concepts of Molecular weight, Atomic weight, Normality, Molarity, Standards, Atomic structure, Valence, Acids, Bases, Salts & indicators

4. Concepts of pH: Concepts of Acid Base reaction and hydrogen ion concentration.

Definition of pH, buffer & pH meter

5. Chemistry of Carbohydrates:

- a. Definition, Classification and biological importance.
- b. Monosaccharides, Oligosaccharides, Disaccharides & Polysaccharides:

6. Chemistry of Lipids:

- a. Definition, Classification and biological importance.
- b. Simple lipids: Triacylglycerol and waxes-composition and functions.
- c. Compound lipids : Phospholipids, Sphingolipids, Glycolipid and Lipoproteins : Composition and functions.
- d. Derived lipids: Fatty acids — saturated & unsaturated. Steroids and their properties.

7. Chemistry of Proteins:

- a. Amino acids: Classification, properties, side chains of amino acids.
- b. Protein: Definitions, Classifications and functions.
- c. Peptides: Biologically active peptides
- d. Overview of Structural organization of proteins.
- e. Denaturation of proteins and denaturing agents

8. Chemistry of Nucleic acids:

- a) DNA Structure and function
- b) RNA: Types, Structure (only t RNA) and Functions.

PRACTICAL 2B: CRCT05

Section B

Practical 30 Hours

Biochemistry Practicals

1. Introduction to apparatus, Instruments and use of Chemical Balance.
2. Maintenance of Laboratory Glassware and apparatus.
3. Reactions of Carbohydrates (Glucose, fructose, maltose, lactose, sucrose and starch)
4. Reactions Proteins (Albumin and Casein)
5. Colour reactions of Proteins
6. Identification of Unknown Carbohydrates and proteins

SCHEME OF EXAMINATION- Theory

Theory Total- 30 Marks

Duration: 90 minutes

No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	2	1	1 x 10	10	10	10	50
2.	Short Essay Question	5	3	2 x 5	10			
3.	Short Answers	5	5	5 x 2	10			

Semester I

PAPER 3 - CRCT03 **Section A - Pathology** **Theory 25 Hours**

Basic Haematology

- Introduction to Haematology: (a) Definition (b) Importance (c) Important equipment used.
- Laboratory organization and safety measures in haematology Laboratory
- Introduction to blood, its composition, function and normal cellular components.
- Collection and preservation of blood sample for various haematological investigations.
- Normal Values in Hematology
- Preparation of blood Films- Types. Methods of preparation (Thick and thin smear/film)
- Definition, principles & procedure, Normal values, Clinical significance, errors involved, means to minimize errors for the following:
 1. Haemoglobinometry, PCV, Red Cell Indices
 2. Total leucocytes count (TLC)
 3. Differential leucocytes count (DLC), Absolute Eosinophil count, Reticulocyte count and Platelet Count.
 4. Erythrocyte Sedimentation Rate (ESR)
 5. Blood Grouping
- Staining techniques in Haematology (Romanowsky's stains) :Principle, composition, preparation of staining reagents and procedure of the following
 1. Giemsa stain
 2. Leishman stain
 3. Wright's stain
 4. Field's stain

Scheme of Examination

Type of questions and distribution of marks for Theory examination in each subject in First Semester.

Duration 90 minutes

S. No.	Question	Question asked	Question to attempt	Marks	Max. Marks	Internal assessment	Viva	Total Marks
1.	Long Essay Question	2	1	1 x 10	10	10	10	50
2.	Short Essay Question	3	2	2 x 5	10			
3.	Short Answers	5	5	5 x 2	10			

Suggested Readings:

Reference books (Latest Edition)

Sl. No.	Name of Book & title	Author	Publisher, Name, Place of publication
1	Practical Pathology	P. Chakraborty Gargi Chakraborty	New Central Book Agency, Kolkotta
2.	Text Book of Haematology	Dr. Tejinder Singh	Arya Publications, Sirmour (H.P)
3.	Text Book of Medical Laboratory Technology	Praful Godkar	Bhalani Publication House, Mumbai
4.	Practical Haematology	Sir John Dacie	Churchill Livingstone, London
5.	Todd & Sanford, Clinical Diagnosis & Management by Laboratory Methods	John Bernard Henry	All India Travellar Booksellar, Delhi.
6.	Practical Pathology	Dr. Ganga S. Pilli	Prabhu Publications, Dharwad

Practical 3A: CRCT06 Section A – Pathology

Practical 30 Hours Basic Haematology

1. Hb Estimation-Sahli's method & Cyanmethhaemoglobin method
2. RBC Count
3. Retic Count
4. Preparation of blood smears and staining with Leishman stain
5. WBC Total Count
6. WBC -Differential Count
7. Platelet Count
8. Absolute Eosinophil Count
9. ESR- Westergreens & Wintrobe's method,
10. PCV.

Exam Pattern

1. Major Experiment: Perform any two exercises: 20 Marks

- ◆ Hb Estimation-Sahli's method
- ◆ RBC Count
- ◆ Preparation of blood smears and staining with Leishman stain- WBC - Differential count
- ◆ WBC Count
- ◆ Platelet Count
- ◆ Absolute Eosinophil Count

II. Minor Experiment: Any one examination 10 Marks

- ◆ Reticulocyte Count
- ◆ ESR- Westergreens & Wintrobe's method,
- ◆ PCV

III. Spotters 10 Marks

IV. Internal Assessment: 10 Marks

Total: 50 Marks

Practical Assessment

Scheme of Practical Examination for First Semester.

(Section A Pathology -50 Marks + Section B Microbiology 50 Marks)

Sr. No.	Practical	Practical	IA	Grand Total
1	Section A	40	10	50
2	Section B	40 (Major 30 + Minor 10)	10	50

Scheme of Exam for Practicals:

Major Experiment: 20 Marks

Minor Experiment: 10 Marks

Spotters : 10 Marks

Internal Assessment: 10 Marks

Total : 50 Marks

Semester I

PAPER 3- CRCT03

Section B – Microbiology

Theory 25 Hours

- **Introduction to Medical Microbiology:** - Definition - History - Host-Microbe relationship.
- **Microscopy:** - Introduction and history - Types of microscopes
 - (a) Light microscope
 - (b) Dark ground Microscope
 - (c) Fluorescent Microscope
 - (d) Phase contrast Microscope
 - (e) Electron microscope:
- Principles and operational mechanisms of various types of microscopes
- **Sterilization:** - Definition -- Types and principle of sterilization methods
 - **Physical methods-** (a) Heat (dry heat, moist heat with special Reference to autoclave - their care and maintenance.) (b) Radiation (c) Filtration, Efficiency testing to various sterilizers.
 - **Chemical methods**
 - **Antiseptics and disinfectants:** Definition, Types and properties - Mode of action - Uses of various disinfectants, Precautions while using the disinfectants -

Qualities of a good disinfectant, In-house preparation of alcoholic hand/skin disinfectants, Testing efficiency of various disinfectants

- Antibiotics and drug resistance
- Classification of Microbes
- Bacterial Cell Growth and Nutrition
- Overview and mechanisms of Bacterial gene transfer.
- Ubiquity of microbes.

Scheme of Examination for Theory

Type of questions and distribution of marks for Theory examination in each subject in First Semester. Section B - Microbiology - 50 marks

S. No.	Question	Question asked	Question to attempt	Marks	Max. Marks	Internal assessment	Viva	Total Marks
1.	Long Essay Question	2	1	1 x 10	10	10	10	50
2.	Short Essay Question	3	2	2 x 5	10			
3.	Short Answers	5	5	5 x 2	10			

Suggested Readings:

1. Ananthanarayan and Paniker's Textbook of Microbiology. Tenth Edition. Reba Kanungo
2. Textbook of Microbiology for MLT. Second Edition. Dr. C. P. Baveja.

Practical 3B: CRCT06 Section B – Microbiology

Practical 30 Hours

- Focusing, handling and care of Microscopes
- Hanging drop
- Simple stain
- Gram stain
- ZN stain
- Sterilization and Disinfection.

Scheme of Practical Examination for First Semester : Practical Examination for First Semester.

Sr. No.	Practical	Practical	IA	Grand Total
1	Section A	40 (Major 30 + Minor 10)	10	50
2	Section B	40 (Major 30 + Minor 10)	10	50

Major : **30 Marks**

Gram Stain 15

Marks ZN Stain 15

Marks

Minor : **10 Marks**

Spotter 10 Marks

IA : **10 Marks**

Total **50 Marks**

Suggested Readings:

- Practical Microbiology, Fourth Edition. C.P Baveja.

I YEAR B.Sc. Allied ENGLISH

ELS01

COURSE CONTENTS:

Subsidiary subject 60 hours for 1st year marks to be sent to university before IInd year exam. Course description: It is designated to help the students to acquire a good command over English language for common and medical terminology used in medical practice.

Behavioural objectives:

Ability to speak and write proper English
Ability to read and understand English
Ability to understand and practice medical terminology.
Paragraph
Letter writing
Note making
Description
The use of paragraphs
Essay writing
Telegrams
Precise-writing and abstracting
Report writing
Medical Terminology
Use of dictionary

Scheme of examination

Theory: 80 Marks Duration: 3 hours

- 1) Fill in the blanks - 10 marks
- 2) Articles (Passage/fill in the blanks) - 10 marks
- 3) Tense (Sentence identification/rewriting a sentence) - 10 marks
- 4) Voice (Rewrite) - 10 marks
- 5) Speech (Rewrite) - 10 marks
- 6) Linkers (Paragraph) - 10 marks
- 7) Paragraph writing - 10 marks
- 8) Letter writing - 10 marks

Text Books Recommended (Latest Edition)

Sl. No.	Name of the Book & Title	Author	Publisher's Name Place of Publication
1.	Sharma Strengthen your writing	V. R. Narayana	New Delhi, Orient Longman
2.	Grammar and composition	Wren and Martin	Delhi, Chand & Co.
3.	Spoken English	Shashikumar V. D'Souza P. V.	New Delhi, Tata Mergaw Hill
4.	Medical dictionary	Dorland's pocket IBH Publishing Co.	New Delhi; Oxford &

SECOND SEMESTER

S.No	Subject code	Course	Hours			Credits
			L	P	Total	
1	CRCT07	Anatomy	2	2		3
2	CRCT08(A)	Physiology	1	2		2
3	CRCT08(B)	Biochemistry	1	2		2
4	CRCT09(A)	Pathology	1	2		2
5	CRCT09(B)	Microbiology	1	2		2
6	ELS02	Subsidiary	1			1
		Clinical Posting	18			09
		Total				21

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	CRCT07	Paper 1	Human Anatomy	60 + 20 + 20	100
2	CRCT08	Paper 2 Section 2A	Human Physiology	30 + 10 + 10	50
		Section 2B	Basics of Biochemistry	30 + 10 + 10	50
3	CRCT09	Paper 3 Section 3A	Haematology & Clinical Pathology	30 + 10 + 10	50
		Section 3B	Microbiology	30 + 10 + 10	50
4	ELS02	Paper 4 Subsidiary	Computer science	80 + 20	100
Grand Total					400

Sr. No.	Subject Code	Practical	Subjects	Practical + IA	Total
5	CRCT10	Practical 1	Human Anatomy	80 + 20	100
6	CRCT11	Practical 2 2A	Human Physiology	40 + 10	50
		2B	Basics of Biochemistry	40 + 10	50
7	CRCT12	Practical 3A	Hematology & Clinical Pathology	40 + 10	50
		3B	Microbiology	40 + 10	50
Grand Total					300

Semester II

PAPER 1 - CRCT07

Human Anatomy

Theory 40 Hours

Anatomy of the Digestive System:

Components of Digestive system, Alimentary tube, Anatomy of organs of digestive tube, mouth, tongue, tooth, salivary glands, liver, Biliary apparatus, pancreas, Names and positions and brief functions - with its applied anatomy.

Anatomy of Renal System.

Organization of renal system

Kidneys: Location, gross features, relations, structure, blood supply, nerve supply, lymphatic drainage and with its applied anatomy.

Ureters and urinary bladder-Location, gross features, structure and with its applied anatomy Urethra in brief along with its applied anatomy.

Anatomy of Reproductive System.

Male Reproductive System: Testis, Duct system - with its applied anatomy.

Female Reproductive System: Uterus, Ovaries, Duct system, Accessory organs- with its applied anatomy.

Anatomy of the Endocrine System.

Name of all endocrine glands their positions, Hormones and their functions- Pituitary, Thyroid and parathyroid glands, Adrenal glands, Gonads and Endocrine part of pancreas- with its applied anatomy.

Type of questions and distribution of marks for Theory examination in each subject in Second Semester.

Sl. No.	Question	Question asked	Question to attempt	Marks	Max Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	20	20	100
2.	Short Essay Question	7	5	5 x 5	25			
3.	Short Answers	5	5	5 x 3	15			

Suggested Readings:

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Human Anatomy Regional and Applied. Vol. 1, Vol.2 & Vol.3	B. D. Chaurasia	C.B.S.Publishers, New Delhi.
2. Text Book of Human Histology	Inderbir Singh	Jaypee Brothers, Medical Publishers, Delhi.
3. Clinically Oriented Anatomy	Keith L. Moore	Williams and Wilkins, Baltimore.
4. Gray's Anatomy	Susan Standring	Elsevier Churchill Livingstone, Edinburg
5. Text book of Histology - A Practical Guide	J. P. Gunasegaran	Elsevier Publication, Gurgaon, Hariyana.
6. Practical manual of Histology for Medical students	Neelkanth Kote	Jaypee Brothers, Medical Publishers, Delhi.

Practical 1: CRCT10

Human Anatomy

Practicals- 20 Hours

Systemic Histology slides:

1. G.I.T - oesophagus, stomach, small intestine, large intestine, liver, pancreas and gall bladder.
2. Kidney, ureter and urinary bladder.
3. Endocrine glands - Adrenal, Pancreas, Pituitary, Thyroid and Parathyroid
4. Uterus, Ovary, Testis.

Practical:

- 1) Demonstration of the digestive system organs
- 2) Demonstration of excretory systems organs
- 3) Demonstration of Male & Female reproductive organs
- 4) Demonstration of Endocrine glands.

Practical Assesment

Scheme of Practical Examination for Second Semester.

Sr. No.	Practical	Practica l	IA	Grand Total
1	Practicala 1	80	20	100

Scheme of Exam for Practical:

Practicals

Gross

Anatomy

Discussion 3 x 10 marks : 30
Marks

Histology

Spotters 10 x 2 marks : 20
Marks

Spotters 15 x 2 marks : 30
Marks

IA marks

: 20 Marks

Total : 100 Marks

SEMESTER II

PAPER 2 - CRCT08

Section A - Physiology

Theory: 35 Hours

RESPIRATORY SYSTEM

Physiological Anatomy of Respiratory System and Functions, Concept of Dead Space
Mechanism of Respiration, Lung volume and capacities, Surfactant, definition of compliance

Transport of Oxygen, ODC Curve and CO₂ transport

Regulation of Respiration – Types and functions of Respiratory Centres

Cyanosis, Dyspnea, Apnea, Hypoxia – definition and types

CARDIOVASCULAR SYSTEM

Physiological Anatomy of Heart

Cardiac Cycle – Definition and Phases

Cardiac Output - Definition, factors

Blood pressure - Definition, Determinants & Factors affecting blood pressure, regulation of blood pressure, Definition of Hypertension and Hypotension Myocardial Ischemia and Infarction.

Normal Electrocardiogram – Definition, Waves and Uses

EXCRETORY SYSTEM

Functional Anatomy

Functional anatomy of kidneys, structure of a nephron, features of renal circulation, juxtaglomerular apparatus

Mechanism of Urine formation

Glomerular Filtration – Definition, glomerular filtration rate, factors effecting GFR, Tubular reabsorption, functions of Proximal convoluted tubule, loop of Henle, distal convoluted tubule & collecting tubule.

Micturition

Muscles of the bladder, nerves of bladder, micturition reflex, & concept of Artificial Kidney

DIGESTIVE SYSTEM

Functional Anatomy of GIT

Composition & functions of saliva,

Composition of gastric juice, mechanism of Secretion & functions of HCl secretion,

Composition and functions of pancreatic juice

Functions of Liver and bile Juice

Definition Jaundice and it types

Movements of GI Tract - Deglutition, Movements of Small Intestine

ENDOCRINES

Major Endocrine glands

Pituitary Gland: Anterior & Posterior Pituitary Hormones and functions

Thyroid Gland: Hormones secreted and functions, Goiter

Adrenal Gland: Hormones secreted by adrenal cortex and medulla and their functions

Pancreas: Endocrine Hormones of Pancreas and their functions, Diabetes Mellitus

Parathyroid Gland: PTH, calcitonin and its actions

REPRODUCTIVE SYSTEM

Puberty

Puberty, Pubertal changes in male and female

Male Reproductive System

Male reproductive organs, Spermatogenesis, Morphology of a sperm, Semen, Factors influencing spermatogenesis, Functions of testosterone

Female Reproductive System

Female reproductive organs, Oogenesis, Ovulatory cycle with its hormonal basis, Tests for Ovulation Menstrual cycle with its hormonal basis, Functions of Estrogen & Progesterone

Pregnancy & Lactation

Fertilization, Functions of Placenta, Hormones of Placenta, Pregnancy tests, Contraceptive methods, Mammary gland & Lactation, Milk Ejection Reflex, Composition of Milk, advantages of breast Feeding, Parturition

PRACTICAL 2A – CRCT11
Section A – Human Physiology

30 Hours

- 1) Clinical Examination of Pulse
- 2) Blood Pressure Recording
- 3) Effect of exercise on BP
- 4) Effect posture
- 5) Auscultation for Heart Sounds
- 6) Spirometry – Description of Normal Findings
- 7) Electrocardiogram of a normal person – Description of ECG waves in Lead II
- 8) Artificial Respiration

Practical Total 50 Mark

Major- 25 Marks

Minor- 15 Marks

Internal-Assessment- 10 Marks

Total -50 Marks

Scheme of Examination

Theory Total 50 Marks

No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Internal Assessment	Viva 10	Total Marks
1.	Long Essay Question	2	1	1 x 10	10	10	10	50
2.	Short Essay Question	3	2	2 x 5	10			
3.	Short Answers	5	5	5 x 2	10			

Suggested Readings:

Recommended Text Books (Latest Edition)

Sl. No	Name of the Book & Title	Author	Publisher's Name, Place of Publication
1	Textbook of Physiology for MLT	Prof A.K.Jain	Avichal Publishing company
2	Textbook of Medical Physiology	D.Venkatesh & H.H.Sudhakar	Wolters Kluwers
3	Concise Medical Physiology	Sujit K Choudhari	New Central Books Calcutta
4	Textbook of Physiology	Arthur C Guyton	Prism Publishers Bangalore
5	Practical Physiology	Prof. A.K.Jain	Arya Publication

SEMESTER II

PAPER 2: CRCT08

Section B

Basics of Biochemistry

Theory 35 Hours

1. Specimen collection of blood, urine, cerebrospinal fluid and other body fluids, preservation and preparation of protein free filtrate.
2. Enzymes: definition, classification, coenzymes, factors affecting enzyme activity and inhibitors, units of measurements, isoenzymes, Diagnostic enzymology (AST, ALT ALP, LDH, CPK and Troponin).
3. Digestion and Absorption of Carbohydrates, proteins and lipids
4. Nutrition – Calorific value and nutritional importance of Carbohydrates, Lipids, Proteins and Dietary fibers. BMR & Factors affecting BMR
5. Vitamins- Sources, RDA, functions and deficiency manifestations.
6. Minerals-Calcium, Phosphorus, Iron, copper, zinc, selenium and fluoride
7. Non Protein Nitrogenous compounds-Clinical Significance of Urea, Uric acid, creatinine, acetone and HCL
8. Overview of Metabolism

Carbohydrate Metabolism-Glycolysis, Gluconeogenesis and TCA Cycle

Protein Metabolism- General Reactions of amino acids and Urea cycle

PRACTICAL 2B: CRCT11

Basics of Biochemistry II

Practicals

30 Hours

1. Demonstration of Colorimeter, spectrophotometer, pH meter.
2. Quantitative analysis of Glucose, Urea and creatinine
3. Estimation of urine creatinine
4. Biochemically important substance- Urea, Uric acid, creatinine, acetone and HCL

SCHEME OF EXAMINATION- Theory

Theory - 30 Marks

Duration: 90 minutes

No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Internal Assessment	Total Marks
1.	Long Essay Question	2	1	1 x 10	10	10	50
2.	Short Essay Question	5	3	2 x 5	10		
3.	Short Answers	5	5	5 x 2	10		

Practical Examination-Semester II

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Quantitative analysis of Glucose/Urea/ creatinine /Estimation of urine creatinine	1	1 x 20	20 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Analysis of biochemically important substances	1	1 x 20	20 Marks

Practical	40 Marks
IA Marks:	10 Marks
Grand Total	50 Marks

Suggested Readings:

Sl. No.	Name of the Books & Title	Author	Publisher's Name, Place of Publication
1	Clinical Chemistry	VARLEY	William Heinemann Medical Books Ltd & Inter Science Book. Inc. New York.
2.	Clinical Chemistry	TEITZ	W.B. Saunders Company Harcourt(India) Private Limited New Delhi-110048.

3.	Clinical Chemistry	KAPLAN	The C.V.Mosby Company, St. Louis Washington, D.C. Toronto.
4.	Text Book of Medical Biochemistry	RAMKRISHAN (S), PRASANNA (KG), RAJAN (R),	Orient Langman, Bombay
5.	Test Book of Bio Chemistry for Medical Students	VASUDEVAN(D M), & SREE KUMARI (S)	Jaypee Brothers, New Delhi.
6.	Biochemistry	U. Satyanarayan	Books and Allied (P) Ltd. Kolkata-700009 (India)
7.	Biochemistry	DAS (Debajyothi)	Academic Publishers Calcutta.

PAPER 3: CRCT09

Section A - Haematology & Clinical Pathology

Theory : 25 Hours

Hematology

1. Bone marrow
 - a. Techniques of aspiration, preparation and staining of films
 - b. Bone marrow biopsy
2. Preparation of buffy coat smears
3. Laboratory tests used in the investigation of anemia's
 - a. B 12 and folic acid: Normal values, derangements and interpretation of results.
 - b. Schilling test - Method and interpretation
 - c. Serum iron, iron binding capacity, Ferritin, Transferrin saturation: Normal values, derangements and interpretation of results
4. Laboratory test used in investigation of hemolytic anemia's
 - a. Osmotic fragility
 - b. Investigation of G-6 PD deficiency
 - c. Test for sickling
 - d. Estimation on of Hb-F, Hb-A2
 - e. Plasma haemoglobin and Haptoglobin, demonstration of haemosiderin in urine
 - f. Haemoglobin electrophoresis
 - g. Coomb's test (Direct & Indirect) - Test for auto immune hemolytic Anaemias.

Clinical Pathology

1. Urine examination
Physical, Chemical & Microscopic
2. Semen analysis

Scheme of Examination

Type of questions and distribution of marks for Theory examination in each subject in Second Semester.

(Section A - Pathology - 50 marks + Section B - Microbiology - 50 marks)

No.	Question asked	Questions asked	Questions to attempt	Marks	Max. marks	IA	Viva	Total marks
1.	Long Essay Question	2	1	1x10	10	10	10	50
2.	Short Essay Question	3	2	2 x 5	10			
3.	Short Answers	5	5	5 x 2	10			

Suggested Readings:

Reference books (Latest Edition)

Sl. No.	Name of Book & title	Author	Publisher, Name, Place of publication
1	Practical Pathology	P. Chakraborty Gargi Chakraborty	New Central Book Agency, Kolkotta
2.	Text Book of Haematology	Dr. Tejinder Singh	Arya Publications, Sirmour (H.P)
3.	Text Book of Medical Laboratory Technology	Praful Godkar	Bhalani Publication House, Mumbai
4.	Practical Haematology	Sir John Dacie	Churchill Livingstone, London
5.	Todd & Sanford, Clinical Diagnosis & Management by Laboratory Methods	John Bernard Henry	All India Travellar Booksellar, Delhi.
6.	Practical Pathology	Dr. Ganga S. Pilli	Prabhu Publications, Dharwad.
7.	Hematology Blood Banking & Transfusion (PB)	Dutta B. A.	CBS Publishers & Distributors Pvt. Ltd.
8.	Blood Transfusion in Clinical Practice (HB)	Kochhar P. K.	CBS Publishers & Distributors Pvt. Ltd.
9.	Transfusion Medicine, 3e (PB)	Mc Cullough	CBS Publishers & Distributors Pvt. Ltd.
10.	Practical Transfusion Medicine, 4e (HB)	Murphy	CBS Publishers & Distributors Pvt. Ltd.

Section A: Pathology

Practical 35 Hours

I. HAEMATOLOGY

- Sickling test-Demonstration
- Bone Marrow Smear preparation & staining procedure- Demonstration
- Demonstration of Malarial Parasite.
- Blood grouping.

II. CLINICAL PATHOLOGY

- Visit to pathology laboratory – Postings in batches - 15 days for 2 hours
- Urine examination
 - Physical
 - Chemical – Reducing substances ketone bodies, proteins and blood
 - Microscopy
 - Dipstick method – Demonstration
- Semen Analysis Demonstration

Practical Assessment

Scheme of Practical Examination for Second Semester.

(Section A Pathology 50 Marks + Section B Microbiology -50 Marks)

Pathology Practicals		
I. Major		30 marks
a. Urine Examination	10 marks	
b. Urine Microscopy	10 marks	
c. Blood Grouping	10 marks	
II. Minor		10 marks
a. Spotters	10 marks	
	IA	10 marks
	Total	50 marks

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical A	40 (Major 30 + Minor10)	10	50
2	Section B	40 (Major 30 + Minor10)	10	50

PAPER 3: CRCT09

Section B – Microbiology

Theory 25 Hours

- Culture media and different methods of cultivation.
- **Immunology**– Introduction, Specific and non-specific immunity, Antigens, Antibodies – Structure and function, Complement and antigen-antibody reaction.

Scheme of Examination

Theory 40 Marks

Duration 90 minutes

No.	Question asked	Questions to attempt	Questions	Marks	Max. marks	Internal assessment	Viva	Total marks
1.	Long Essay Question	2	1	1x10	10	10	10	50
2.	Short Essay Question	3	2	2 x 5	10			
3.	Short Answers	5	5	5 x 2	10			

Suggested Readings:

- 1) Ananthanarayan and Paniker's Testbook of Microbiology. Tenth Edition. Reba Kanungo
- 2) Textbook of Microbiology for MLT. Second Edition. Dr. C.P. Baveja.

PRACTICAL 3: CRCT12

Section B - Microbiology

Practicals 25 Hours

- Biomedical waste management
- Collection of various clinical specimens.
- Serological tests
- Un-inoculated culture media and culture techniques.

Practical Exam Pattern

Major :		-25 marks
• Biomedical waste management	-	10 marks
• Serological tests/Inoculation techniques		-15 marks
Minor :		-15 marks
Spotters		15 marks
IA		-10 marks
	Total	-50 marks

COMPUTER SKILLS ELS02

Fundamentals of Computers-I

1. **Introduction to computer:** introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.
 - a. **Input output devices:** input devices (keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices),
Output devices (monitors, pointers, plotters, screen image projector, voice response Systems)
 - b. **Processor and memory:** The Central Processing Unit (CPU) and main memory.
 - c. **Storage Devices:** sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.
2. **Introduction to MS-Word:** introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spellchecking, printing the document file, creating and editing of table and mail merge.
3. **Introduction to Excel:** introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
4. **Introduction to power-point:** introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.
5. **Introduction of Operating System:** introduction, operating system concepts, types of operating system
 - a. **Introduction to MS-DOS:** History of DOS, features of MS-DOS, MS-DOS Commands (internal and external).
 - b. **Introduction of windows:** History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).
6. **Computer networks:** introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
7. **Internet and its Applications:** definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.
8. **Application of Computer in various fields:** Medical, Education, Railway, Defense, Industry, Management, Sports, Commerce, Internet.
9. *Introduction to installation of different software and introduction about different software related to MLS.*

Practicals:

Learning to use MS Office: MS WORD, MS EXCEL & MS PowerPoint and Internet

THIRD SEMESTER

Semester III

S.No	Subject code	Course	Hours			Credits
			L	P	Total	
1	CRCT13	Applied Anatomy and Physiology related to Critical Care	2	2		3
2	CRCT14	Applied Pharmacology in Critical Care	2	2		3
3	CRCT15	Applied Microbiology And Infection Control	2	2		3
4	ELS03	Environmental Studies	1			1
		Clinical Posting		18		09
		Total				19

Sr. No.	Subject Code	Theory	Subjects	Theory + IA +Viva Voce	Total
1	CRCT13	Paper 1	Applied Anatomy and Physiology related to Critical Care	60 + 20 + 20	100
2	CRCT14	Paper 2	Applied Pharmacology in Critical Care	60 + 20 + 20	100
3	CRCT15	Paper 3	Applied Microbiology And Infection Control	60 + 20 + 20	100
4	ELS02	Paper 4 Subsidiary	Environmental Studies	80 + 20	100
Grand Total					400

Sr. No.	Practical	Subjects	Practical + IA	Total
5	Practical 1	Applied Anatomy and Physiology related to Critical Care	80 + 20	100
6	Practical 2	Applied Pharmacology in Critical Care	80 + 20	100
7	Practical 3	Applied Microbiology And Infection Control	80 + 20	100
Grand Total				300

SEMESTER III

PAPER 1: CRCT13

Theory 30 Hours

Applied Anatomy and Physiology related to Critical Care

Applied Anatomy related to critical care paper1

I RESPIRATORY SYSTEM

- Introduction
- Medical Terminology
- Anatomical terms, planes, relations
 - o Anatomy of the upper respiratory tract
- Nose, oral cavity
- Pharynx, Larynx
 - o Anatomy of thoracic cage bones, muscles, innervation
 - o Anatomy of the lungs - overview
 - o Pleura, lobes of lung, bronchi, trachea, hilum, bronchial tree
 - o Alveolus, Bronchioles,
 - o Blood supply,
 - o Lymphatics
 - o Innervation

II CARDIOVASCULAR SYSTEM

- Overview of CVS
- Anatomy of heart - Pericardium, myocardium, endocardium, valves,
- Anatomy of Vascular system - Major Vessels, Arteries, Veins, Capillaries
- Regional Circulation - coronary, cerebral, splanchnic

III CENTRAL NERVOUS SYSTEM

- Basic organisation of the nervous system - Central, Peripheral, Autonomic
- Cerebral blood flow
- Pain pathway

Applied physiology related to critical care

I. RESPIRATORY SYSTEM

- Physiology of breathing
- Homeostasis
- Mechanics of Breathing, Muscle action
- Regulation of breathing
- Lung Volumes & Capacity
- Gas exchange & transport- oxygen, carbon dioxide

- Diffusion
- O₂ Transport and abnormalities
- CO₂ Transport and abnormalities
- Pressure, Volume
- Resistance, Compliance
- Ventilation and Perfusion, V/Q ratio
- Gas exchange, mechanism of diffusion
- Work of breathing
- Transport of O₂ and CO₂; factors affecting oxygen transport
- Acid - base balance
- Pulmonary Function Tests
- Arterial Blood Gas
- Types of respiratory failure - causes and treatment

II CARDIOVASCULAR SYSTEM

- Cardiac cycle
- Cardiac output - factors affecting cardiac output
- Cardiac conducting system
- Regulation of rate, basic arrhythmias
- Principles of ECG, Normal ECG
- Blood pressure
- Maintenance of normal blood pressure and factors affecting it
- systolic, diastolic, pulse pressure, mean
- Oxygen delivery, uptake to tissues
- Central venous pressure
- Cardiac output, Stroke volume contractility
- Preload, after load
- Interpretation of common haemodynamic parameters.
- Assessment of hemodynamic parameters
- Recognise the following regarding arterial cannulation
- Indications
- Cannulation sites
- Possible complications
- Normal pressures and their significance
- Pressure wave forms
- Significance of respiratory variation in the pressure wave forms

CVP Monitoring

- Indications

- Factors affecting measurement
- Insertion sites
- Types of catheters
- Correct technique of pressure measurement.

III CENTRAL NERVOUS SYSTEM

- Metabolic requirements of the brain
- Consciousness, Coma, Brain injury
- Sedation
- Brain Death

SCHEME OF EXAMINATION – Semester III

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	6X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester III

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
<u>X ray, graphs ,ECG</u>	4	4 x 20	80 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Spotters		4X10	40 Marks

Practical

80 Marks

I A Marks
Grand Total

20Marks
150 Marks

Recommended Books:

1. Critical Care Physiology Robert H Bartlett
2. Applied Physiology in Critical Care Physiology Michael R. Pinsky

Reference books:

1. Textbook of Medical Physiology, AC Guyton, JE Hall
2. Ganong's review of Medical Physiology

Online Reference

1. WWW.derangedphysiology.com
2. WWW.emcrit.org

PAPER 2:CRCT14

Theory 30 Hours

Applied Pharmacology in critical care:

- Drugs- Nomenclature
- Modes of action of drugs
- Routes of administration
- Drug dose calculation- Dilution, infusion rate

Medical gases: O₂ ; N₂O

- Bronchodilators
- Mucokinetic agents
- Antihistamines
- Steroids

- Drugs affecting autonomic nervous system
- Inotropic agents, Chronotropic agents,
- Vasopressors & Vasodilators
- Anti-hypertensives
- Analgesics; sedatives
- neuromuscular blocking agents
- Antimicrobial drugs, antiviral and anti-fungal agents - basic concepts Antimicrobial Resistance - Basic concepts
- Antiseptic and disinfectants agents

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester III

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Drug preparation	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Spotters		4x 10	40 Marks

Practical 80Marks
I A Marks 20Marks
Grand Total 100 Marks

Recommended Books:

1. Textbook of Microbiology Anatanarayanan and Paniker
2. Essentials of Medical Pharmacology KD.Tripathi

Reference books:

1. Infectious Diseases in Critical Care Medicine, Burke A Cunha
2. Textbook of Critical Care, Jean Louis Vincent, Edward Abraham

Online Reference

1. WWW.derangedphysiology.com
2. WWW.intensivecarenetwork.com

PAPER 3:CRCT15

Theory 30 Hours

APPLIED MICROBIOLOGY AND INFECTION CONTROL

INTRODUCTION - Importance of infection in an ICU

Agents causing Infection

SPREAD OF INFECTION Source; host; transmission

Biohazardous materials

INFECTION CONTROL & UNIVERSAL PRECAUTIONS

- Sterilisation & Disinfection - concepts
- Methods of sterilization
- Spread of infection
- Elimination of source - Cleaning and sterilizing equipment
- Interrupting transmission of infection - role of health care workers
- Disposal of infection wastes
- Surveillance; quality control

SPECIFIC INFECTIONS

Community acquired infections

Nosocomial Infections: Types - Prevention.

HIV-AIDS .

Hepatitis A, B, C

Tropical Infections -Tetanus, Malaria, Leptospirosis, Dengue, Rickettsial, Amoebiasis

SCHEME OF EXAMINATION – Semester III

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester III

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
microbiology reposts	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Spotters & Interpretation of lab reports		4 x 10	40 Marks

Practical
I A Marks
Grand Total

80 Marks
20Marks
100 Marks

Recommended Books:

1. Textbook of Microbiology Anatanarayanan and Paniker
2. Essentials of Medical Pharmacology KD.Tripathi

Reference books:

1. Infectious Diseases in Critical Care Medicine ,Burke A Cunha
2. Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham

Online Reference

1. WWW.derangedphysiology.com
2. WWW.intensivecarenetwork.com

ELS03 ENVIRONMENTAL STUDIES

GOAL:

The students should gain knowledge to understand the multidisciplinary nature of the environment and the awareness of the eco system, which maintains the natural environment.

OBJECTIVES:

a) KNOWLEDGE

At the end of the 3rd semester course the student is expected to know:

1. The natural resources like forest, water, mineral, food, energy and land.
2. Functions of the eco system.
3. Bio-diversity and its conservation.
4. Environmental pollution & its prevention.
5. Social issues.

b) SKILLS

At the end of the 3rd semester course the student is expected to:

1. Visit local areas to understand and document environmental assets like river, forest, grassland, hill and mountain.
2. Visit an industrial area or agricultural area to know about local pollutants.
3. Identify common plants, insects and birds in their local areas.
4. Identify rivers, hills and mountains in their local areas.
5. To make use of the knowledge to protect natural resources.

COURSE CONTENTS

Theory and Field work: 50 Hours

◆ **Theory - 45 hours**

◆ **Field work - 5 hours**

1: Multi-disciplinary nature of environmental studies

Definition, scope and importance, need for public awareness. **2 hours**

2: Natural Resources:

Renewable and non-renewable resources:

Natural resources and associated problems.

- a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
- b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.

- f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- g) Role of an individual in conservation of natural resources.
- h) Equitable use of resources for sustainable lifestyles **8 hours**

3: Ecosystems

- ◆ Concept of an ecosystem.
- ◆ Structure and function of an ecosystem.
- ◆ Producers, consumers and decomposers.
- ◆ Energy flow in the ecosystem.
- ◆ Ecological succession.
- ◆ Food chains, food webs and ecological pyramids.
- ◆ Introduction, types, characteristic features, structure and function of the following ecosystems:-
 - a. Forest ecosystem
 - b. Grassland ecosystem
 - c. Desert ecosystem
 - d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) **6 hours**

4: Biodiversity and its conservation **8 hours**

- ◆ Introduction - Definition: genetic, species and ecosystem diversity.
- ◆ Bio geographical classification of India.
- ◆ Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
- ◆ Biodiversity at global, National and local levels.
- ◆ India as a mega-diversity nation.
- ◆ Hot-spots of biodiversity.
- ◆ Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- ◆ Endangered and endemic species of India
- ◆ Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

5: Environmental Pollution **8 hours**

Definition

- ◆ Cause, effects and control measures of:-
 - a. Air pollution
 - b. Water pollution
 - c. Soil pollution
 - d. Marine pollution
 - e. Noise pollution
 - f. Thermal pollution
 - g. Nuclear hazards
- ◆ Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- ◆ Role of an individual in prevention of pollution.
- ◆ Pollution case studies.
- ◆ Disaster management: floods, earthquake, cyclone and landslides.

6: Social Issues and the Environment

7 hours

- ◆ From Unsustainable to Sustainable development
- ◆ Urban problems related to energy
- ◆ Water conservation, rain water harvesting, watershed management
- ◆ Resettlement and rehabilitation of people; its problems and concerns. Case Studies
- ◆ Environmental ethics: Issues and possible solutions.
- ◆ Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.
- ◆ Wasteland reclamation.
- ◆ Consumerism and waste products.
- ◆ Environment Protection Act.
- ◆ Air (Prevention and control of Pollution) Act.
- ◆ Wildlife Protection Act
- ◆ Forest Conservation Act
- ◆ Issues involved in enforcement of environmental legislation.

7: Human Population and the Environment

6 hours

- ◆ Population growth, variation among nations.
- ◆ Population explosion - Family Welfare Programme.
- ◆ Environment and human health.
- ◆ Human Rights.
- ◆ Value Education.
- ◆ HIV/AIDS
- ◆ Women and Child Welfare.
- ◆ Role of Information Technology in Environment and human health.
- ◆ Case Studies.

8: Field work

- ◆ Visit to a local area to document environmental assets
river/forest/grassland/hill/mountain
- ◆ Visit to a local polluted site - Urban / Rural/ Industrial/Agricultural.
- ◆ Study of common plants, insects, birds.
- ◆ Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)

SCHEME OF EXAMINATION

A. Theory : 80Marks

- ◆ Long Essay 2 X 10 = 20
- ◆ Short Essay 8 X 5 = 40
- ◆ Short Answers 5 X 4 = 20

B. Field Work: 20 Marks

Recommended Books:

Sl. No.	Title	Author	Edition & Year	Publisher
1	Environmental Biology	Agarwal, K.C.	2001	Nidi Publication Ltd. Bikaner
2	The Biodiversity of India	Bharucha Erach		Mapin Publishing Pvt. Ltd., Ahmedabad - 380 013
3	Environmental Encyclopedia	Cunningham W.P., Copper T.H., Gorhani E. & Hepworth M.T.	2001	Jaico Publication House, Mumbai.
4	Global Biodiversity Assessment	Heywood V. H. & Waston R.T.	1995	Cambridge University Press 1140p
5	Environmental Protection and Laws	Jadhav H. & Bhosale V. M.	1995	Himalaya Publishing House, Delhi 284p
6	Environmental Science Systems & Solutions	Mckinney M. L. & School R.M.	1996	

FOURTH SEMESTER

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	CRCT16	Paper 1	Basics Of Intensive Care Technology Part 1	60 + 20 + 20	100
2	CRCT17	Paper 2	Basics Of Intensive Care Technology Part 2	60 + 20 + 20	100
3	CRCT18	Paper 3	Basics Of Intensive Care Technology Part 3	60 + 20 + 20	100
4	ELS02	Paper 4 Subsidiary	Law- Indian Constitution	80 + 20	100
Grand Total					400

Sr. No.	Practical	Subjects	Practical + IA	Total
5	Practical 1	Basics Of Intensive Care Technology Part 1	80 + 20	100
6	Practical 2	Basics Of Intensive Care Technology Part 2	80 + 20	100
7	Practical 3	Basics Of Intensive Care Technology Part 3	80 + 20	100
Grand Total				300

PAPER 1:CRCT16

Theory 30 Hours

BASICS OF INTENSIVE CARE TECHNOLOGY PART 1

Airway Care

INDICATIONS FOR ARTIFICIAL AIRWAYS

- Relieving airway obstruction
- Secretion removal
- Protecting the airway
- Positive Pressure Ventilation

SELECTING AND ESTABLISHING AN ARTIFICIAL AIRWAY

- Nasal airways
- Pharyngeal airways
- Tracheal airways

AIRWAY CLEARANCE TECHNIQUES

- Airway suctioning
- Bronchoscopy

AIRWAY MAINTENANCE

- Securing the airway and confirming placement
- Providing adequate humidification
- Minimizing nosocomial infections
- Providing cuff care
- Facilitating clearance of secretions
- Troubleshooting airway emergencies

EXTUBATION

- Indications
- Procedure
- Post extubation care & complications

Oxygen Therapy

- Sources of oxygen for therapy
- Storage of oxygen
- Oxygen delivery systems
- Hazards of oxygen
- Modes of O₂ therapy
- Monitoring O₂ delivery systems (in vitro)

Blood gases in patient (in vitro.)

- Pulse oximetry
- Economic issues

CHEST XRAY and BASIC CONCEPTS IN CT

NORMAL CHEST X-RAY

- Normal anatomy
- Basic physics of X-ray and assessment of film quality

- Cardiac configuration .
- Lung fields and airway
- Optimum position of - ET, NG, Central Lines

ABNORMAL CXR /CT:

- Trauma:
- Pneumothorax
- Hemothorax
- Lung contusion
- Pulmonary oedema
- CCF
- ARDS
- Pneumonia: - Bronchopneumonia
- Lobar pneumonia
- Aspiration pneumonia

Fundamentals of Electricity and Electronics:

Resistance: Symbol, units, colour coding equivalent resistance with 'connection in series and parallel.

Capacitance: Symbol, units, series and parallel connection

Inductance and transformers

Parameters of electricity power - voltage, current frequency, power.

Differences between AC and DC - .

AC and DC power supplies, Phase, neutral and earth - conventional colour coding

Ohms law and Kirchoff's law Electrical Circuits.

Earth and grounding - Symbol, importance in patient care.

AC and DC power supplies- Phase, neutral and earth - conventional colour coding

Classification of medical equipment

1. According to type of protection: B C F etc
2. According to mode of protection: Class I -III.

Semester IV

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester IV

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS		4 x 10	40 Marks

Practical	80 Marks
I A Marks	20Marks
Grand Total	100 Marks

Recommended Books:

1. The ICU book ,Paul Marino
2. ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
2. Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham

Online Reference

1. lifeinthefastlane.com
2. criticalcarereviews.com

PAPER 2: CRCT17

Theory 30 Hours

BASICS OF INTENSIVE CARE TECHNOLOGY PART 2

Clinical Scenarios

RESPIRATORY SYSTEM

- Respiratory Failure
- Acute Respiratory Distress Syndrome
- Pneumonia, Tuberculosis
- Opportunistic infections
- Bronchial asthma
- Chronic obstructive airways disease
- Chronic bronchitis
- Emphysema
- Chronic Suppurative Lung Disease Bronchiectasis
- Lung Abscess

- Atelectasis I Collapse
 - Pleural diseases: pneumothorax, pleural effusions
- CARDIOVASCULAR SYSTEM**
- Shock - hypovolemic, cardiogenic, obstructive, septic
 - Congestive cardiac failure; Acute-left ventricle failure
 - Pulmonary oedema
 - Pulmonary hypertension
 - Pulmonary embolism
 - Ischemic heart disease; Myocardial infarction

**SCHEME OF EXAMINATION –
SemesterIV**

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester IV

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
CASE SCENARIO	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SHORT CASE SCENARIO		4x 10	40 Marks

Practical
I A Marks
Grand Total **80 Marks**
20Marks
100 Marks

Recommended Books:

1. The ICU book ,Paul Marino
- 2.ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi

3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
2. Textbook of Critical Care, Jean Louis Vincent, Edward Abraham

Online Reference

1. lifeinthefastlane.com
2. criticalcarereviews.com

PAPER 3:CRCT18

Theory 30 Hours

BASICS OF INTENSIVE CARE TECHNOLOGY PART 3

NERVOUS SYSTEM:

- Cerebrovascular Disease
- Neurological Failure:
- Coma
- Delirium
- Neuromuscular disease
- Myasthenia gravis
- Guillain Barre Syndrome
- Cerebrovascular disease, stroke
- Brain Death
- Persistent Vegetative State
- Trauma
- Head injury
- Unstable spine & protection

GASTROINTESTINAL, HEPATIC, PANCREAS:

- Upper GI Bleed
- Hepatic Coma
- Pancreatitis

RENAL:

Renal Failure in ICU

ENDOCRINE & METABOLIC:

- Hypoglycemia
- Hyperglycemia

HAEMATOLOGY:

- Haematological Malignancies
- Neutropenia
- Coagulopathy
-

MISCELLANEOUS:

- Envenomation - snake bite, scorpion sting
- Poisoning - general supportive care, common poisons

ELS04

LAW - INDIAN CONSTITUTION

I. GOAL :

The students should gain the knowledge and insight into the Indian Constitution so that they are aware of the fundamental rights and freedom bestowed through the democratic governance of our country.

II. OBJECTIVES :

A) KNOWLEDGE :

At the end of the B.Sc. 4th Semester the student is expected to know:

- 1) Basic knowledge of the Indian Constitution.
- 2) Democratic institutions created by the Constitution.
- 3) Special rights created by the Constitution for regional and linguistic minorities.
- 4) Election Commission.
- 5) Legislative, Executive and Judicial powers and their functions in India.

B) SKILLS:

At the end of the B.Sc. 4th Semester the student is expected to make use of knowledge:

- 1) To perform his / her duties towards the society judiciously and with conscious effort for self-development.
- 2) To utilize State policies in their future practice.

COURSE CONTENTS

	Theory:	25 Hours
Unit I	a) Meaning of term Constitution. b) Making of the Indian Constitution - 1946 - 1949 and role played by Dr. B. R. Ambedkar. c) Salient Features of the Constitution. d) Preamble of the Constitution.	2 Hours
Unit II	The democratic institutions created by the Constitution. Bicameral System of Legislature at the Centre and in the States. Devolution of Powers to Panchayat Raj Institutions.	5 Hours
Unit III	Fundamental Rights and Duties - Their content and significance	5 Hours
Unit IV	Directive Principles of State policies - The need to balance Fundamental Rights with Directive Principles.	1 Hour
Unit V	Special rights created in the constitution for Dalits, Backward class, Women and Children, and the Religious and	

	Linguistic Minorities	1 Hour
Unit VI	Doctrine of Separation of Powers - Legislative, Executive and Judicial, and their functions in India.	4 Hours
Unit VII	The Election Commission and State Public Service Commissions.	2 Hours
Unit VIII	Method of amending the Constitution.	1 Hours
Unit IX	Enforcing rights through Writs Certiorari, Mandamus, Quo warranto and Habeas Corpus.	2 Hours
Unit X	Constitution and Sustainable Development in India.	2 Hours

Reference: 1. Durga Das Basu, Introduction to the Constitution of India, Gurgaon; LexisNexis, 2018 (23rd edn.)
 2. M.V.Pylee, India's Constitution, New Delhi; S. Chand Pub., 2017 (16th edn.)
 3. J.N. Pandey, The Constitutional Law of India, Allahabad; Central Law Agency, 2018 (55th edn.)
 4. Constitution of India (Full Text), India.gov.in., National Portal of India, https://www.india.gov.in/sites/upload_files/npi/files/coi_part_full.pdf
 5. Durga Das Basu, Bharatada Samvidhana Parichaya, Gurgaon; LexisNexis Butterworths Wadhwa, 2015
 6. Kb Merunandan, Bharatada Samvidhana Ondu Parichaya, Bangalore, Meragu Publications, 2015

Scheme of Examination

University Theory Examination at the end of fourth Semster:100 Marks

Reference Books Latest Edition :

Sl. No.	Title	Author	Publisher
1	The Constution of – A Politico – Legal Study	J. C. Johari	Sterling Publication Pvt. Ltd.
2	Constitution Law	J. N. Pandey	Central Law Agency
3	The Indian Constitution	Granville Austin	Corner Stone of Nation

FIFTH SEMESTER**SEMISTER V**

Sr. No.	Subject Code	Theory	Subjects	Theory + IA +Viva Voce	Total
1	CRCT19	Paper 1	Intensive Care Technology- Clinical	60 + 20 + 20	100
2	CRCT20	Paper 2	Intensive Care Technology- Applied(1)	60 + 20 + 20	100
3	CRCT21	Paper 3	Intensive Care Technology- Applied (2)	60 + 20 + 20	100
4	ELS02	Paper 4 Subsidiary	Biomedical waste Management	80 + 20	100
Grand Total					400

Sr. No.	Practical	Subjects	Practical + IA	Total
5	Practical 1	Intensive Care Technology- Clinical	80 + 20	100
6	Practical 2	Intensive Care Technology- Applied(1)	80 + 20	100
7	Practical 3	Intensive Care Technology- Applied (2)	80 + 20	100
Grand Total				300

PAPER 1:CRCT19

Theory 30 Hours

INTENSIVE CARE TECHNOLOGY- CLINICAL

1. ARTERIAL BLOOD GASES

- Procedure, puncture sites
- Sampling techniques
- Using an ABG machine,
- Different types of ABG machines - advantages and disadvantages, cost considerations
- Transportation of sample
- Interpretation of values
- Appropriate Interventions

2. MECHANICAL VENTILATION - NON INVASIVE AND INVASIVE

- Basic concepts: - Mechanics of ventilation
- Work of breathing
- Indications
- Humidification of gas
- Ventilator settings
- Timings -Inspiratory, Expiratory, Inspiratory hold
- Flow
- Tidal volume
- Pressure - Peak
- Plateau
- PEEP
- "POP-OFF"
- Pressure support
- Proximal airway vs. distal
- FiO₂
- Modes of ventilation

Non Invasive, CPAP, BiPAP

Invasive modes - Controlled, Assisted, SIMV, APRV, Pressure Support

- Alarm settings
- Care of ventilator & tubings- -Sterility
- Weaning – concepts
- Humidifier - types
- Advantages and disadvantages
- Inhaled drug therapy
- Nebulisation - different types, advantages & disadvantages
- MDI with Spacer

3. CARE OF PATIENTS ON VENTILATOR

- Ensuring proper placement of tube

- Cuff pressure,
- Tracheobronchial hygiene, suctioning
- Humidification, Chest physio
- Ventilator settings
- Monitoring ventilatory parameters

4. CARE OF CHEST TUBE

Drainage systems of pleural air, fluid

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	6X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester VI

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
TROUBLESHOOTING	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS		4 x 10	40 Marks

Practical	80 Marks
I A Marks	20Marks
Grand Total	100 Marks

Recommended Books:

1. The ICU book ,Paul Marino
2. ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
2. Textbook of Critical Care, Jean Louis Vincent, Edward Abraham
3. mechanical ventilation by David Chang

Online Reference

1. lifeinthefastlane.com
2. criticalcarereviews.com

PAPER 2 : CRCT20

Theory 30 Hours

INTENSIVE CARE TECHNOLOGY- APPLIED (I) CARDIOVASCULAR SUPPORT:

A. Assisting in .

1. Arterial and central venous cannulation
2. Peripheral venous cannulation
3. PiCCO I Pulmonary artery catheter insertion - measuring cardiac output by thermodilution
4. Pericardiocentesis
5. Transvenous pacemaker
6. Basic ultrasonography

B. Placement of ECG leads taking 12-lead dynamic ECG.

C. Use of infusion devices for vasoactive medications.

D. Assisting in electrical cardioversion and defibrillation. Placement of transcutaneous pacemaker.

E. Setting up invasive pressure monitoring - levelling, calibration, zeroing; measuring pressures

• MONITORING CARDIOVASCULAR SUPPORT:

Zeroing, calibration and trouble-shooting of pressure transducers.

Troubleshooting invasive blood pressure monitoring and central venous pressure monitoring' Setting up and troubleshooting invasive cardiac output monitoring - PiCCO, PA catheter ,

BASIC ULTRASONOGRAPHY

• INVASIVE PRESSURE MONITORING

- Arterial & venous
- Care & maintenance
- Transducers, dome, zeroing, calibration

• BASICS OF FLUID RESUSCITATION & INOTROPIC SUPPORT

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2.	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester V

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
<u>MONITORING, TROUBLESHOOTING</u>	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS	8	4 x 10	40 Marks

Practical 80 Marks
I A Marks 20Marks
Grand Total 100 Marks

Recommended Books:

1. The ICU book ,Paul Marino
2. ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
2. Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham
3. mechanical ventilation by David Chang

Online Reference

1. lifeinthefastlane.com
2. criticalcarereviews.com

Theory 30 Hours

INTENSIVE CARE TECHNOLOGY- APPLIED (2)

RESPIRATORY SUPPORT:

1. Maintaining an open airway.
2. Assisting in
 - i. Tracheal intubation (oral, nasal)
 - ii. Cricothyrotomy, tracheostomy, trans tracheal catheters
 - iii. Mechanical ventilatory support
Monitoring airway pressures
 - iv. Topical use of respiratory medication (inhalers and nebulisers)
 - v. Suctioning: Chest physiotherapy and incentive spirometry.
 - vi. Weaning techniques.
 - vii. Assisting in fibroptic bronchoscopy.
 - viii. Oxygen therapy devices and their limitations
 - ix. Assisting in chest tube insertion and chest drainage systems
 - x. Bed side pulmonary function tests
 - xi. Arterial blood gas sampling; Using the ABG machine
 - xii. CPAP & BI PAP circuit

RESPIRATORY THERAPY:

Setting up & troubleshooting:

Oxygen administration

Non-invasive Ventilation - NIV on standard ventilator, BiPAP, CPAP

Invasive Ventilation

Setting up the ventilator

Oxygenation

Ventilation

Alarms

Trigger

Evaluate and trouble shoot the patient- ventilator system

Interpret ventilator graphic waveform

Detect and measure auto-peep

Monitoring of patients who are assisted by mechanical ventilation and are in sudden distress

MONITORING RESPIRATORY SUPPORT

Monitoring of patients who are assisted by mechanical ventilation and are in sudden distress

Recognise the methods and significance of measuring the following lung volumes and flows in the ICU.

- a. Tidal volume
- b. Vital capacity
- c. Peak Flow Rate
- d. Negative Inspiratory Pressure
- e. Respiratory Graphics Analysis

7. RECOGNITION OF CARDIORESPIRATORY ARREST

8. BASIC LIFE SUPPORT (Hands on Training)

- Ventilation, Use of Ambu bag
- Cardiac massage

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester vI

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
PROCEDURES	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS		4 x 10	40 Marks

Practical	80 Marks
I A Marks	20Marks
Grand Total	100 Marks

Recommended Books:

1. The ICU book ,Paul Marino
2. ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
2. Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham
3. mechanical ventilation by David Chang

Online Reference

1. lifeinthefastlane.com
2. criticalcarereviews.com

Biomedical waste management

ELS05

15 hours

Programme

Creating awareness about the various aspects of biomedical waste and disposal practices among the health care providers

Skill

Segregation and safe disposal of biomedical waste

OBJECTIVES

- 1) List the various types of wastes generated in a hospital laboratory.
- 2) Define and classify biomedical waste
- 3) Explain the Biomedical waste management Rule
- 4) Definition of certain terms in health care waste
- 5) Mention the guidelines as per Karnataka pollution control board for biomedical waste management
- 6) List the steps involved in Bio-medical Waste Management.
- 7) Describe the various steps involved in biomedical waste collection.
- 8) List the guidelines for segregation of biomedical waste.
- 9) List the standards for treatment and disposal as per BMWM rule, 2016
- 10) Explain the segregation, treatment and disposal of waste depending on colour coding
- 11) State the methods for waste disposal depending on the type of waste.
- 12) Mention the responsibilities of healthcare workers(Who handle it and one who manage).

Unit I

- a) Various types of biomedical wastes generated in a hospital laboratory.
- b) Biomedical waste management Rule.
- c) Terminologies in health care waste.
- d) Bio-medical wastes-Definition and classification

Unit II

Guidelines as per Karnataka pollution control board for segregation of bio medical wastes.

Unit III

- a) Steps involved in Bio-medical Waste Management.
- b) Methods of waste disposal depending on the type of waste.

- c) Guidelines for segregation of biomedical waste.
- d) Steps involved in biomedical waste collection.
- e) Treatment Option for Bio-medical Waste.

Unit IV

Segregation, treatment and disposal of

- Yellow
- Red
- White
- Blue

Unit V

- a) BMWM rule, 2016- Standards for treatment and disposal
- b) Mention the responsibility of healthcare facility worker

Unit VI

Hazards of Biomedical Waste to the stake holder

Patient: Nosocomial infections

Health care provider: Occupational hazard

Environment: Pollution and contamination

Field visit

- 1.To categories various types of biomedical waste based on colour coding.(3 hours)
- 2.Field Visit for segregation, treatment and disposal of waste.(3 hours)
- 3.Field visit for waste disposal depending upon the type of waste. (3 hours)

References

https://www.who.int/docstore/water_sanitation_health/wastemanag/ch19.htm

Hegde V, Kulkarni RD, Ajantha GS. Biomedical waste management. Journal of Oral and Maxillofacial Pathology. 2007 Jan 1;11(1):5.

Thareja P, Singh B, Singh S, Agrawal D, Kaur P. Biomedical waste management: need for human civilization. Indian Journal of Clinical Anatomy and Physiology. 2015 Apr;2(2):66-73.

SIXTH SEMESTER

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	CRCT22	Paper 1	Intensive Care Technology-Advanced	60 + 20 + 20	100
2	CRCT23	Paper 2	CSSD Procedures	60 + 20 + 20	100
3	CRCT24	Paper 3	Procedures And Biomedical Waste Management In Intensive Care Unit	60 + 20 + 20	100
4	ELS02	Paper 4 Subsidiary	Fundamentals of Electricity and Electronics:	80 + 20	100
Grand Total					400

Sr. No.	Practical	Subjects	Practical + IA	Total
5	Practical 1	Intensive Care Technology- Advanced	80 + 20	100
6	Practical 2	CSSD Procedures	80 + 20	100
7	Practical 3	Procedures And Biomedical Waste Management In Intensive Care Unit	80 + 20	100
Grand Total				300

PAPER 1: CRCT22

Theory 30 Hours

INTENSIVE CARE TECHNOLOGY- ADVANCED

9. CONCEPTS IN ADVANCED LIFE SUPPORT

- Drugs
- Defibrillator

PROLONGED LIFE SUPPORT

- Concept of the "ICU" and team work

10. CARE OF THE UNCONSCIOUS PATIENT

- Comfort, orientation, pain control
- Skin integrity assessment and care
- Physiotherapy - Chest & Limbs
- Nutritional needs and supply
- Basic care of surgical wounds and fractures
- Psychological assessment and support in an ICU.

11. BASIC ADMINISTRATION:

Economic Issues .

Raising purchase orders for equipment

Maintaining consumables stock

Maintaining equipment - repair and troubleshooting

12. TRAUMA, BURNS, ENVIRONMENTAL INJURIES, PERIOPERATIVE CARE

**SCHEME OF EXAMINATION –
Semester VI**

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester VI

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
CASE SCENARIO	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SHORT CASE SCENARIO		4x 10	40 Marks

Practical
I A Marks
Grand Total 80 Marks
20Marks
100 Marks

Recommended Books:

1. The ICU book ,Paul Marino
2. ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
2. Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham

Online Reference

1. lifeinthefastlane.com
2. criticalcarereviews.com

PAPER 2: CRCT23

Theory: 30 Hours

11. CSSD PROCEDURES

1. Waste disposal collection of used items from user area, reception protective clothing and disinfections sage gaurds,
2. use of disinfections sorting and classification of equipment for clean-ing purposes, sharps, blunt lighted etc. contaminated high risk baby care - delicate instruments or hot care instruments,
3. cleaning process - use of detergents. Mechanical cleaning apparatus, cleaning instruments, cleaning jars, receivers bowls etc. trays, basins and similar hand ware utensils. Cleaning of catheters and tubings, cleaning glass ware, cleaning syringes and needles.
4. Materials used for wrapping and packing assembling pack contents. Types of packs prepared. Inclusion of trays and galliparts in packs. Method of wrapping and making use of indications to show that a pack of container has been through a sterilization process date stamping.

5. General observations principles of sterilization. Moist heat sterilization. Dry heat sterilization. EO0gas sterilization. H202 gas plasma vapo sterilization.

12. BIOMEDICAL WASTE MANAGEMENT

13. MEDICAL ETHICS

1. Medical ethics - Definition - Goal - Scope
2. Code of conduct - Introduction –
3. Basic principles of medical ethics – Confidentiality
4. Malpractice and negligence - Rational and irrational drug therapy
5. Autonomy and informed consent - Right of patients
6. Care of the terminally ill- Euthanasia
8. Organ transplantation
9. Medico legal aspects of medical records - Medicolegal case and type- Rec-ords and document related to MLC - ownership of medical records - Confiden-tiality Privilege communication - Release of medical information - Unauthor-ized disclosure - rentention of medical records - other various aspects

SCHEME OF EXAMINATION – Semester VI

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester VI

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS		4 x 10	40 Marks

Practical	80 Marks
I A Marks	20Marks
Grand Total	100 Marks

Recommended Books

1. The ICU book, Paul Marino
2. ICU Protocols A Stepwise approach, Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
2. Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham

Online Reference

1. lifeinthefastlane.com
2. criticalcarereviews.com

PAPER 3: CRCT24

Theory: 30 hours

PROCEDURES AND BIOMEDICAL WASTE MANAGEMENT IN INTENSIVE CARE UNIT

14, PROCEDURAL SKILLS

EMERGENCY LIFE SUPPORT:

Basic Life Support - Keeping Airway open, Use of Ambu bag and mask ventilation, Cardiac massage

Advanced Life Support

Use of Defibrillator

Emergency Management of Trauma

GASTROINTESTINAL; GENITOURINARY AND OBSTETRIC AND GYNAECOLOGICAL PROBLEMS:

1. Assisting in

a. Placement of Trans oesophageal devices.

NG tubes, enteral feeding tubes, Sengstaken-Blackemore tube

b. Maintenance of urinary catheters

c. Placement of hemodialysis catheters

d. Management peritoneal dialysis

e. Management CVVHD

f. bed side screening ultrasonography

NERVOUS SYSTEM:

Assisting in:

Lumbar puncture

Application of intracranial pressure monitoring device

Application of in-line immobilisation (C spine protection)

Cervical neck collar.

TOXICOLOGY:

Gastric lavage

ANALGESIA and SEDATION

Care of Epidural

Patient Controlled Analgesia

HAEMATOLOGICAL DISORDERS:

Assisting in:

Exchange Transfusion

Plasmapheresis

15.BASICS OF ULTRASOUND AND RADIOLOGY IN CRITICAL CARE

1. USG physics

2. Basic cardiac ultrasound and ECHO views

3. Basic lung ultrasound

4. Basic abdominal ultrasound

5. Echocardiographic assessment of a patient in shock

6. Ultrasound for vascular access

7. Reading xrays and CT with clinical correlation

16.EQUIPMENT MAINTENANCE & BASIC TROUBLESHOOTING:

Ventilators, CPAP, BiPAP machines

Pumps - Infusion, Syringe

Monitors - Standalone & multipara meter

ECG Machine

ABG Machine

Defibrillator

USG Machine

SCHEME OF EXAM FOR THEORY

Semester VI

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2.	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester VI

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
PRESSURE TRANSDUCTION TROUBLESHOOTING	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS		4 x 10	40 Marks

Practical	80 Marks
I A Marks	20Marks
Grand Total	100 Marks

Recommended Books:

1. The ICU book, Paul Marino
2. ICU Protocols A Stepwise approach, Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
2. Textbook of Critical Care, Jean Louis Vincent, Edward Abraham
3. Mechanical ventilation by David Chang

Online Reference

- 1.lifeinthefastlane.com
- 2.criticalcarereviews.com

ELS06

Fundamentals of Electricity and Electronics:

Resistance: Symbol, units, colour coding equivalent resistance with 'connection in series and parallel.

Capacitance: Symbol, units, series and parallel connection

Inductance and transformers

Parameters of electricity power - voltage, current frequency, power.

Differences between AC and DC - .

AC and DC power supplies, Phase, neutral and earth - conventional colour coding

Ohms law and Kirchoff's law Electrical Circuits.

Earth and grounding - Symbol, importance in patient care.

AC and DC power supplies- Phase, neutral and earth - conventional colour coding

Classification of medical equipment

1. According to type of protection: B C F etc
2. According to mode of protection: Class I -III.

Internal Assessment

1. Internal Assessment will be undertaken for theory and practical periodically as per the semester system and the average marks of the tests will be calculated and reduced to 20 or 10 as applicable and the marks are to be communicated to the university.
2. In order to be eligible to appear for University Examination a candidate, should secure at least 35% of total marks assigned for internal assessment in a particular subject for theory and practical's separately.

Declaration of result

1. Criteria for pass
 - a. Main subject: A Candidate is declared to have passed the examination in a subject, if he/she secures 40% of the total marks in Theory and Practical separately.
 - b. Elective Subjects: The minimum marks for a pass in a elective subject shall be 35% of the maximum marks prescribed for a subject and the marks shall be communicated to the University before the commencement of the Practical examination.
 - c. In case a candidate fails in either theory or practical, he/she has to appear for both theory and Practical in the subject in any subsequent examination and he/she must obtain the minimum for a pass in the subject (theory and practical separately)
 - d. A candidate shall be declared to have passed the examination if he/she passes in all the main subjects.

Carry over System:

At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he/she is appearing for. Example:-

- If the candidate has not cleared semester I, he/she can appear for semester II and pending subjects of semester I simultaneously.
- For appearing for semester III he/she should have cleared semester I and can appear for papers pending from semester II along with semester III subjects.
- For appearing for semester IV he/she should have cleared semester II and can appear for papers pending from semester III along with semester IV subjects.
- For appearing for semester V he /she should have cleared semester III and can appear for papers pending from semester IV along with semester V subjects.
- For appearing for semester VI he/she should have cleared semester IV and can appear for papers pending from semester V along with semester VI

subjects.

Examiners:

There should be minimum two examiners, one internal from the same university and one external Examiner for the first year subjects and for Pharmacology in the second year shall have Postgraduate degree in the respective subject with 3 years teaching experience of M.Sc. (Medical) with 5 years teaching experience

Ordinance Governing B.Sc. Emergency Medicine Technology Degree Course (Semester System) Syllabus/Curriculum 2021-22



KLE
ACADEMY OF HIGHER
EDUCATION AND RESEARCH
Deemed-to-be-University

Accredited 'A' Grade by NAAC (2nd Cycle)
Placed in 'A' Category by Government of India (MHRD)

KLE Academy of Higher Education & Research
(Deemed-to-be-University)

[Declared as Deemed-to-be-University u/s 3 of the UGC Act, 1956 vide Government of India Notification
No. F.9 -19/2000-U.3 (A)]

J. N. Medical College Campus, Nehru Nagar, Belagavi-590 010, Karnataka, India.
Phone : +91-0831-2444444 Fax : 0831-2493777
web : <http://www.kledeemeduniversity.edu.in>
E-mail : coe@kledeemeduniversity.edu.in

Edition Year: 2021-22

© Registrar

Director, Academic Affairs

Email: diracademic@kledeemeduniversity.edu.in

KLE Academy of Higher Education & Research

JNMC Campus, Nehru Nagar, Belagavi-590 010.

Phone : 0831-2444444

e-mail:info@kledeemeduniversity.edu.in

Price Rs: 275/-only

Printed at:

Omega Offset

4574, Shetty Galli, Belagavi.

Ph: 0831-2424124 E-mail: customerservice@omegaoffset.com



VISION

To be an outstanding KAHER of excellence ever in pursuit of newer horizons to build self-reliant global citizens through assured quality educational programs.

MISSION

- To promote sustainable development of higher education consistent with statutory and regulatory requirements.
- To plan continuously provide necessary infrastructure, learning resources required for quality education and innovations.
- To stimulate to extend the frontiers of knowledge, through faculty development and continuing education programs.
- To make research a significant activity involving staff, students and society.
- To promote industry / organization, interaction/collaborations with regional/national/international bodies.
- To establish healthy systems for communication among all stakeholders for vision oriented growth. To fulfill the national obligation through rural health missions.

OBJECTIVES

The objectives are to realize the following at KAHER and its constituent institutions:

- To implement effectively the programs through creativity and innovation in teaching, learning and evaluation.
- To make existing programs more careers oriented through effective system of review and redesign of curriculum.
- To impart spirit of enquiry and scientific temperament among students through research oriented activities.
- To enhance reading and learning capabilities among faculty and students and inculcate sense of lifelong learning.
- To promulgate process for effective, continuous, objective oriented student performance evaluation.
- To ordinate periodic performance evaluation of the faculty.
- To incorporate themes to build values, Civic responsibilities & sense of national integrity.
- To ensure that the academic, career and personal counseling are in-built into the system of curriculum delivery.
- To strengthen, develop and implement staff and student welfare programs.
- To adopt and implement principles of participation, transparency and accountability in governance of academic and administrative activities.
- To constantly display sensitivity and respond to changing educational, social, and community demands.
- To promote public-private partnership.

INSIGNIA



The Emblem of the **KAHER** is a Philosophical statement in Symbolic.

The Emblem...

A close look at the emblem unveils a pillar, a symbol of the "KAHER of Excellence" built on strong values & principles.

The Palm and the Seven Stars...

The Palm is the palm of the teacher- the hand that acts, promises & guides the students to reach for the Seven Stars...

The Seven Stars signify the 'Saptarishi Dnyanamandal', the Great Bear-a constellation made of Seven Stars in the sky, each signifying a particular Domain. Our culture says: The true objective of human birth is to master these Knowledge Domains.

The Seven Stars also represent the Saptarishis, the founders of KLE Society whose selfless service and intense desire for "Dnyana Dasoha" laid the foundation for creating the knowledge called KLE Society.

Hence another significance of the raised palm is our tribute to these great Souls for making this KAHER a possibility.

Empowering Professionals...

'Empowering Professionals', inscription at the base of the Emblem conveys that our Organization with its strength, maturity and wisdom forever strive to empower the student community to become globally competent professionals. It has been a guiding force for many student generations in the past, and will continue to inspire many forth coming generations.

Notification

CONTENTS

Section	Topics	Page Nos.
I	Preamble, Objective, Name of the Course Duration, Eligibility	1-2
II	Course contents and scheme of examination of 1 st Semester B.Sc. Emergency Medicine Technology	3-16
III	Course contents and scheme of examination of 2 nd Semester B.Sc. Emergency Medicine Technology	17-31
IV	Course contents and scheme of examination of 3 rd to 6 th Semester B.Sc. Emergency Medicine Technology	32-73
V	Internal Assessment	74-76

B.Sc. EMERGENCY MEDICINE TECHNOLOGY

PREAMBLE

The B.Sc. Emergency Medicine Technology Course is of **3 years(6 semesters) and 6 months internship** duration aimed at training students in the field of trauma and emergency care with a good scientific foundation. The B.Sc. Accident And Emergency Care Technology course offered at faculty of Allied Health Sciences, KLE Academy of Higher Education and Research will prepare competent technologist with adequate knowledge and skills necessary for assisting in assessment of trauma patients and patients presenting to emergency ward, bedside monitoring, stabilisation, setting up equipment, and assist in the clinical decision making process in emergency care. They will also be trained in record keeping and data collection in the emergency ward. Along with the basic knowledge and advanced training in the latest technologies in emergency care, these graduates will play an important role in determining the quality of health care provided.

OBJECTIVE

The objective is to impart the basic knowledge & technical skills of Emergency care and its application in the health care delivery system.

I. ELIGIBILITY FOR ADMISSION

A candidate seeking admission to the Bachelor of Science –**Emergency Medicine Technology** Course shall have passed:

- 1) The two year Pre-University examination or equivalent as recognized by KAHER with Physics, Chemistry and Biology as principal subjects of study.

OR

- 2) Pre Degree Course from a recognized university (two years after ten years of schooling) with Physics, Chemistry and Biology as principal subjects of study.

OR

- 3) Any equivalent examination recognized by KAHER for the above purpose with Physics, Chemistry and Biology as principal subjects of study.

OR

- 4) Pre university vocational course from an approved Board with laboratory technology as vocational subject.

II. DURATION OF COURSE

The duration of the Course shall be for period of three years and six months compulsory rotatory internship

III. MEDIUM OF INSTRUCTION

The medium of instruction and examination shall be English

IV. SCHEME OF EXAMINATION

There shall be six examinations during the course, each at the end of the first, second, third, fourth, fifth and sixth semester.

V. ATTENDANCE

Every candidate shall attend at least 80% of the total number of classes conducted in a calendar year from date of commencement of the term to the last working day as notified by the University in each of the subjects prescribed for that year separately in Theory and Practical. Only such candidates are eligible to appear for the University examinations in their first attempt. Special classes conducted for any purpose shall not be considered for the calculation of percentage of attendance for eligibility. A Candidate lacking in prescribed percentage of attendance in any one or more subjects either in Theory or Practical in the first appearance will not be eligible to appear the University Examination either in one or more subjects. Failed candidates should have attended at least 80% of the total number of classes conducted in that term in individual subjects separately in Theory and Practical to become eligible to appear for the University Examination in that subject in the supplementary or subsequent Examination. However, this is not applicable in case of carryover subjects.

Job opportunities and prospects

On finishing this course you are easily placed in the hospitals. You work in hospitals in emergency rooms, trauma centres, ICUs, ambulance services and similar healthcare settings requiring emergency and critical care. Hospitals working in both the private and public sector will be in need of your services. Other places to look for employment are government hospitals, military hospitals, railway hospitals and so on. You can undertake a post graduate program like M.Sc in Accident And Emergency Care Technology. You may also get to do research work in the field by opting for a doctoral program.

Employment:

Those who successfully complete the course will have very good opportunities in all leading hospitals in India and abroad.

COURSE STRUCTURE

First year

Theory classes and practical of following subjects:

Anatomy

Physiology

Biochemistry

Microbiology

Introduction to Computer application

Quality Assurance & Accreditation

English & Soft Skills

Second year

Theory class and posting in the clinical area:

Pharmacology

Applied anatomy and physiology in critical care

Applied microbiology and Pharmacology in critical care

Basics of Intensive Care Technology part 1 and part 2

Third year

Theory class and posting in the clinical area:

Intensive Care Technology– Clinical

Intensive Care Technology– Applied

Intensive Care Technology– Advanced

Fourth Year

Fourth year is internship in the clinical area.

CUMULATIVE GRADE POINT AVERAGE (CGPA)

Letter grades and grade points equivalent to percentage of mark and performance

10 Point Grade Scale

Percentage of Marks obtained	Letter Grade	Grade Point	Performance
91.00-100	O	10	Outstanding
80.00-89.99	A+	9	Excellent
70.00-79.99	A	8	Good
60.00-69.99	B+	7	Fair
50.00-59.99	B	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

1. Conversion of Grades into GPA

$$\text{GPA} = \frac{\text{Credits} \times \text{grade points}}{\text{Total Credits}}$$

2. Cumulative Grade Point Average (CGPA) of all six semesters will be calculated as: Total No. of GPA / No. of Semester

FIRST SEMESTER

S.No	Subject code	Course	Hours			Credits
			L	P	Total	
1	EMT01	Anatomy	2	2		3
2	EMT02(A)	Physiology	1	2		2
3	EMT02(B)	Biochemistry	1	2		2
4	EMT03(A)	Pathology	1	2		2
5	EMT03(B)	Microbiology	1	2		2
6	ELS01	English	1			1
		Clinical Posting	18			08
		Total				20

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	EMT01	Paper 1	Human Anatomy	60 + 20 + 20	100
2	EMT02	Paper 2 Section A	Human Physiology	30 + 10 + 10	50
		Section B	Basics of Biochemistry	30 + 10 + 10	50
3	EMT03	Paper 3 Section A	Pathology Basic Hematology	30 + 10 + 10	50
		Section B	Microbiology	30 + 10 + 10	50
4	ELS01	Paper 4 Subsidiary	English	80 + 20	100
Grand Total					400

Sr. No.	Subject Code	Practical	Subjects	Practical + IA	Total
5	EMT04	Practical 1	Human Anatomy	80 + 20	100
6	EMT 05	Practical 2A	Human Physiology	40 + 10	50
		2B	Basics of Biochemistry	40 + 10	50
7	EMT06	Practical 3A	Hematology & Clinical Pathology	40 + 10	50
		3B	Microbiology	40 + 10	50
Grand Total					300

Semester I

PAPER 1: EMT01 **Human Anatomy** **Theory 25 Hours**

The human body as a whole:

Definitions, Subdivisions of Anatomy, Terms of location and position, Fundamental Planes, Vertebrate structure of man, Organization of the Body cells and Tissues.

Locomotion and support:

The Skeletal system: Types of bones, structure and growth of bones, Divisions of the skeleton, Appendicular skeleton, Axial skeleton, name of all the bones and their parts, joint- classification, types of movements with examples.

Anatomy of the Nervous System:

Central nervous system: Brain and Spinal cord, functions, meninges.

The Brain- Brief structure of Hind Brain, Midbrain and Forebrain, Location, gross features, parts, functional areas, cerebral blood circulation and coverings, Functions of peripheral nervous system, Organization and Structure of Typical Spinal Nerve Spinal Cord: Gross features, extent, blood supply and coverings, reflex- arc. Applied Anatomy of spinal cord and brain.

Anatomy of circulatory system:

Heart: Size, location, external features, chambers, pericardium and valves, Blood supply and Nerve supply.

Right and Left Atrium: Structural features, venous area, septum and appendages, structural features inflow and outflow characteristics.

The study of blood vessels, General plan of circulation, pulmonary and systemic circulation.

Names of arteries and veins and their positions, general plan of lymphatic system. Coronary Circulation, Lymphatic drainage of heart in brief Applied aspects of heart and pericardium.

Anatomy of the Respiratory system:

Organization of Respiratory System, Gross structure and interior of Nose, Nasal cavity, Para nasal air sinuses,

Gross structure and interior of Pharynx, Larynx, trachea, bronchial tree, Pleura

Gross structure and Histology of Lungs, Pulmonary Circulation, Pulmonary Arteries, Pulmonary Veins and Bronchial Arteries.

Nerve Supply of Respiratory System and Applied aspect of Respiratory System.

Histology

General Slides:

Hyaline cartilage, Fibro cartilage, Elastic cartilage, T.S & L.S of bone, Blood vessels, Tonsils, Spleen, Thymus, Lymph node, Epithelial tissue, Skeletal and cardiac muscle, Peripheral nerve and optic nerve.

Systemic Slides

1. G.I.T
2. Lung-Trachea

3. Kidney, Ureter, Urinary bladder
4. Endocrine- Adrenal, pancreas, pituitary, thyroid and parathyroid
5. Uterus, Ovary, testis

Type of questions and distribution of marks for Theory examination in each subject in First Semester.

Sr. No.	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	20	20	100
2	Short Essay Question	7	5	5 X 5	25			
3.	Short Answers	5	5	5 x 3	15			

Suggested Readings:

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Human Anatomy Regional and Applied. Vol. 1, Vol.2 & Vol.3	B.D.Chaurasia	C.B.S.Publishers, New Delhi
2. Hand Book of General Anatomy	B.D.Chaurasia	C.B.S.Publishers, New Delhi
3. Text Book of Human Histology	Inderbir Singh	Jaypee Brothers, Medical Publishers, Delhi
4. Clinically Oriented Anatomy	Keith L. Moore	Williams and Wilkins, Baltimore
5. Gray's Anatomy	Susan Standring	Elsevier Churchill Livingstone, Edinburg

**PRACTICAL 1: EMTS04
Anatomy**

Practical 20 Hours

1. General Histology Slides:
 - Epithelial Tissue,
 - Connective Tissue,
 - Hyaline Cartilage,
 - Fibro Cartilage,
 - Elastic Cartilage,
 - T.S. & L.S. of Bone,
 - Blood Vessels,
 - Tonsil,
 - Spleen,
 - Thymus,
 - Lymph node,
 - Skeletal and Cardiac Muscle
 - Peripheral Nerve and Optic Nerve
2. Systemic Histology Slides:
 - RS -Lungs and Trachea
 - Cerebrum
3. Demonstration of all bones - Showing parts, joints,
4. X-rays of all normal bones and joints.
5. Demonstration of heart and normal angiograms.
6. Demonstration of Brain
7. Demonstration of different parts of respiratory system and normal X-rays

PRACTICAL ASSESMENT

Scheme of Practical Examination for First Semester.

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical 1	80	20	100

Scheme of Exam for Practicals:

Practical Histology Spotters: 10 X 2 Marks = 20 marks

Gross Anatomy Discussion: 2 X 20 Marks = 40 marks

Spotters: 10 X 2 Marks = 20 marks

IA Marks

20 marks

Total:

100 Marks

Suggested Readings:

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Human Anatomy Regional and Applied. Vol. 1, Vol.2 & Vol.3	B.D.Chaurasia	C.B.S.Publishers, New Delhi
2. Hand Book of General Anatomy	B.D.Chaurasia	C.B.S.Publishers, New Delhi
3. Text book of Histology - A Practical Guide	J.P. Gunasegaran	Elsevier Publication, Gurgaon, Hariyana
4. Practical manual of Histology for Medical students	Neelkanth Kote	Jaypee Brothers, Medical Publishers, Delhi.

SEMESTER I

PAPER 2: EMT02

Section A- Human Physiology

Theory: 35 Hours

GENERAL PHYSIOLOGY

Structure of Cell membrane and Cell Organelles, intercellular junctions

Classification of Body fluid compartments & composition, Homeostasis

Transport across cell membrane --Active transport and Passive transport

NERVE MUSCLE PHYSIOLOGY

Definition of Resting Membrane Potential, Action Potential - Phases & ionic basis

Classification and structure of Nervous Tissue

Structure, Classification and Properties of Skeletal Muscle

Neuromuscular Junction - Definition, Structure and Mechanism of neuromuscular transmission, Myasthenia gravis.

Excitation contraction coupling of skeletal muscles.

BLOOD

Composition and functions of blood and plasma proteins

Red Blood Cells: Morphology & functions, Erythropoiesis, types & functions of hemoglobin, Definition and Classification of Anemia & Jaundice.

White blood cells: Morphology, functions & variation, Definition of Leucopoiesis, Immunity – definition and classification

Platelets and Blood Coagulation: Morphology & functions of platelets, Mechanism of Hemostasis, Anticoagulants, Bleeding disorders.

Blood Groups: Classification of Blood Groups, ABO and Rh blood group systems, uses of blood grouping test and Cross matching, Blood Transfusion and its hazards.

CENTRAL NERVOUS SYSTEM

Organization of CNS-

Introduction, Structure of neuron, Functional organization of CNS and function in brief, Introduction to Autonomic Nervous System.

Synapse, Receptor & Reflex-

Definition of synapse, receptor & reflex, Classification of Synapse, Structure of synapse

The sensory system-

Overview of sensory system, Structure of Spinal Cord, Ascending tracts – Anterior Column, Lateral Column and Posterior Column Tract – Course, termination and function

The motor system-

Overview of motor system, cortical motor areas, pyramidal tract– Course, termination and function, Upper & Lower Motor Neuron, Lumbar Puncture.

Temperature Regulation-

Normal temperature of body, Regulation of body temperature & Fever

SPECIAL SENSES

Vision

Structure of Eye, Functions of rods and cones, accommodation, visual pathway, near, distant & color vision, light reflex, Refractory errors of eye & correction.

Hearing

Structure and functions of external ear, middle and inner ear, Mechanism of hearing & Important Tests of Hearing

Taste, Olfaction --

Taste – Receptors and primary taste sensations, Olfaction- olfactory mucosal receptors

PRACTICAL 2A - EMT05

Section: Physiology

30 Hours

- 1) Study of Microscope and its use
- 2) Collection of Blood and study of Haemocytometer
- 3) Haemoglobinometry
- 4) White Blood Cell count
- 5) Red Blood Cell count
- 6) Determination of Blood Groups
- 7) Leishman's staining and Differential WBC Count
- 8) Determination of Bleeding Time
- 9) Determination of Clotting

Practical Total 50 Marks

Major- 25 Marks

Minor- 15 Marks

Internal-Assessment- 10 Marks

Total - 50 Marks

Scheme of Examination

Theory Total 50 Marks

No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Internal Assessment	Viva 10	Total Marks
1.	Long Essay Question	2	1	1 x 10	10	10	10	50
2.	Short Essay Question	3	2	2 x 5	10			
3.	Short Answers	5	5	5 x 2	10			

Suggested Readings:

Recommended Text Books (Latest Edition)

Sl. No.	Name of the Book & Title	Author	Publisher's Name, Place of Publication
1	Textbook of Physiology for MLT	Prof A.K.Jain	Avichal Publishing company
2	Textbook of Medical Physiology	D.Venkatesh & H.H.Sudhakar	Wolters Kluwers
3	Concise Medical Physiology	Sujit K Choudhari	New Central Books Calcutta
4	Textbook of Physiology	Arthur C Guyton	Prism Publishers Bangalore
5	Practical Physiology	Prof. A.K.Jain	Arya Publication

Biochemistry

1st Semester (Allied & MLT)

PAPER 2: EMT02

Section B: Basics of Biochemistry

Theory 35 Hours

1. Introduction to Medical lab Technology:

(a) Role of Medical lab Technologist (b) Ethics, Responsibility (c) Safety measures (d) First aid. (e) Cleaning and care of general laboratory glass ware and equipment.

2. Introduction to Apparatus- Chemical Balance: Different types, Principles and applications.

3. Units of Measurements: Concepts of Molecular weight, Atomic weight, Normality, Molarity, Standards, Atomic structure, Valence, Acids, Bases, Salts & indicators

4. Concepts of pH: Concepts of Acid Base reaction and hydrogen ion concentration. Definition of pH, buffer & pH meter

5. Chemistry of Carbohydrates:

a. Definition, Classification and biological importance.

b. Monosaccharides, Oligosaccharides, Disaccharides & Polysaccharides:

6. Chemistry of Lipids:

a. Definition, Classification and biological importance.

b. Simple lipids: Triacylglycerol and waxes-composition and functions.

c. Compound lipids : Phospholipids, Sphingolipids, Glycolipid and Lipoproteins : Composition and functions.

d. Derived lipids: Fatty acids — saturated & unsaturated. Steroids and their properties.

7. Chemistry of Proteins:

a. Amino acids: Classification, properties, side chains of amino acids.

b. Protein: Definitions, Classifications and functions.

c. Peptides: Biologically active peptides

d. Overview of Structural organization of proteins.

e. Denaturation of proteins and denaturing agents

8. Chemistry of Nucleic acids:

a) DNA Structure and function

b) RNA: Types, Structure (only t RNA) and Functions.

PRACTICAL 2B: EMT05

Section B

Practical 30 Hours

Biochemistry Practicals

1. Introduction to apparatus, Instruments and use of Chemical Balance.

2. Maintenance of Laboratory Glassware and apparatus.

3. Reactions of Carbohydrates (Glucose, fructose, maltose, lactose, sucrose and starch)

4. Reactions Proteins (Albumin and Casein)

5. Colour reactions of Proteins

6. Identification of Unknown Carbohydrates and proteins

SCHEME OF EXAMINATION- Theory

Theory Total- 30 Marks

Duration: 90 minutes

No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	2	1	1 x 10	10	10	10	50
2.	Short Essay Question	5	3	2 x 5	10			
3.	Short Answers	5	5	5 x 2	10			

Practical Examination-Semester I

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Qualitative Analysis: Identification of Unknown Carbohydrate or protein	1	1 x 20	20 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Color reactions of proteins (any one)	1	1 x 20	20 Marks

Practical Marks	40 Marks
IA Marks:	10 Marks
Grand Total	50 Marks

Suggested Readings:

Sl. No.	Name of the Books & Title	Author	Publisher's Name, Place of Publication
1	Clinical Chemistry	VARLEY	William Heinemann Medical Books Ltd & Inter Science Book. Inc. New York.
2.	Clinical Chemistry	TEITZ	W.B. Saunders Company Harcourt(India) Private Limited New Delhi-110048.
3.	Clinical Chemistry	KAPLAN	The C.V.Mosby Company, St. Louis Washington, D.C. Toronto.
4.	Text Book of Medical Biochemistry	RAMKRISHAN (S), PRASANNA (KG), RAJAN (R),	Orient Langman, Bombay
5.	Test Book of Bio Chemistry for Medical Students	VASUDEVAN(D M), & SREE KUMARI (S)	Jaypee Brothers, New Delhi.
6.	Biochemistry	U. Satyanarayan	Books and Allied (P) Ltd. Kolkata-700009 (India)
7.	Biochemistry	DAS (Debajyothi)	Academic Publishers Calcutta.

Semester I

PAPER 3 - EMT03 **Section A - Pathology** **Theory 25 Hours**

Basic Haematology

- Introduction to Haematology: (a) Definition (b) Importance (c) Important equipment used.
- Laboratory organization and safety measures in haematology Laboratory
- Introduction to blood, its composition, function and normal cellular components.
- Collection and preservation of blood sample for various haematological investigations.
- Normal Values in Hematology
- Preparation of blood Films- Types. Methods of preparation (Thick and thin smear/film)
- Definition, principles & procedure, Normal values, Clinical significance, errors involved, means to minimize errors for the following:
 1. Haemoglobinometry, PCV, Red Cell Indices
 2. Total leucocytes count (TLC)
 3. Differential leucocytes count (DLC), Absolute Eosinophil count, Reticulocyte count and Platelet Count.
 4. Erythrocyte Sedimentation Rate (ESR)
 5. Blood Grouping

- Staining techniques in Haematology (Romanowsky's stains) :Principle, composition, preparation of staining reagents and procedure of the following
 1. Giemsa stain
 2. Leishman stain
 3. Wright's stain
 4. Field's stain

Scheme of Examination

Type of questions and distribution of marks for Theory examination in each subject in First Semester.

Duration 90 minutes

S. No.	Question	Question asked	Question to attempt	Marks	Max. Marks	Internal assessment	Viva	Total Marks
1.	Long Essay Question	2	1	1 x 10	10	10	10	50
2.	Short Essay Question	3	2	2 x 5	10			
3.	Short Answers	5	5	5 x 2	10			

Suggested Readings:

Reference books (Latest Edition)

Sl. No.	Name of Book & title	Author	Publisher, Name, Place of publication
1	Practical Pathology	P. Chakraborty Gargi Chakraborty	New Central Book Agency, Kolkotta
2.	Text Book of Haematology	Dr. Tejinder Singh	Arya Publications, Sirmour (H.P)
3.	Text Book of Medical Laboratory Technology	Praful Godkar	Bhalani Publication House, Mumbai
4.	Practical Haematology	Sir John Dacie	Churchill Livingstone, London
5.	Todd & Sanford, Clinical Diagnosis & Management by Laboratory Methods	John Bernard Henry	All India Travellar Booksellar, Delhi.
6.	Practical Pathology	Dr. Ganga S. Pilli	Prabhu Publications, Dharwad

Practical 3A: EMT06
Section A – Pathology

Practical 30 Hours

Basic Haematology

1. Hb Estimation-Sahli's method & Cyanmethhaemoglobin method
2. RBC Count
3. Retic Count
4. Preparation of blood smears and staining with Leishman stain
5. WBC Total Count
6. WBC -Differential Count
7. Platelet Count
8. Absolute Eosinophil Count
9. ESR- Westergreens & Wintrobe's method,
10. PCV.

Exam Pattern

I. Major Experiment: Perform any two exercises: 20 Marks

- ❖ Hb Estimation-Sahli's method
- ❖ RBC Count
- ❖ Preparation of blood smears and staining with Leishman stain- WBC - Differential count
- ❖ WBC Count
- ❖ Platelet Count
- ❖ Absolute Eosinophil Count

II. Minor Experiment: Any one examination 10 Marks

- ❖ Reticulocyte Count
- ❖ ESR- Westergreens & Wintrobe's method,
- ❖ PCV

III. Spotters 10 Marks

IV. Internal Assessment: 10 Marks

Total: 50 Marks

Practical Assessment

Scheme of Practical Examination for First Semester.

(Section A Pathology -50 Marks + Section B Microbiology 50 Marks)

Sr. No.	Practical	Practical	IA	Grand Total
1	Section A	40	10	50
2	Section B	40 (Major 30 + Minor 10)	10	50

Scheme of Exam for Practicals:

Major Experiment : 20 Marks

Minor Experiment : 10 Marks

Spotters : 10 Marks
Internal Assessment : 10 Marks
Total : 50
Marks

Semester I

PAPER 3- EMT03

Section B – Microbiology

Theory 25 Hours

- **Introduction to Medical Microbiology:** - Definition - History - Host-Microbe relationship.
- **Microscopy:** - Introduction and history - Types of microscopes
 - (a) Light microscope
 - (b) Dark ground Microscope
 - (c) Fluorescent Microscope
 - (d) Phase contrast Microscope
 - (e) Electron microscope:
- Principles and operational mechanisms of various types of microscopes
- **Sterilization:** - Definition -- Types and principle of sterilization methods
 - **Physical methods-** (a) Heat (dry heat, moist heat with special Reference to autoclave - their care and maintenance.) (b) Radiation (c) Filtration, Efficiency testing to various sterilizers.
 - **Chemical methods**
 - **Antiseptics and disinfectants:** Definition, Types and properties - Mode of action - Uses of various disinfectants, Precautions while using the disinfectants - Qualities of a good disinfectant, In-house preparation of alcoholic hand/skin disinfectants, Testing efficiency of various disinfectants
 - Antibiotics and drug resistance
 - Classification of Microbes
 - Bacterial Cell Growth and Nutrition
 - Overview and mechanisms of Bacterial gene transfer.
 - Ubiquity of microbes.

Scheme of Examination for Theory

Type of questions and distribution of marks for Theory examination in each subject in First Semester. Section B - Microbiology - 50 marks

S. No.	Question	Question asked	Question to attempt	Marks	Max. Marks	Internal assessment	Viva	Total Marks
1.	Long Essay Question	2	1	1 x 10	10	10	10	50
2.	Short Essay Question	3	2	2 x 5	10			
3.	Short Answers	5	5	5 x 2	10			

Suggested Readings:

1. Ananthanarayan and Paniker's Textbook of Microbiology. Tenth Edition. Reba Kanungo
2. Textbook of Microbiology for MLT. Second Edition. Dr. C. P. Baveja.

Practical 3B: EMT06 Section B – Microbiology

Practical 30 Hours

- Focusing, handling and care of Microscopes
- Hanging drop
- Simple stain
- Gram stain
- ZN stain
- Sterilization and Disinfection.

Scheme of Practical Examination for First Semester : Practical Examination for First Semester.

Sr. No.	Practical	Practical	IA	Grand Total
1	Section A	40 (Major 30 + Minor 10)	10	50
2	Section B	40 (Major 30 + Minor 10)	10	50

Major : 30 Marks

Gram Stain 15
Marks ZN Stain 15
Marks

Minor : 10 Marks

Spotter 10 Marks

IA : 10 Marks

Total 50 Marks

Suggested Readings:

- Practical Microbiology, Fourth Edition. C.P Baveja.

I YEAR B.Sc. Allied ENGLISH

ELS01

COURSE CONTENTS:

Subsidiary subject 60 hours for 1st year marks to be sent to university before IInd year exam.
Course description: It is designated to help the students to acquire a good command over English language for common and medical terminology used in medical practice.

Behavioural objectives:

Ability to speak and write proper
English Ability to read and understand
English
Ability to understand and practice medical terminology.
Paragraph
Letter
writing Note
making
Description
The use of paragraphs
Essay writing
Telegrams
Precise-writing and abstracting
Report writing
Medical Terminology
Use of dictionary

Scheme of examination

Theory: 80 Marks Duration: 3 hours

- | | |
|---|------------|
| 1) Fill in the blanks | - 10 marks |
| 2) Articles (Passage/fill in the blanks) | - 10 marks |
| 3) Tense (Sentence identification/rewriting a sentence) | - 10 marks |
| 4) Voice (Rewrite) | - 10 marks |
| 5) Speech (Rewrite) | - 10 marks |
| 6) Linkers (Paragraph) | - 10 marks |
| 7) Paragraph writing | - 10 marks |
| 8) Letter writing | - 10 marks |

Text Books Recommended (Latest Edition)

Sl. No.	Name of the Book & Title	Author	Publisher's Name Place of Publication
1.	Sharma Strengthen your writing	V. R. Narayana	New Delhi, Orient Longman
2.	Grammar and composition	Wren and Martin	Delhi, Chand & Co.
3.	Spoken English	Shashikumar V. D'Souza P. V.	New Delhi, Tata Mergaw Hill
4.	Medical dictionary	Dorland's pocket IBH Publishing Co.	New Delhi; Oxford &

SECOND SEMESTER

S.No	Subject code	Course	Hours			Credits
			L	P	Total	
1	EMT07	Anatomy	2	2		3
2	EMT08(A)	Physiology	1	2		2
3	EMT08(B)	Biochemistry	1	2		2
4	EMT09(A)	Pathology	1	2		2
5	EMT09(B)	Microbiology	1	2		2
6	ELS02	Subsidiary	1			1
		Clinical Posting	18			09
		Total				21

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA +Viv Voce	Total
1	EMT07	Paper 1	Human Anatomy	60 + 20 + 20	100
2	EMT08	Paper 2 Section 2A	Human Physiology	30 + 10 + 10	50
		Section 2B	Basics of Biochemistry	30 + 10 + 10	50
3	EMT09	Paper 3 Section 3A	Haematology & Clinical Pathology	30 + 10 + 10	50
		Section 3B	Microbiology	30 + 10 + 10	50
4	ELS02	Paper 4 Subsidiary	Computer science	80 + 20	100
Grand Total					400

Sr. No.	Subject Code	Practical	Subjects	Practical + IA	Total
5	EMT10	Practical 1	Human Anatomy	80 + 20	100
6	EMT11	Practical 2 2A	Human Physiology	40 + 10	50
		2B	Basics of Biochemistry	40 + 10	50
7	EMT12	Practical 3A	Hematology & Clinical Pathology	40 + 10	50
		3B	Microbiology	40 + 10	50
Grand Total					300

Semester II

PAPER 1 - EMT07

Human Anatomy

Theory 40 Hours

Anatomy of the Digestive System:

Components of Digestive system, Alimentary tube, Anatomy of organs of digestive tube, mouth, tongue, tooth, salivary glands, liver, Biliary apparatus, pancreas, Names and positions and brief functions - with its applied anatomy.

Anatomy of Renal System.

Organization of renal system

Kidneys: Location, gross features, relations, structure, blood supply, nerve supply, lymphatic drainage and with its applied anatomy.

Ureters and urinary bladder-Location, gross features, structure and with its applied anatomy Urethra in brief along with its applied anatomy.

Anatomy of Reproductive System.

Male Reproductive System: Testis, Duct system - with its applied anatomy.

Female Reproductive System: Uterus, Ovaries, Duct system, Accessory organs- with its applied anatomy.

Anatomy of the Endocrine System.

Name of all endocrine glands their positions, Hormones and their functions- Pituitary, Thyroid and parathyroid glands, Adrenal glands, Gonads and Endocrine part of pancreas- with its applied anatomy.

Type of questions and distribution of marks for Theory examination in each subject in Second Semester.

Sl. No.	Question	Question asked	Question to attempt	Marks	Max Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	20	20	100
2.	Short Essay Question	7	5	5 x 5	25			
3.	Short Answers	5	5	5 x 3	15			

Suggested Readings:

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Human Anatomy Regional and Applied. Vol. 1, Vol.2 & Vol.3	B. D. Chaurasia	C.B.S.Publishers, New Delhi.
2. Text Book of Human Histology	Inderbir Singh	Jaypee Brothers, Medical Publishers, Delhi.
3. Clinically Oriented Anatomy	Keith L. Moore	Williams and Wilkins, Baltimore.
4. Gray's Anatomy	Susan Standring	Elsevier Churchill Livingstone, Edinburg
5. Text book of Histology - A Practical Guide	J. P. Gunasegaran	Elsevier Publication, Gurgaon, Hariyana.
6. Practical manual of Histology for Medical students	Neelkanth Kote	Jaypee Brothers, Medical Publishers, Delhi.

Practical 1: EMT10 Human Anatomy

Practicals- 20 Hours

Systemic Histology slides:

1. G.I.T - oesophagus, stomach, small intestine, large intestine, liver, pancreas and gall bladder.
2. Kidney, ureter and urinary bladder.
3. Endocrine glands - Adrenal, Pancreas, Pituitary, Thyroid and Parathyroid
4. Uterus, Ovary, Testis.

Practical:

- 1) Demonstration of the digestive system organs
- 2) Demonstration of excretory systems organs
- 3) Demonstration of Male & Female reproductive organs
- 4) Demonstration of Endocrine glands.

Practical Assesment

Scheme of Practical Examination for Second Semester.

Sr. No.	Practical	Practica l	IA	Grand Total
1	Practicala 1	80	20	100

Scheme of Exam for Practicals:

Practicals

Gross

Anatomy

Discussion 3 x 10 marks : 30
Marks

Histology

Spotters 10 x 2 marks : 20
Marks

Spotters 15 x 2 marks : 30
Marks

IA marks

: 20 Marks

Total : 100 Marks

SEMESTER II

PAPER 2 - EMT08

Section A - Physiology

Theory: 35 Hours

RESPIRATORY SYSTEM

Physiological Anatomy of Respiratory System and Functions, Concept of Dead Space
Mechanism of Respiration, Lung volume and capacities, Surfactant, definition of compliance

Transport of Oxygen, ODC Curve and CO₂ transport

Regulation of Respiration – Types and functions of Respiratory Centres

Cyanosis, Dyspnea, Apnea, Hypoxia – definition and types

CARDIOVASCULAR SYSTEM

Physiological Anatomy of Heart

Cardiac Cycle – Definition and Phases

Cardiac Output - Definition, factors

Blood pressure - Definition, Determinants & Factors affecting blood pressure, regulation of blood pressure, Definition of Hypertension and Hypotension Myocardial Ischemia and Infarction,

Normal Electrocardiogram – Definition, Waves and Uses

EXCRETORY SYSTEM

Functional Anatomy

Functional anatomy of kidneys, structure of a nephron, features of renal circulation, juxtaglomerular apparatus

Mechanism of Urine formation

Glomerular Filtration – Definition, glomerular filtration rate, factors effecting GFR, Tubular reabsorption, functions of proximal convoluted tubule, loop of Henle, distal convoluted tubule & collecting tubule.

Micturition

Micturition reflex & concept of Artificial Kidney

DIGESTIVE SYSTEM

Functional Anatomy of GIT

Composition & functions of saliva,

Composition of gastric juice, mechanism of Secretion & functions of HCl secretion,

Composition and functions of pancreatic juice

Functions of Liver and bile Juice

Definition of Jaundice and it types

Movements of GI Tract - Deglutition, Movements of Small Intestines

ENDOCRINES

Major Endocrine glands

Pituitary Gland: Anterior & Posterior Pituitary Hormones and functions

Thyroid Gland: Hormones secreted and Functions, Goiter

Adrenal Gland: Hormones secreted by adrenal cortex and medulla and their functions

Pancreas: Endocrine Hormones of Pancreas and their functions, Diabetes Mellitus

Parathyroid Gland: PTH, calcitonin and its actions

REPRODUCTIVE SYSTEM

Puberty

Puberty, Pubertal changes in male and female

Male Reproductive System

Male reproductive organs, Spermatogenesis, Morphology of a sperm, Semen, Factors influencing spermatogenesis, Functions of testosterone

Female Reproductive System

Female reproductive organs, Oogenesis, Ovulatory cycle with its hormonal basis, Tests for Ovulation Menstrual cycle with its hormonal basis, Functions of Estrogen & Progesterone

Pregnancy & Lactation

Fertilization, Functions of Placenta, Hormones of Placenta, Pregnancy tests, Contraceptive methods, Mammary gland & Lactation, Milk Ejection Reflex, Composition of Milk, advantages of breast Feeding, Parturition

PRACTICAL 2A – EMT11

Section A – Human Physiology

30 Hours

- 1) Clinical Examination of Pulse
- 2) Blood Pressure Recording
- 3) Effect of exercise on BP
- 4) Effect posture
- 5) Auscultation for Heart Sounds
- 6) Spirometry – Description of Normal Findings
- 7) Electrocardiogram of a normal person – Description of ECG waves in Lead II
- 8) Artificial Respiration

Practical Total 50 Mark

Major- 25 Marks

Minor- 15 Marks
Internal-Assessment- 10 Marks
Total -50 Marks

Scheme of Examination

Theory Total 50 Marks

No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Internal Assessment	Viva 10	Total Marks
1.	Long Essay Question	2	1	1 x 10	10	10	10	50
2.	Short Essay Question	3	2	2 x 5	10			
3.	Short Answers	5	5	5 x 2	10			

Suggested Readings:

Recommended Text Books (Latest Edition)

Sl. No	Name of the Book & Title	Author	Publisher's Name, Place of Publication
1	Textbook of Physiology for MLT	Prof A.K.Jain	Avichal Publishing company
2	Textbook of Medical Physiology	D.Venkatesh & H.H.Sudhakar	Wolters Kluwers
3	Concise Medical Physiology	Sujit K Choudhari	New Central Books Calcutta
4	Textbook of Physiology	Arthur C Guyton	Prism Publishers Bangalore
5	Practical Physiology	Prof. A.K.Jain	Arya Publication

SEMESTER II

PAPER 2: EMT08

Section B

Basics of Biochemistry

Theory 35 Hours

1. Specimen collection of blood, urine, cerebrospinal fluid and other body fluids, preservation and preparation of protein free filtrate.
2. Enzymes: definition, classification, coenzymes, factors affecting enzyme activity and inhibitors, units of measurements, isoenzymes, Diagnostic enzymology (AST, ALT ALP, LDH, CPK and Troponin).
3. Digestion and Absorption of Carbohydrates, proteins and lipids

4. Nutrition – Calorific value and nutritional importance of Carbohydrates, Lipids, Proteins and Dietary fibers. BMR & Factors affecting BMR

5. Vitamins- Sources, RDA, functions and deficiency manifestations.

6. Minerals-Calcium, Phosphorus, Iron, copper, zinc, selenium and fluoride

7. Non Protein Nitrogenous compounds-Clinical Significance of Urea, Uric acid, creatinine, acetone and HCL

8. Overview of Metabolism

Carbohydrate Metabolism-Glycolysis, Gluconeogenesis and TCA Cycle

Protein Metabolism- General Reactions of amino acids and Urea cycle

PRACTICAL 2B: EMT11

Basics of Biochemistry II

Practicals

30 HOURS

1. Demonstration of Colorimeter, spectrophotometer, pH meter.
2. Quantitative analysis of Glucose, Urea and creatinine
3. Estimation of urine creatinine
4. Biochemically important substance- Urea, Uric acid, creatinine, acetone and HCL

SCHEME OF EXAMINATION- Theory

Theory - 30 Marks

Duration: 90 minutes

No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Internal Assessment	Total Marks
1.	Long Essay Question	2	1	1 x 10	10	10	50
2.	Short Essay Question	5	3	2 x 5	10		
	Short	5	5	5 x 2	10		

3.	Answers						
----	---------	--	--	--	--	--	--

Practical Examination-Semester II

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Quantitative analysis of Glucose/Urea/creatinine /Estimation of urine creatinine	1	1 x 20	20 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Analysis of biochemically important substances	1	1 x 20	20 Marks

Practical	40 Marks
IA Marks:	10 Marks
Grand Total	50 Marks

Suggested Readings:

Sl. No.	Name of the Books & Title	Author	Publisher's Name, Place of Publication
1	Clinical Chemistry	VARLEY	William Heinemann Medical Books Ltd & Inter Science Book. Inc. New York.
2.	Clinical Chemistry	TEITZ	W.B. Saunders Company Harcourt(India) Private Limited New Delhi-110048.
3.	Clinical Chemistry	KAPLAN	The C.V.Mosby Company, St. Louis Washington, D.C. Toronto.

1.	Long Essay Question	2	1	1x10	10	10	10	50
2.	Short Essay Question	3	2	2 x 5	10			
3.	Short Answers	5	5	5 x 2	10			

Suggested Readings:

Reference books (Latest Edition)

Sl. No.	Name of Book & title	Author	Publisher, Name, Place of publication
1	Practical Pathology	P. Chakraborty Gargi Chakraborty	New Central Book Agency, Kolkotta
2.	Text Book of Haematology	Dr. Tejinder Singh	Arya Publications, Sirmour (H.P)
3.	Text Book of Medical Laboratory Technology	Praful Godkar	Bhalani Publication House, Mumbai
4.	Practical Haematology	Sir John Dacie	Churchill Livingstone, London
5.	Todd & Sanford, Clinical Diagnosis & Management by Laboratory Methods	John Bernard Henry	All India Travellar Booksellar, Delhi.
6.	Practical Pathology	Dr. Ganga S. Pilli	Prabhu Publications, Dharwad.
7.	Hematology Blood Banking & Transfusion (PB)	Dutta B. A.	CBS Publishers & Distributors Pvt. Ltd.
8.	Blood Transfusion in Clinical Practice (HB)	Kochhar P. K.	CBS Publishers & Distributors Pvt. Ltd.
9.	Transfusion Medicine, 3e (PB)	Mc Cullough	CBS Publishers & Distributors Pvt. Ltd.
10.	Practical Transfusion Medicine, 4e (HB)	Murphy	CBS Publishers & Distributors Pvt. Ltd.

PRACTICAL 3: EMT12

Section A: Pathology

Hours

I. HAEMATOLOGY

- Sickling test-Demonstration
- Bone Marrow Smear preparation & staining procedure- Demonstration
- Demonstration of Malarial Parasite.
- Blood grouping.

II. CLINICAL PATHOLOGY

- Visit to pathology laboratory – Postings in batches - 15 days for 2 hours
- Urine examination

Practical 35

1.	Long Essay Question	2	1	1x10	10	10	10	50
2.	Short Essay Question	3	2	2 x 5	10			
3.	Short Answers	5	5	5 x 2	10			

Suggested Readings:

- 1) Ananthanarayan and Paniker's Testbook of Microbiology. Tenth Edition. Reba Kanungo
- 2) Textbook of Microbiology for MLT. Second Edition. Dr. C.P. Baveja.

PRACTICAL 3: BMLS12

Section B - Microbiology

- Biomedical waste management
- Collection of various clinical specimens .
- Serological tests
- Un-inoculated culture media and culture techniques.

Practicals 25 Hours

Practical Exam Pattern

Major :

- Biomedical waste management -
- Serological tests/Inoculation techniques

-25 marks

10 marks

-15 marks

Minor :

Spotters

IA

-15 marks

15 marks

-10 marks

Total

-50 marks

COMPUTER SKILLS

ELS02

Fundamentals of Computers-I

1. **Introduction to computer:** introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.
 - a. **Input output devices:** input devices (keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices),
Output devices (monitors, pointers, plotters, screen image projector, voice response Systems)
 - b. **Processor and memory:** The Central Processing Unit (CPU) and main memory.
 - c. **Storage Devices:** sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.
2. **Introduction to MS-Word:** introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spellchecking, printing the document file, creating and editing of table and mail merge.
3. **Introduction to Excel:** introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
4. **Introduction to power-point:** introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.
5. **Introduction of Operating System:** introduction, operating system concepts, types of operating system
 - a. **Introduction to MS-DOS:** History of DOS, features of MS-DOS, MS-DOS Commands (internal and external).
 - b. **Introduction of windows:** History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).
6. **Computer networks:** introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
7. **Internet and its Applications:** definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.
8. **Application of Computer in various fields:** Medical, Education, Railway, Defense, Industry, Management, Sports, Commerce, Internet.
9. *Introduction to installation of different software and introduction about different software related to MLS.*

Practicals:

Learning to use MS Office: MS WORD, MS EXCEL & MS PowerPoint and Internet

THIRD SEMESTER

Semester III

S.No	Subject code	Course	Hours			Credits
			L	P	Total	
1	EMT13	Applied Anatomy and Physiology related to Critical Care	2	2		3
2	EMT14	Applied Microbiology and Pharmacology related to Critical Care	2	2		3
3	EMT15	Basics of Research Methodology	2	2		3
4	ELS03	Environmental Studies	1			1
		Clinical Posting	18			09
		Total				19

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	EMT13	Paper 1	Applied Anatomy and Physiology related to Critical Care	60 + 20 + 20	100
2	EMT14	Paper 2	Applied Clinical Pharmacology in critical care:	60 + 20 + 20	100
3	EMT15	Paper 3	Clinical Microbiology And Infection Control	60 + 20 + 20	100
4	ELS03	Paper 4 Subsidiary	Environmental Studies	80 + 20	100
Grand Total					400

Sr. No.	Practical	Subjects	Practical + IA	Total
5	Practical 1	Applied Anatomy and Physiology related to Critical Care	80 + 20	100
6	Practical 2	Applied Clinical Pharmacology in critical care:	80 + 20	100
7	Practical 3	Clinical Microbiology And Infection Control	80 + 20	100
Grand Total				300

SEMESTER III

Paper 1 : EMT13

Theory 30 Hours

Applied Anatomy and Physiology related to Critical Care

Applied Anatomy related to critical care paper1

I RESPIRATORY SYSTEM

- Introduction
- Medical Terminology
- Anatomical terms, planes, relations
- o Anatomy of the upper respiratory tract
- Nose, oral cavity
- Pharynx, Larynx
- o Anatomy of thoracic cage bones, muscles, innervation
- o Anatomy of the lungs - overview
- o Pleura, lobes of lung, bronchi, trachea, hilum, bronchial tree
- o Alveolus, Bronchioles,
- o Blood supply,
- o Lymphatics
- o Innervation

II CARDIOVASCULAR SYSTEM

- Overview of CVS
- Anatomy of heart - Pericardium, myocardium, endocardium, valves,
- Anatomy of Vascular system - Major Vessels, Arteries, Veins, Capillaries
- Regional Circulation - coronary, cerebral, splanchnic

III CENTRAL NERVOUS SYSTEM

- Basic organisation of the nervous system - Central, Peripheral, Autonomic
- Cerebral blood flow
- Pain pathway

Applied physiology related to critical care

I. RESPIRATORY SYSTEM

- Physiology of breathing
- Homeostasis
- Mechanics of Breathing, Muscle action
- Regulation of breathing
- Lung Volumes & Capacity
- Gas exchange & transport- oxygen, carbon dioxide
- Diffusion
- O₂ Transport and abnormalities
- CO₂ Transport and abnormalities
- Pressure, Volume
- Resistance, Compliance
- Ventilation and Perfusion, V/Q ratio
- Gas exchange, mechanism of diffusion

- Work of breathing
- Transport of O₂ and CO₂; factors affecting oxygen transport
- Acid - base balance
- Pulmonary Function Tests
- Arterial Blood Gas
- Types of respiratory failure - causes and treatment

II CARDIOVASCULAR SYSTEM

- Cardiac cycle
- Cardiac output - factors affecting cardiac output
- Cardiac conducting system
- Regulation of rate, basic arrhythmias
- Principles of ECG, Normal ECG
- Blood pressure
- maintenance of normal blood pressure and factors affecting it
- systolic, diastolic, pulse pressure, mean
- Oxygen delivery, uptake to tissues
- Central venous pressure
- Cardiac output, Stroke volume contractility
- Preload, After load
- Interpretation of common haemodynamic parameters.
- Assessment of hemodynamic parameters
- Recognise the following regarding arterial cannulation
- Indications
- Cannulation sites
- Possible complications
- Normal pressures and their significance
- Pressure wave forms
- Significance of respiratory variation in the pressure wave forms

CVP Monitoring

- Indications
- Factors affecting measurement
- Insertion sites
- Types of catheters
- Correct technique of pressure measurement.

III CENTRAL NERVOUS SYSTEM

- Metabolic requirements of the brain
- Consciousness, Coma, Brain injury
- Sedation
- Brain Death

**SCHEME OF EXAMINATION –
Semester III**

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2.	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester III

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
<u>X ray, graphs ,ECG</u>	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Spotters		8 x 10	80 Marks

Practical	80 Marks
I A Marks	20Marks
Grand Total	100 Marks

Recommended Books:

1. Critical Care Physiology Robert H Bartlett
2. Applied Physiology in Critical Care Physiology Michael R.Pinsky

Reference books:

1. Textbook of Medical Physiology , AC Guyton, JE Hall
2. Ganong's review of Medical Physiology

Online Reference

1. WWW.derangedphysiology.com
2. WWW.emcrit.org

Paper 2 :EMT14

Theory 30 Hours

Applied Clinical Pharmacology in critical care:

- Drugs- Nomenclature
- Modes of action of drugs
- Routes of administration
- Drug dose calculation- Dilution, infusion rate

Medical gases: O2 ; N2O

- Bronchodilators
- Mucokinetic agents
- Antihistamines
- Steroids

- Drugs affecting autonomic nervous system
- Inotropic agents, Chronotropic agents,
- Vasopressors & Vasodilators
- Antihypertensives
- Analgesics; sedatives
- Neuromuscular blocking agents
- Antimicrobial drugs, antiviral and anti-fungal agents - basic concepts Antimicrobial Resistance - Basic concepts
- Antiseptic agents

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	80	20	20	100
2	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester III

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Drug preparation	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Spotters		8 x 10	80 Marks

Practical
I A Marks
Grand Total

80 Marks
20Marks
100 Marks

Recommended Books:

- 1.Textbook of Microbiology Anatanarayanan and Paniker
- 2.Essentials of Medical Pharmacology KD.Tripathi

Reference books:

- 1.Infectious Diseases in Critical Care Medicine ,Burke A Cunha
2. Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham

Online Reference

- 1.WWW.derangedphysiology.com
- 2.WWW.intensivecarenetwork.com

Paper 3:EMT15

Theory 30 Hours

Clinical Microbiology And Infection Control

INTRODUCTION - Importance of infection in an ICU

Agents causing Infection

SPREAD OF INFECTION Source; host; transmission

Biohazardous materials

INFECTION CONTROL & UNIVERSAL PRECAUTIONS

- Sterilisation & Disinfection - concepts

- Methods of sterilization

- Spread of infection

- Elimination of source - Cleaning and sterilizing equipment

- Interrupting transmission of infection - role of health care workers

- Disposal of infection wastes

- Surveillance; quality control

SPECIFIC INFECTIONS

Community acquired infections

Nosocomial Infections: Types - Prevention .

HIV-AIDS .

Hepatitis A, B, C

Tropical Infections -Tetanus, Malaria, Leptospirosis, Dengue, Rickettsial, Amoebiasis

SCHEME OF EXAMINATION – Semester III

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester III

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
microbiology reposts	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Spotters & Interpretation of lab reports and slides		8 x 10	80 Marks

Practical 80 Marks
I A Marks 20Marks
Grand Total 100 Marks

Recommended Books:

- 1.Textbook of Microbiology Anatanarayanan and Paniker
- 2.Essentials of Medical Pharmacology KD.Tripathi

Reference books:

- 1.Infectious Diseases in Critical Care Medicine ,Burke A Cunha
2. Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham

Online Reference

- 1.WWW.derangedphysiology.com
- 2.WWW.intensivecarenetwork.com

ELS03 ENVIRONMENTAL STUDIES

GOAL:

The students should gain knowledge to understand the multidisciplinary nature of the environment and the awareness of the eco system, which maintains the natural environment.

OBJECTIVES:

a) KNOWLEDGE

At the end of the 3rd semester course the student is expected to know:

1. The natural resources like forest, water, mineral, food, energy and land.
2. Functions of the eco system.
3. Bio-diversity and its conservation.
4. Environmental pollution & its prevention.
5. Social issues.

b) SKILLS

At the end of the 3rd semester course the student is expected to:

1. Visit local areas to understand and document environmental assets like river, forest, grassland, hill and mountain.
2. Visit an industrial area or agricultural area to know about local pollutants.
3. Identify common plants, insects and birds in their local areas.
4. Identify rivers, hills and mountains in their local areas.
5. To make use of the knowledge to protect natural resources.

COURSE CONTENTS

Theory and Field work: 50 Hours

♦ **Theory - 45 hours**

♦ **Field work - 5 hours**

1: Multi-disciplinary nature of environmental studies

Definition, scope and importance, need for public awareness.

2 hours

2: Natural Resources:

Renewable and non-renewable resources:

Natural resources and associated problems.

- a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
- b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.
- f) Land resources: Land as a resource, land degradation, man induced landslides, soil

erosion and desertification.

g) Role of an individual in conservation of natural resources.

h) Equitable use of resources for sustainable lifestyles

8 hours

3: Ecosystems

◆ Concept of an ecosystem.

◆ Structure and function of an ecosystem.

◆ Producers, consumers and decomposers.

◆ Energy flow in the ecosystem.

◆ Ecological succession.

◆ Food chains, food webs and ecological pyramids.

◆ Introduction, types, characteristic features, structure and function of the following ecosystems:-

a. Forest ecosystem

b. Grassland ecosystem

c. Desert ecosystem

d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

6 hours

4: Biodiversity and its conservation

8 hours

◆ Introduction - Definition: genetic, species and ecosystem diversity.

◆ Bio geographical classification of India.

◆ Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.

◆ Biodiversity at global, National and local levels.

◆ India as a mega-diversity nation.

◆ Hot-spots of biodiversity.

◆ Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.

◆ Endangered and endemic species of India

◆ Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

5: Environmental Pollution

8 hours

Definition

◆ Cause, effects and control measures of:-

a. Air pollution

b. Water pollution

c. Soil pollution

d. Marine pollution

e. Noise pollution

f. Thermal pollution

g. Nuclear hazards

◆ Solid waste Management: Causes, effects and control measures of urban and industrial wastes.

◆ Role of an individual in prevention of pollution.

◆ Pollution case studies.

◆ Disaster management: floods, earthquake, cyclone and landslides.

6: Social Issues and the Environment

7 hours

- ◆ From Unsustainable to Sustainable development
- ◆ Urban problems related to energy
- ◆ Water conservation, rain water harvesting, watershed management
- ◆ Resettlement and rehabilitation of people; its problems and concerns. Case Studies
- ◆ Environmental ethics: Issues and possible solutions.
- ◆ Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.
- ◆ Wasteland reclamation.
- ◆ Consumerism and waste products.
- ◆ Environment Protection Act.
- ◆ Air (Prevention and control of Pollution) Act.
- ◆ Wildlife Protection Act
- ◆ Forest Conservation Act
- ◆ Issues involved in enforcement of environmental legislation.

7: Human Population and the Environment

6 hours

- ◆ Population growth, variation among nations.
- ◆ Population explosion - Family Welfare Programme.
- ◆ Environment and human health.
- ◆ Human Rights.
- ◆ Value Education.
- ◆ HIV/AIDS
- ◆ Women and Child Welfare.
- ◆ Role of Information Technology in Environment and human health.
- ◆ Case Studies.

8: Field work

- ◆ Visit to a local area to document environmental assets
river/forest/grassland/hill/mountain
- ◆ Visit to a local polluted site - Urban / Rural/ Industrial/Agricultural.
- ◆ Study of common plants, insects, birds.
- ◆ Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)

SCHEME OF EXAMINATION

A. Theory : 80 Marks

- ◆ Long Essay 2 X 10 = 20
- ◆ Short Essay 8 X 5 = 40
- ◆ Short Answers 5 X 4 = 20

B. Field Work: 20 Marks

Recommended Books:

Sl. No.	Title	Author	Edition & Year	Publisher
1	Environmental Biology	Agarwal, K.C.	2001	Nidi Publication Ltd. Bikaner
2	The Biodiversity of India	Bharucha Erach		Mapin Publishing Pvt. Ltd., Ahmedabad - 380 013
3	Environmental Encyclopedia	Cunningham W.P., Copper T.H., Gorhani E. & Hepworth M.T.	2001	Jaico Publication House, Mumbai.
4	Global Biodiversity Assessment	Heywood V. H. & Waston R.T.	1995	Cambridge University Press 1140p
5	Environmental Protection and Laws	Jadhav H. & Bhosale V. M.	1995	Himalaya Publishing House, Delhi 284p
6	Environmental Science Systems & Solutions	Mckinney M. L. & School R.M.	1996	

FOURTH SEMESTER

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	EMT16	Paper 1	Emergency Medicine Technology I	60 + 20 + 20	100
2	EMT17	Paper 2	Basics of Emergency Medicine & Emergency Medical Services II	60 + 20 + 20	100
3	EMT18	Paper 3	Emergency Medicine & Emergency Medical Services III	60 + 20 + 20	100
4	ELS03	Paper 4 Subsidiary	Law- Indian Constitution	80 + 20	100
Grand Total					400

Sr. No.	Practical	Subjects	Practical + IA	Total
5	Practical 1	Emergency Medicine Technology I	80 + 20	100
6	Practical 2	Basics of Emergency Medicine & Emergency Medical Services II	80 + 20	100
7	Practical 3	Emergency Medicine & Emergency Medical Services III	80 + 20	100
Grand Total				300

PAPER 1 - EMT16

Theory 30 Hours

Emergency Medicine Technology I

Airway Care

INDICATIONS FOR ARTIFICIAL AIRWAYS

- Relieving airway obstruction
- Secretion removal
- Protecting the airway
- Positive Pressure Ventilation

SELECTING AND ESTABLISHING AN ARTIFICIAL AIRWAY

- Nasal airways
- Pharyngeal airways
- Tracheal airways

AIRWAY CLEARANCE TECHNIQUES

- Airway suctioning
- Bronchoscopy

AIRWAY MAINTENANCE

- Securing the airway and confirming placement
- Providing adequate humidification
- Minimizing nosocomial infections
- Providing cuff care
- Facilitating clearance of secretions
- Troubleshooting airway emergencies

EXTUBATION

- Indications
- Procedure
- Post extubation care & complications

Oxygen Therapy

- Sources of oxygen for therapy
- Storage of oxygen
- Oxygen delivery systems
- Hazards of oxygen
- Modes of O₂ therapy
- Monitoring O₂ delivery systems (in vitro)

Blood gases in patient (in vitro.)

- Pulse oximetry
- Economic issues

CHEST XRAY and BASIC CONCEPTS IN CT & MRI

NORMAL CHEST X-RAY

- Normal anatomy
- Basic physics of X-ray and assessment of film quality
- Cardiac configuration .
- Lung fields and airway

- Optimum position of - ET, NG, Central Lines

ABNORMAL CXR /CT:

- Trauma:

- Pneumothorax

- Hemothorax

- Lung contusion

- Pulmonary oedema

-CCF

-ARDS

- Pneumonia: - Bronchopneumonia

- Lobar pneumonia

- Aspiration pneumonia

Semester IV

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2.	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester IV

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS		8 x 10	80 Marks

Practical	80 Marks
I A Marks	20Marks
Grand Total	100 Marks

Recommended Books:

1. The ICU book ,Paul Marino
- 2.ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
- 2.Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham

Online Reference

- 1.lifeinthefastlane.com
- 2.criticalcarereviews.com

PAPER 2-EMT17

Theory 30 Hours

BASICS OF EMERGENCY MEDICINE & EMERGENCY MEDICAL SERVICES II

TRIAGE AND GENERAL EMERGENCIES

Concepts and principles of Disaster Nursing

Causes and Types of Disaster:

Natural and Man-made Earthquakes, Floods, Epidemics, Cyclones Fire, Explosion, Accidents, Violence, Terrorism; biochemical, War

Policies related to emergency/disaster management; International, national, state, institutional

Disaster preparedness:

Team, Guidelines, protocols, Equipment's, Resources

Coordination and involvement of; Community, various govt. departments,

Non-government Organizations and International agencies

Legal Aspects of Disaster

Impact on Health and after effects : Post Traumatic Stress Disorder

Rehabilitation; physical, psychosocial, Financial, Relocation

Concept, priorities, principles and Scope of emergency care

Organization of emergency services: physical setup, staffing,

Equipment and supplies, protocols,

Concepts of triage and role of triage person

Coordination and involvement of different departments and facilities

Principles of emergency management

1. LIFE SUPPORT & RESUSCITATION

Basic life support in perspective

Cardiopulmonary function and actions for survival

Adult Basic life support, Advanced Cardiac life support

Pediatric Basic Life support

Special resuscitation situations(drowning, hanging, Pregnancy)

Safety during CPR training and actual rescue

☐☐ BASIC PRINCIPLES OF TRAUMA CARE (ATLS)

The principles of kinetic energy Mechanism –Basic mechanics of Injury

Pattern.

Primary survey

Secondary survey as appropriate

Reassessment

Identification of Life threatening injuries

Shock –different types & Categories

Revised trauma score, Glasgow Coma Score

Lifting & transporting of injured persons

Splints and Immobilization

Lead ECG and Interpretation of normal ECG

IVcannulation

Blood sampling

Triage

Transportation of patients(Spine board and Scoop board)

BLS

ACLS

Biomedical waste dispose

Splinting Immobilization

SCHEME OF EXAMINATION – SemesterIV

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	75X5	25				

3.	Short Answers	5	5	5 x 3	15				
----	---------------	---	---	-------	----	--	--	--	--

Practical Examination-Semester IV

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
CASE SCENARIO	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
		8x 10	80 Marks

Recommended Books:

1. The ICU book ,Paul Marino
2. ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
2. Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham

Online Reference

1. lifeinthefastlane.com
2. criticalcarereviews.com

Practical	80 Marks
I A Marks	20Marks
Grand Total	100 Marks

PAPER 3-EMT18

Theory 30 Hours

EMERGENCY MEDICINE & EMERGENCY MEDICAL SERVICES III

COURSE CONTENT

1. Medical emergencies

Hypoglycemia

Hyperglycemia, DKA ,HONK

Poisoning

Anaphylaxis

Hypothermia

Hyperthermia

Mental illness

2. Fluids and electrolytes

Fluid administration (Types of Fluids)

Formulas (Hypo and Hyper natremia)

o Dehydration

o Over hydration

Electrolyte imbalance (Sodium, Potassium, Bicarbonate, Chloride)

3. Acid base emergencies: (Respiratory and metabolic Acidosis/Alkalosis)

Interpretation

4. Respiratory Emergencies:

Foreign body obstruction

Chronic obstructive pulmonary disease (COPD)

Asthma

Pneumonia, Pulmonary edema, ARDS

Common medication in respiratory problems

(Meter dose inhaler, nebuliser)

Mechanical ventilator – General principles, Basic modes of ventilation, NIV

5. Gastrointestinal Emergencies:

Abdominal pain

Peptic ulcer disease

Cholecystitis

Hepatitis

Pancreatitis

Abdominal aortic aneurysm

Bowel obstruction

Hernias

Gastro intestinal bleeding

6. Cardiovascular Emergencies:

Angina pectoris

Myocardial infarction (MI), Thrombolytic Therapy

Congestive Cardiac Failure (CCF)

Aortic Aneurysm

Hypertensive Emergencies

12 lead ECG and Interpretation

Heart Block and Cardiac Arrhythmias

6. Central Nervous System Emergencies:

Meningitis

Stroke

Seizure

Status epileptics

Syncope

7. Genito urinary emergencies:

Renal failure

Urolithiasis

Urinary tract infection

Haematuria

8. Hematological Disorders:

Red blood cell disorders:

Anemia and Types/Polycythemia

White blood disorders

Platelet abnormalities

9. Endocrine and Metabolic Emergencies:

Diabetic Ketoacidosis

Hyperosmolar coma

Thyroid crisis

Diabetes insipidus

Vomiting

Diarrhea

11. Dermatological Emergencies:

Viral infections:

Varicella

Herpes zoster

Acute leprosy reactions

Autoimmune disorders:

Pemphigus vulgaris

Systemic lupus erythematosus

Toxic disorders:

Acute erythroderma

Severe pruritus,

Scabies

Allergic reactions – Anaphylaxis/Angioedema

13. Toxicology:

Define the term poison

The four ways in which a poison may enter the body

General principles of assessment and management of poison and overdose

Opiates toxicity

Organophosphates

Carbon monoxide

Cyanide

Caustics

Copper sulphate

Digoxin toxicity

Hydrocarbons

Tricyclic antidepressant toxicity

Metals – Arsenic/Iron

Acetaminophen overdose

Poisonous alcohols Methanol

Poisonous plants – Oleander, Oduvanthalai

14. Emergencies due to venomous bites and stings:

Snake bite
 Scorpion stings
 Spider bite
 Bee and wasp stings
 Dog bite
 Cat bite
 Human bite
 Monkey bite

15. INDUSTRIAL HAZARDS

Electrocution
 Amputation
 Crush injury
 Fall from height
 Assaults

OBSTETRICAL EMERGENCIES

Pre eclampsia
 Placenta praevia/Abruption
 Post Partum Hemorrhage
 Amniotic fluid embolism
 Cord prolapse
 Ectopic Pregnancy

17. MENTAL HEALTH EMERGENCIES

Aggressive patient
 Suicide
 Deliberate selfharm

18. Paediatric emergencies

Neonatal resuscitation
 Pediatric resuscitation
 Assessment of newborn and pediatric
 Meconium aspiration
 Diaphragmatic hernia
 Apnea
 Drowning
 SIDS (Sudden infant Death Syndrome)
 Neonatal Seizure
 Febrile convulsion
 Shock

NERVOUS SYSTEM:

**SCHEME OF EXAMINATION –
 SemesterIV**

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
--------	----------	----------------	---------------------	-------	---------------	--------------	------	---------------------	-------------

1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2.	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester IV

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
CASE SCENARIO	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SHORT CASE SCENARIO		8 x 10	80 Marks

Recommended Books:

1. The ICU book ,Paul Marino
2. ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
2. Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham

Online Reference

1. lifeinthefastlane.com
2. criticalcarereviews.com

Practical	80 Marks
I A Marks	20Marks
Grand Total	100 Marks

ELS04

LAW - INDIAN CONSTITUTION

I. GOAL :

The students should gain the knowledge and insight into the Indian Constitution so that they are aware of the fundamental rights and freedom bestowed through the democratic governance of our country.

II. OBJECTIVES :

A) KNOWLEDGE :

At the end of the B.Sc. 4th Semester the student is expected to know:

- 1) Basic knowledge of the Indian Constitution.
- 2) Democratic institutions created by the Constitution.
- 3) Special rights created by the Constitution for regional and linguistic minorities.
- 4) Election Commission.
- 5) Legislative, Executive and Judicial powers and their functions in India.

B) SKILLS:

At the end of the B.Sc. 4th Semester the student is expected to make use of knowledge:

- 1) To perform his / her duties towards the society judiciously and with conscious effort for self-development.
- 2) To utilize State policies in their future practice.

COURSE CONTENTS

	Theory:	25 Hours
Unit I	a) Meaning of term Constitution. b) Making of the Indian Constitution - 1946 - 1949 and role played by Dr. B. R. Ambedkar. c) Salient Features of the Constitution. d) Preamble of the Constitution.	2 Hours
Unit II	The democratic institutions created by the Constitution. Bicameral System of Legislature at the Centre and in the States. Devolution of Powers to Panchayat Raj Institutions.	5 Hours
Unit III	Fundamental Rights and Duties - Their content and significance	5 Hours
Unit IV	Directive Principles of State policies - The need to balance Fundamental Rights with Directive Principles.	1 Hour
Unit V	Special rights created in the constitution for Dalits, Backward class, Women and Children, and the Religious and	

	Linguistic Minorities	1 Hour
Unit VI	Doctrine of Separation of Powers - Legislative, Executive and Judicial, and their functions in India.	4 Hours
Unit VII	The Election Commission and State Public Service Commissions.	2 Hours
Unit VIII	Method of amending the Constitution.	1 Hours
Unit IX	Enforcing rights through Writs Certiorari, Mandamus, Quo warranto and Habeas Corpus.	2 Hours
Unit X	Constitution and Sustainable Development in India.	2 Hours

Reference: 1. Durga Das Basu, Introduction to the Constitution of India, Gurgaon; LexisNexis, 2018 (23rd edn.)

2. M.V.Pylee, India's Constitution, New Delhi; S. Chand Pub., 2017 (16th edn.)

3. J.N. Pandey, The Constitutional Law of India, Allahabad; Central Law Agency, 2018 (55th edn.)

4. Constitution of India (Full Text), India.gov.in., National Portal of India, https://www.india.gov.in/sites/upload_files/npi/files/coi_part_full.pdf

5. Durga Das Basu, Bharatada Samvidhana Parichaya, Gurgaon; LexisNexis Butterworths Wadhwa, 2015 6. Kb Merunandan, Bharatada Samvidhana Ondu Parichaya, Bangalore, Meragu Publications, 2015

Scheme of Examination

University Theory Examination at the end of fourth Semster:100 Marks

Reference Books Latest Edition :

Sl. No.	Title	Author	Publisher
1	The Constution of – A Politico – Legal Study	J. C. Johari	Sterling Publication Pvt. Ltd.
2	Constitution Law	J. N. Pandey	Central Law Agency
3	The Indian Constitution	Granville Austin	Corner Stone of Nation

FIFTH SEMESTER

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	EMT19	Paper 1	Emergency Surgery & Emergency Surgical Services	60 + 20 + 20	100
2	EMT20	Paper 2	Clinical Procedures And Instruments In Emergency Services	60 + 20 + 20	100
3	EMT21	Paper 3	Patient Examination And Nursing	60 + 20 + 20	100
4	ELS03	Paper 4 Subsidiary	Biomedical Waste Management	80 + 20	100
Grand Total					400
Sr. No.	Practical	Subjects		Practical + IA	Total
5	Practical 1	Emergency Surgery & Emergency Surgical Services		80 + 20	100
6	Practical 2	Clinical Procedures And Instruments In Emergency Services		80 + 20	100
7	Practical 3	Patient Examination And Nursing		80 + 20	100
Grand Total					300

FIFTH SEMESTER

PAPER 1 : EMT19

Theory 30 Hours

EMERGENCY SURGERY & EMERGENCY SURGICAL SERVICES

OBJECTIVES

The student should gain knowledge and recognition of major abdominal illness and trauma, ask for relevant investigations, so as to avoid any delay in resuscitation.

1. PRINCIPLES OF ANAESTHESIA

General Anaesthesia

Local Anaesthesia

Regional Anaesthesia

2. WOUNDS AND SUTURING

Types of common wounds

Treatment

Cleansing the wound

Wound healing

Principles of incision and closure (including suturing)

3. BURNS

Skin Anatomy

Classification of Burn

Special Burn considerations

FOREIGN BODY OBSTRUCTION

4. GASTROINTESTINAL SYSTEM

Acute Appendicitis

Acute Pancreatitis

Intestinal obstruction

Upper GI Bleed

Lower GI Bleed

Duodenal and gastric ulcer

Renal colic

5. TRAUMA

* Head injury

Thoracic injuries

Blunt trauma, Penetrating trauma

6. TORSION

TESTIS

PRACTICALS

Assisting in various procedures like:

o Central Venous

Access o Suturing of

Wounds o

Tracheostomy

o Intercostal Drainage

o Needle Thoracocentesis

o Cricothyroidectomy
Skills of intubation in a Maniquenin

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester vI

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
TROUBLESHOOTING	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS		8 x 10	80 Marks

Practical 80 Marks
I A Marks 20Marks
Grand Total 100 Marks

Recommended Books:

1. TEXTBOOK OF ANAESTHESIA BY MILLERS
2. The ICU book ,Paul Marino
- 2.ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine

2. Textbook of Critical Care, Jean Louis Vincent, Edward Abraham
3. mechanical ventilation by David Chang

Online Reference

1. lifeinthefastlane.com
2. criticalcarereviews.com

PAPER 2: EMT20 **Theory 30 Hours**

CLINICAL PROCEDURES AND INSTRUMENTS IN EMERGENCY SERVICES

CLINICAL PROCEDURES AND INSTRUMENTS EMERGENCY SERVICES COURSE DESCRIPTION

This course is designed to help the students to develop an understanding of the philosophy, objectives, theories and process of accident and emergency care technology in various Supervised Clinical settings. It is aimed at helping the students to acquire knowledge, understanding and skills in techniques of practice them in Supervised Clinical settings

1. INSTRUMENTATION IN EMERGENCY SERVICES

Introduction to Biomedical engineering (Man – machine relationship)

ECG

DC Defibrillator

Intravenous pumps

Laryngoscope, ambubag, suction machine

SPO2 monitoring, Temperature monitoring

BP apparatus, BP monitoring NIBP,

IBP

Ventilators Intensive

care, portable

Manual resuscitator

Radiology equipment & radiation hazards

Suction machine

Nebuliser

Medical gases

Ambulance and its power supply

Dialysis machine

Infant warmer & incubator

1. CLINICAL PROCEDURES IN EMERGENCY ROOM

Vital Sign Measurement:

- o Pulse assessment
- o Respiratory assessment
- o Temperature assessment
- o Blood pressure assessment

SP02

Pain score (VAS)

Respiratory procedures:

- p Endotracheal intubation and extubation
- o Drugs through ET tube
- o Tracheostomy insertion and management
- o Suctioning an artificial airway:
 - o Naso tracheal suctioning
 - o Insertion of nasopharyngeal and oropharyngeal airway
- o Mechanical ventilation
- o Intercostal drain
- o age
- o Thoracocentesis

Intermediate Airways

- o Laryngeal Mask Airway
- o Esophageal – Tracheal Combitube

Non invasive Assessment and Support of Oxygenation and Ventilation

- o Pulse oximetry
- o Carbon dioxide Monitoring > Capnometry
- o Oxygen therapy
- o Delivery systems for Inhaled Medication

Nebulizers

Metered Dose Inhaler

Cardiovascular procedures (Observation)

- o Cardiac Monitoring
 - o Central venous pressure monitoring
 - o Insertion of Arterial line:
 - o Central venous cannulation
 - o Transcutaneous cardiac pacing
 - o Transvenous cardiac pacing
 - o Pericardiocentesis
 - o Cardioversion
 - o Defibrillation
- Cannulating Umbilical Vein
- o Indication
 - o Procedure
 - o Drugs through umbilical vein
 - o Complication

Intraosseous Infusion

- o Indication
- o Procedure
- o Drugs through intraosseous line
- o Complication

Gastrointestinal procedures

Insertion of nasogastric tube

Insertion of enteral feeding tube and initiation of feedings. Gastric lavage

Upper gastrointestinal

endoscopy Insertion of rectal

tube Paracentesis

Peritoneal lavage

Poison decontamination

p Activated charcoal

o Whole bowel irrigation

Genitourinary procedures

p Urethral catheterization

o Peritoneal dialysis

o Placement and Management of external Arteriovenous shunt (Assisting).

o Continuous Arteriovenous hemofiltration (Assisting)

Intravenous Therapy

p Insertion of intravenous catheter

o Administration of parenteral nutrition

o Blood and Blood product administration

Neurologic Procedures

Lumbar Puncture (Observation/Assisting)

PRACTICALS

ECG Interpretation

o Spotter identification

Thermometer

BP apparatus

Stethoscope

Glucometer

Intraosseous infusion

LMA

Combitube

ET intubation

Nebuliser

Ventilator

Capnography

Pulse oximeter

Chest Xray

interpretation

ABG – Interpretation

ACLS

ATLS

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester vI

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
<u>MONITORING,</u> <u>TROUBLESHOOTING</u>	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS		8 x 10	80 Marks

Practical 80 Marks
I A Marks 20Marks
Grand Total 100 Marks

Recommended Books:

1. The ICU book ,Paul Marino
- 2.ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
2. Textbook of Critical Care, Jean Louis Vincent, Edward Abraham
3. mechanical ventilation by David Chang

Online Reference

1. lifeinthefastlane.com
2. criticalcarereviews.com

PAPER 3: EMT21

Theory 45 Hours

PATIENT EXAMINATION AND NURSING

INTRODUCTION PUBLIC

HEALTH

Importance of Community Medicine

Modes of Transmission of Diseases

Principles of Prevention & Control of Diseases

Hospital infections, disinfection, disinfestations and sterilization

Disposal of Hospital wastes

Important Communicable diseases –

Respiratory, Intestinal; contact – STD /

AIDS

Health education

2. INDIVIDUAL PATIENT CARE

The Art of History taking

Physical examination (GPE & different systems)

Care of Unconscious patient

Diagnosis of Brain death

3. INTRODUCTION TO HEALTH AND HEALTH CARE SYSTEM

Definition and concepts of terms health, illness, morbidity, mortality, patient

Nature of disease pattern

Impact of illness on individual, family and community

Hospital (settings type and functions)

4. ADMISSION OF

PATIENTS

Preparation

of unit Admission

procedure Medico legal

issues

5. COMMUNICATION SKILLS Process of

communication Modes of communication

Characteristics of effective communication

Factors affecting communication Observing,

listening and interviewing Nurse patient

relationship

Communication with other members of health team

5. COMFORT REST AND SLEEP NEEDS OF PATIENTS

Purposes of rest and sleep

Factors affecting rest and sleep

Common problems of sleep

Use of comfort devices

6. PATIENT HYGIENE

Definition and principles relevant to hygiene

Factors influencing hygiene

Care of skin and its appendages, mouth, eyes, ear, nose, perineum and clothing

Common health problems of poor personal hygiene

7. HOUSE KEEPING

Rubber Goods, Enamel Ware Plastic, Porcelain, Glass Articles etc.

8. VITAL SIGNS

Temperature

o Definition and normal body temperature

o Factors affecting normal body temperature o

Assessment of normal body temperature

Pulse

o Definition and normal pulse

rate o Characteristics of

normal pulse

o Factors influencing

pulse

o Alterations in pulse

o Assessment of pulse

Respiration

o Definition and normal

respiratory rate o Characteristics of

normal respiration o Factors

influencing respiratory rate o

Alterations in respiration

Blood pressure

o Definition and normal blood pressure

o Factors influencing normal blood

pressure o Assessment of blood

pressure

FIRST AID AND NURSING EMERGENCIES

Principles of first aid management

Wounds, haemorrhage, shock

Fracture, dislocations, muscle injuries

Splinting

Respiratory emergencies, unconsciousness

Burns, scalds, foreign bodies in the skin, eye, ear, nose, throat, stomach

Frost bite, effects of heat cramps, bites and stings

Poisoning

Bandaging

9. FLUID AND ELECTROLYTE BALANCE

Factors affecting fluid, electrolyte and acid base balance

Care of patients with fluid and electrolyte imbalance

Starting IV infusion

10. BODY MECHANICS

Movement of patient lifting and transporting

11. INFECTION CONTROL

Infection cycle

Universal precautions

Barriers technique

12. HEALTH EDUCATION

Aims and objectives of health education

Principles of health education

Methods of health education

Audio visual aids – purposes, types, selection and use

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester vI

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
PROCEDURES	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS		8 x 10	80 Marks

Practical 80 Marks
I A Marks 20Marks
Grand Total 100 Marks

Recommended Books:

1. The ICU book ,Paul Marino
- 2.ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
- 2.Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham
3. mechanical ventilation by David Chang

Online Reference

- 1.lifeinthefastlane.com
- 2.criticalcarereviews.com

**Biomedical waste management
ELS05**

15 hours

Programme

Creating awareness about the various aspects of biomedical waste and disposal practices among the health care providers

Skill

Segregation and safe disposal of biomedical waste

OBJECTIVES

- 1) List the various types of wastes generated in a hospital laboratory.
- 2) Define and classify biomedical waste
- 3) Explain the Biomedical waste management Rule
- 4) Definition of certain terms in health care waste
- 5) Mention the guidelines as per Karnataka pollution control board for biomedical waste management
- 6) List the steps involved in Bio-medical Waste Management.

- 7) Describe the various steps involved in biomedical waste collection.
- 8) List the guidelines for segregation of biomedical waste.
- 9) List the standards for treatment and disposal as per BMWM rule, 2016
- 10) Explain the segregation, treatment and disposal of waste depending on colour coding
- 11) State the methods for waste disposal depending on the type of waste.
- 12) Mention the responsibilities of healthcare workers(Who handle it and one who manage).

Unit I

- a) Various types of biomedical wastes generated in a hospital laboratory.
- b) Biomedical waste management Rule.
- c) Terminologies in health care waste.
- d) Bio-medical wastes-Definition and classification

Unit II

Guidelines as per Karnataka pollution control board for segregation of bio medical wastes.

Unit III

- a) Steps involved in Bio-medical Waste Management.
- b) Methods of waste disposal depending on the type of waste.
- c) Guidelines for segregation of biomedical waste.
- d) Steps involved in biomedical waste collection.
- e) Treatment Option for Bio-medical Waste.

Unit IV

Segregation, treatment and disposal of

- Yellow
- Red
- White
- Blue

Unit V

- a) BMWM rule, 2016- Standards for treatment and disposal
- b) Mention the responsibility of healthcare facility worker

Unit VI

Hazards of Biomedical Waste to the stake holder

Patient: Nosocomial infections

Health care provider: Occupational hazard

Environment: Pollution and contamination

Field visit

1.To categories various types of biomedical waste based on colour coding.(3 hours)

2.Field Visit for segregation, treatment and disposal of waste.(3 hours)

3.Field visit for waste disposal depending upon the type of waste. (3 hours)

References

https://www.who.int/docstore/water_sanitation_health/wastemanag/ch19.htm

Hegde V, Kulkarni RD, Ajantha GS. Biomedical waste management. Journal of Oral and Maxillofacial Pathology. 2007 Jan 1;11(1):5.

Thareja P, Singh B, Singh S, Agrawal D, Kaur P. Biomedical waste management: need for human civilization. Indian Journal of Clinical Anatomy and Physiology. 2015 Apr;2(2):66-73.

SIXTH SEMESTER

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	EMT22	Paper 1	Intensive Care Technology- Advanced	60 + 20 + 20	100
2	EMT23	Paper 2	CSSD Procedures	60 + 20 + 20	100
3	EMT24	Paper 3	Procedural Skills	60 + 20 + 20	100
4	ELS03	Paper 4 Subsidiary	Fundamentals of Electricity and Electronics	80 + 20	100
Grand Total					400

Sr. No.	Practical	Subjects	Practical + IA	Total
5	Practical 1	Intensive Care Technology- Advanced	80 + 20	100
6	Practical 2	CSSD Procedures	80 + 20	100
7	Practical 3	Procedural Skills	80 + 20	100
Grand Total				300

PAPER 1 : EMT22
Theory 30 Hours

INTENSIVE CARE TECHNOLOGY- ADVANCED

9. CONCEPTS IN ADVANCED LIFE SUPPORT

- Drugs
- Defibrillator

PROLONGED LIFE SUPPORT

- Concept of the "ICU" and team work

10. CARE OF THE UNCONSCIOUS PATIENT

- Comfort, orientation, pain control
- Skin integrity assessment and care
- Physiotherapy - Chest & Limbs
- Nutritional needs and supply
- Basic care of surgical wounds and fractures
- Psychological assessment and support in an ICU.

11. BASIC ADMINISTRATION:

Economic Issues .

Raising purchase orders for equipment

Maintaining consumables stock

Maintaining equipment - repair and troubleshooting

12. BURNS Types , classification , management

**SCHEME OF EXAMINATION –
SemesterIV**

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2.	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester III

Major Practical

Topics	No. Of	Number of Question	Total
--------	--------	--------------------	-------

	Questions	and Marks	
CASE SCENARIO	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SHORT CASE SCENARIO		8 x 10	80 Marks

Recommended Books:

1. The ICU book ,Paul Marino
2. ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
2. Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham

Online Reference

1. lifeinthefastlane.com
2. criticalcarereviews.com

Practical	80 Marks
I A Marks	20Marks
Grand Total	100 Marks

PAPER 2: EMT23

Theory : 30 Hours

CSSD PROCEDURES

1. Waste disposal collection of used items from user area, reception protective clothing and disinfections sage gaurds,
2. use of disinfections sorting and classification of equipment for clean-ing purposes, sharps, blunt lighted etc. contaminated high risk baby care - delicate instruments or hot care instruments,
3. cleaning process - use of detergents. Mechanical cleaning apparatus, cleaning instruments, cleaning jars, receivers bowls etc. trays, basins and similar hand ware utensils. Cleaning of catheters and tubings, cleaning glass ware, cleaning syringes and needles.
4. Materials used for wrapping and packing assembling pack contents. Types of packs prepared. Inclusion of trays and galliparts in packs. Method of wrapping and making use of indications to show that a pack of container has been through a sterilization process date stamping.
5. General observations principles of sterlization. Moist heat sterlization. Dry heat sterlization. EO0gas sterlization. H202 gas plasma vapo sterlization.

13. EQUIPMENT MAINTEN0NCE & BASIC TROUBLESHOOTING:

Ventilators, CPAP, BiPAP machines

Pumps - Infusion, Syringe
 Monitors - Standalone & multiparameter
 ECG Machine
 ABG Machine
 Defibrillator
 USG Machine

14. MEDICAL ETHICS

1. Medical ethics - Definition - Goal - Scope
2. Code of conduct - Introduction –
3. Basic principles of medical ethics – Confidentiality
4. Malpractice and negligence - Rational and irrational drug therapy
5. Autonomy and informed consent - Right of patients
6. Care of the terminally ill- Euthanasia
8. Organ transplantation
9. Medico legal aspects of medical records - Medicolegal case and type- Rec-ords and document related to MLC - ownership of medical records - Confiden-tiality Privilege communication - Release of medical information - Unauthor-ized disclosure - rentention of medical records - other various aspects

**SCHEME OF EXAMINATION –
SemesterIV**

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester III

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS		8 x 10	80 Marks

Practical	80 Marks
I A Marks	20Marks
Grand Total	100 Marks

Recommended Books:

1. The ICU book ,Paul Marino
2. ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
2. Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham

Online Reference

1. lifeinthefastlane.com
2. criticalcarereviews.com

PAPER 3: EMT24

Theory : 30 Hours

PROCEDURAL SKILLS

EMERGENCY LIFE SUPPORT:

Basic Life Support - Keeping Airway open, Use of Ambu bag and mask venti-lation,

Cardiac massage

Advanced Life Support

Use of Defibrillator

Emergency Management of Trauma

GASTROINTESTINAL; GENITOURINARY AND OBSTETRIC AND GYNAECOLOGICAL PROBLEMS:

3. Assisting in

4. ENDOTRACHEAL INTUBATION

a. Placement of trans oesophageal devices.

NG tubes, enteral feeding tubes, Sengstaken-Blackemore tube

b. Maintenance of urinary catheters

c. Placement of hemodialysis catheters

d. Management peritoneal dialysis

e. Management CVVHD

f. bed side screening ultrasonography

NERVOUS SYSTEM:

Assisting in:

Lumbar puncture

Application of intracranial pressure monitoring device

Application of in-line immobilisation (C spine protection)

Cervical neck collar.

TOXICOLOGY:

Gastric lavage

ANALGESIA and SEDATION

Care of Epidural

Patient Controlled Analgesia

HAEMATOLOGICAL DISORDERS:

Assisting in:

Exchange Transfusion

Plasmapheresis

BIOMEDICAL WASTE MANAGEMENT

ULTRASOUND AND RADIOLOGY IN EMERGENCY CARE

1.USG physics

2.Basic cardiac ultrasound and ECHO views

3.Basic lung ultrasound

4.Basic abdominal ultrasound

5.Echocardiographic assessment of a patient in shock

6.Ultrasound for vascular access

7.Reading xrays and CT with clinical correlation

:

SCHEME OF EXAM FOR THEORY

Semester vi

Theory Total- 100 Marks

Duration: 3 Hour

Sl. No	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Theory Total	Viva	Internal Assessment	Total Marks
1.	Long Essay Question	3	2	2 x 10	20	60	20	20	100
2	Short Essay Question	6	5	5X5	25				
3.	Short Answers	5	5	5 x 3	15				

Practical Examination-Semester vI

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
PRESSURE TRANSDUCTION TROUBLESHOOTING	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
SPOTTERS		8x 10	80 Marks

Practical	80 Marks
I A Marks	20Marks
Grand Total	100 Marks

Recommended Books:

1. The ICU book ,Paul Marino
2. ICU Protocols A Stepwise approach ,Rajesh Chawla and Subash Todi
3. Washington manual of critical care

Reference books:

1. Irwin and Rippe's intensive care medicine
2. Textbook of Critical Care ,Jean Louis Vincent , Edward Abraham
3. mechanical ventilation by David Chang

Online Reference

1. lifeinthefastlane.com
2. criticalcarereviews.com

ELS06

Fundamentals of Electricity and Electronics:

Resistance: Symbol, units, colour coding equivalent resistance with 'connection in series and parallel.

Capacitance: Symbol, units, series and parallel connection

Inductance and transformers

Parameters of electricity power - voltage, current frequency, power.

Differences between AC and DC - .

AC and DC power supplies, Phase, neutral and earth - conventional colour coding

Ohms law and Kirchoff's law Electrical Circuits.

Earth and grounding - Symbol, importance in patient care.

AC and DC power supplies- Phase, neutral and earth - conventional colour coding

Classification of medical equipment

1. According to type of protection: B C F etc
2. According to mode of protection: Class I -III.

Internal Assessment

1. Internal Assessment will be undertaken for theory and practical periodically as per the semester system and the average marks of the tests will be calculated and reduced to 20 or 10 as applicable and the marks are to be communicated to the university.
2. In order to be eligible to appear for University Examination a candidate, should secure atleast 35% of total marks assigned for internal assessment in a particular subject for theory and practicals separately.

Declaration of result

1. Criteria for pass
 - a. Main subject: A Candidate is declared to have passed the examination in a subject, if he/she secures 40% of the total marks in Theory and Practical separately.
 - b. Elective Subjects: The minimum marks for a pass in a elective subject shall be 35% of the maximum marks prescribed for a subject and the marks shall be communicated to the University before the commencement of the Practical examination.
 - c. In case a candidate fails in either theory or practical, he/she has to appear for both theory and Practical in the subject in any subsequent examination and he/she must obtain the minimum for a pass in the subject (theory and practical separately)
 - d. A candidate shall be declared to have passed the examination if he/she passes in all the main subjects.

Carry over System:

At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he/she is appearing for. Example:-

- If the candidate has not cleared semester I, he/she can appear for semester II and pending subjects of semester I simultaneously.
- For appearing for semester III he/she should have cleared semester I and can appear for papers pending from semester II along with semester III subjects.
- For appearing for semester IV he/she should have cleared semester II and can appear for papers pending from semester III along with semester IV subjects.
- For appearing for semester V he /she should have cleared semester III and can appear for papers pending from semester IV along with semester V subjects.
- For appearing for semester VI he/she should have cleared semester IV and can appear for papers pending from semester V along with semester VI subjects.

Examiners:

There should be minimum two examiners, one internal from the same university and one external Examiners for the first year subjects and for Pharmacology in the second year shall have Postgraduate degree in the respective subject with 3 years teaching experience of M.Sc. (Medical) with 5 years teaching experience

B.Sc. ENDOSCOPY TECHNOLOGY

Year 2021-22

VISION

To be an outstanding KAHER of excellence ever in pursuit of newer horizons to build self-reliant global citizens through assured quality educational programs.

MISSION

- To promote sustainable development of higher education consistent with statutory and regulatory requirements.
- To plan continuously provide necessary infrastructure, learning resources required for quality education and innovations.
- To stimulate to extend the frontiers of knowledge, through faculty development and continuing education programs.
- To make research a significant activity involving staff, students and society.
- To promote industry / organization, interaction/collaborations with regional/national/international bodies.
- To establish healthy systems for communication among all stakeholders for vision oriented growth.
- To fulfill the national obligation through rural health missions.

OBJECTIVES

The objectives are to realize the following at KAHER and its constituent institutions:

- To implement effectively the programs through creativity and innovation in teaching, learning and evaluation.
- To make existing programs more careers oriented through effective system of review and redesign of curriculum.
- To impart spirit of enquiry and scientific temperament among students through research oriented activities.
- To enhance reading and learning capabilities among faculty and students and inculcate sense of lifelong learning.
- To promulgate process for effective, continuous, objective oriented student performance evaluation.
- To ordinate periodic performance evaluation of the faculty.
- To incorporate themes to build values, Civic responsibilities & sense of national integrity.

- To ensure that the academic, career and personal counseling are in-built into the system of curriculum delivery.
- To strengthen, develop and implement staff and student welfare programs.
- To adopt and implement principles of participation, transparency and accountability in governance of academic and administrative activities.
- To constantly display sensitivity and respond to changing educational, social, and community demands.
- To promote public-private partnership.

CONTENTS

Section	Topics	Page No
I	Preamble, Objective, Name of the Course, Duration, Eligibility	4
II	Course contents and scheme of examination of 1 st Semester B.Sc. Endoscopy technology	6
III	Course contents and scheme of examination of 2 nd Semester B.Sc. Endoscopy technology	24
V	Course contents and scheme of examination of 3 rd to 6 th Semester B.Sc. Endoscopy technology	45
V	Law- Indian Constitution	58

B.Sc. Endoscopy technology

SECTION -I

PREAMBLE

The B.Sc. Endoscopy technology Course is of 3 years (Semester) degree course aimed at training the young graduates in the technological aspects of endoscopy care with good scientific foundation. These students will be in a position to competently carry out and will also be trained in assisting during endoscopy procedure. They will be in demand both within the country and outside as Allied Healthcare personnel. With advanced training in the endoscopy procedure like Capsule Endoscopy, EUS, ERCP, SEMS, other procedure- Hydrogen Breath Test, Manometry. These graduates will play an important role in determining the quality of healthcare provided.

REGULATIONS GOVERNING

1. Title of the Courses offered in Allied Health Sciences:

Bachelor of Science in Endoscopy Technology (BSc. Endoscopy Technology)

2. Eligibility for admission:

Those who have completed GNM Course (3 years or 3 year six months course)

Or

The two year Pre-University examination or equivalent as recognized university.with Physics, Chemistry and Biology as principal subjects of study.

Or

Those who has completed diploma in endoscopy technology course from a recognized university

YEARLY INTAKE: 5 students per year

1. Duration of the course:
2. Duration shall be for a period of three and half years including six months of Internship

3. Medium of instruction:

The medium of instruction and examination shall be in English.

4. Scheme of examination:

There shall be six examinations during the course, each at the end of the first, second, third, fourth, fifth and sixth semester.

5. Attendance:

Every candidate should have attended at least 80% of the total number of classes conducted in an academic year from the date of commencement of the term to the last working day as notified by university in each of the subjects prescribed for that year separately in theory and practical. Only such candidates are eligible to appear for the university examinations in their first attempt. Special classes conducted for any purpose shall not be considered for the calculation of percentage of attendance for eligibility. A candidate lacking in prescribed percentage of attendance in any subjects either in theory or practical in the first appearance will not be eligible to appear for the University Examination in that subject .

FIRST SEMESTER

Scheme of Examination

Theory	Subjects	Theory + IA + Viva Voce	Total
Paper 1	Human Anatomy	60+20+20	100
Paper 2 Section A	Human Physiology	30+10+10	50
Section B	Basics of Biochemistry	30+10+10	50
Paper 3 Section A	Basic of Pathology	30+10+10	50
Section B	Basic of Microbiology	30+10+10	50
Paper 4 Elective	English	80+20	100
Grand Total			400

Practical	Subjects	Practical + IA	Total
Practical 1	Human Anatomy	80+20	100
Practical 2A	Human Physiology	40+10	50
2B	Basics of Biochemistry	40+10	50
Practical 3A	Hematology & Clinical Pathology	40+10	50
3B	Microbiology	40+10	50
Grand Total			300

Semester I

PAPER I: Human Anatomy

Theory 25 Hours

The human body as a whole:

Definitions, Subdivisions of Anatomy, Terms of location and position, Fundamental Planes Vertebrate structure of man, Organization of the Body cells and Tissues.

Locomotion and support:

The Skeletal system: Types of bones, structure and growth of bones, Divisions of the skeleton, Appendicular skeleton, Axial skeleton, name of all the bones and their parts, joint-classification, types of movements with examples.

Anatomy of the Nervous System:

Central nervous system: Brain and Spinal cord, functions, meninges. The Brain- Brief structure of Hind Brain, Midbrain and Forebrain, Location, gross features, parts, functional areas, cerebral blood circulation and coverings, Functions of peripheral nervous system, Organization and Structure of Typical Spinal Nerve Spinal Cord: Gross features, extent, blood supply and coverings, reflex- arc. Applied Anatomy of spinal cord and brain.

Anatomy of circulatory system:

Heart: Size, location, external features, chambers, pericardium and valves, Blood supply and Nerve supply. Right and Left Atrium: Structural features, venous area, septum and appendages, structural features inflow and outflow characteristics. The study of blood vessels, General plan of circulation, pulmonary and systemic circulation. Names of arteries and veins and their positions, general plan of lymphatic system. Coronary Circulation, Lymphatic drainage of heart in brief Applied aspects of heart and pericardium.

Type of questions and distribution of marks for Theory examination in each subject in First Semester

Sl. No.	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Internal Assessment	Viva	Total Marks
1	Long Essay Question	3	2	2x10	20	20	20	20
2	Short Essay Question	7	5	5x5	25			
3	Short Answers	5	5	5x3	15			

Suggested Readings:

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Human Anatomy Regional and Applied Vol. 1, Vol. 2 & Vol. 3	B D Chaurasia	C B S Publishers, New Delhi
2. Hand Book of General Anatomy	B D Chaurasia	C B S Publishers, New Delhi
3. Text Book of Human Histology	Inderbir Singh	Jaypee Brothers, Medical Publishers, Delhi
4. Clinically Oriented Anatomy	Keith L. Moore	Williams and Wilkins, Baltimore
5. Gray's Anatomy	Susan Standring	Elsevier Churchill Livingstone, Edinburg

Practical
Anatomy

20 Hours

1. General Histology Slides:

- Epithelial Tissue,
- Connective Tissue,
- Hyaline Cartilage,
- Fibro Cartilage,
- Elastic Cartilage,
- T.S. & L.S. of Bone,
- Blood Vessels,
- Tonsil,
- Spleen,
- Thymus,
- Lymph node,
- Skeletal and Cardiac Muscle
- Peripheral Nerve and Optic Nerve

2. Systemic Histology Slides:

1 digestive system- esophagus, stomach, small and large intestine, liver, pancreas, gall bladder, bile duct

1. Renal
2. Cerebrum
3. Demonstration of all bones - Showing parts, joints,
4. X-rays of all normal bones and joints.
5. Demonstration of heart
6. Radiographs of abdomen

PRACTICAL ASSESMENT

Scheme of Practical Examination for First Semester

Sl. No.	Practical	Practical	IA	Grand Total
1	Practical 1	80	20	100

Scheme of Exam for Practicals:

Practical Histology	Spotters	: 10 X 2 Marks = 20 marks
Gross Anatomy	Discussion	: 2 X 20 Marks = 40 marks
	Spotters	: 10 X 2 Marks = 20 marks
IA Marks	:	20 marks
Total	:	100 Marks

Suggested Readings:

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Human Anatomy Regional and Applied Vol. 1, Vol. 2 & Vol. 3	B D Chaurasia	C B S Publishers, New Delhi
2. Hand Book of General Anatomy	B D Chaurasia	C B S Publishers, New Delhi
3. Text Book of Histology – A Practical Guide	J P Gunasegaran	Elsevier Publication, Gurgaon, Hariyana
4. Practical Manual of Histology for Medical students	NeelkanthKote	Jaypee Brothers, Medical Publishers, Delhi

General Physiology:

Structure of Cell membrane and Cell Organelles, Intercellular junctions, Classification of Body fluid compartments & composition, Homeostasis, Transport across cell membrane -Definition and Classification.

Nervous system: Functions of Nervous system, Neurone structure, classification and properties. Neuroglia, nerve fiber, classification, conduction of impulses continuous and saltatory. Velocity of impulse transmission and factors affecting. Synapse - structure, types, properties.

Receptors - Definition, classification, properties. Reflex action - unconditioned properties of reflex action. Babinski's sign. Spinal cord nerve tracts. Ascending tracts, Descending tracts - pyramidal tracts - Extrapyramidal tracts. Functions of Medulla, pons, Hypothalamic disorders.

Cerebral cortex lobes and functions, Sensory cortex, Motor cortex, Cerebellum functions of

Cerebellum. Basal ganglion - functions. EEG. Cerebro Spinal Fluid (CSF) : formation, circulation, properties, composition and functions lumbar puncture. Autonomic Nervous System Sympathetic and parasympathetic distribution and functions and comparison of functions.

GIT – mechanism of swallowing, mechanism of HCL production, mechanism of bile production, mechanism of reflux, mechanism of defecation, colon movement, Basic of pancreatic enzyme, liver metabolism

Scheme of examination

Theory Total 50 marks
minutes

Duration 90

Sl. No.	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Internal Assessment	Viva	Total Marks
1	Long Essay Question	2	1	1x10	10	10	10	50
2	Short Essay Question	3	2	2x5	10			
3	Short Answers	5	5	5x2	10			

Suggested Readings:

Recommended Text Books (Latest Edition)

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Textbook of Physiology for MLT	Prof. A K Jain	Avichal Publishing Company
2. Textbook of Medical Physiology	D. Venkatesh & H HSudhakar	WoltersKluwers
3. Concise Medical Physiology	Sujit K Choudhari	New Central Books, Calcutta
4. Textbook of Physiology	Arthurr C Guyton	Prism Publishers, Bangalore
5. Practical Physiology	Prof. A K Jain	Arya Publication

Practical 1: Section A - Physiology

Practical 30 Hours

- 1) Study of Microscope and its use
- 2) Collection of blood
- 3) Haemoglobinometry
- 4) White Blood Cell count
- 5) Red Blood Cell count
- 6) Determination of Blood Groups
- 7) Leishman's staining and Differential WBC Count
- 8) Determination of Bleeding Time
- 9) Determination of Clotting

Practical		Total	50 marks
Major -	25 marks		
Minor -	15 marks		
Internal Assessment -	10 marks		
Total -	50 marks		

Semester I

1. Introduction to Medical lab Technology:

- (a) Role of Medical lab Technologist (b) Ethics, Responsibility (c) Safety measures
- (d) First aid (e) Cleaning and care of general laboratory glass ware and equipment.

2. Introduction to Apparatus- Chemical Balance: Different types, Principles and applications.

3. Units of Measurements: Concepts of Molecular weight, Atomic weight, Normality, Molarity, Standards, Atomic structure, Valence, Acids, Bases, Salts & indicators

4. Concepts of pH: Concepts of Acid Base reaction and hydrogen ion concentration. Definition of pH, buffer & pH meter

5. Chemistry of Carbohydrates:

- a. Definition, Classification and biological importance.

- b. Monosaccharides, Oligosaccharides, Disaccharides & Polysaccharides:

6. Chemistry of Lipids:

- a. Definition, Classification and biological importance.

- b. Simple lipids: Triacylglycerol and waxes-composition and functions.

- c. Compound lipids : Phospholipids, Sphingolipids, Glycolipid and Lipoproteins : Composition and functions.

- d. Derived lipids: Fatty acids-saturated & unsaturated. Steroids and their properties

7. Chemistry of Proteins:

- a. Amino acids: Classification, properties, side chains of amino acids.

- b. Protein: Definitions, Classifications and functions.

- c. Peptides: Biologically active peptides

d. Overview of Structural organization of proteins.

e. Denaturation of proteins and denaturing agents

8. Chemistry of Nucleic acids:

a) DNA Structure and function

b) RNA: Types, Structure (only t RNA) and Functions.

Scheme of examination

Theory Total- 30 Marks

Duration: 90 minutes

Sl. No.	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Internal Assessment	Viva	Total Marks
1	Long Essay Question	2	1	1x10	10	10	10	50
2	Short Essay Question	3	2	2x5	10			
3	Short Answers	5	5	5x2	10			

Suggested Readings:

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Test Book of Biochemistry for Medical Students	Vasudevan (DM) & Sree Kumari (S)	Jaypee Brothers, New Delhi
2. Biochemistry	U. Satyanarayan	Books and Allied (P) Ltd. Kolkata – 700009. India
3. Clinical Chemistry	Varley	William Heinemann Medical

		Books Ltd & Inter Science Book. Inc. New York
4. Clinical Chemistry	TEITZ	W B Saunders Company Harcourt (India) Private Limited New Delhi - 110048

Semester I

PAPER 3: Section A - Pathology

Theory 25 Hours

Pathology - General - cell injury and adaptation, inflammation and repair, fluid and hemodynamic

Basic Hematology

- Introduction to Haematology: (a) Definition (b) Importance (c) Important equipment used.
- Laboratory organization and safety measures in haematology Laboratory
- Introduction to blood, its composition, function and normal cellular components.
- Collection and preservation of blood sample for various haematological investigations
- Normal Values in Hematology
- Preparation of blood Films- Types. Methods of preparation (Thick and thin smear/film)
- Definition, principles & procedure, Normal values, Clinical significance, errors involved, means to minimize errors for the following:
 1. Haemoglobinometry, PCV, Red Cell Indices
 2. Total leucocytes count (TLC)
 3. Differential leucocytes count (DLC), Absolute Eosinophil count, Reticulocyte count and Platelet Count.
 4. Erythrocyte Sedimentation Rate (ESR)
 5. Blood Grouping
- Staining techniques in Haematology (Romanowsky's stains) :Principle, composition, preparation of staining reagents and procedure of the following
 1. Giemsa stain
 2. Leishman stain

3. Wright's stain

4. Field's stain

- Bone Marrow: Techniques of aspiration, Preparation and Staining of films, Bone Marrow Biopsy.

Scheme of Examination

Type of questions and distribution of marks for Theory examination in each subject in FirstSemester

Duration 90 minutes

Sl. No.	Question	Question Asked	Question to Attempt	Marks	Maximum Marks	Internal Assessment	Viva	Total Marks
1	Long Essay Question	2	1	1x10	10	10	10	50
2	Short Essay Question	3	2	2x5	10			
3	Short Answers	5	5	5x2	10			

Suggested Readings:

Reference books (Latest Edition)

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Practical Pathology	P. Chakraborty GargiChakraborty	New Central Book Agency, Kolkata
2. Text book of Haematology	Dr. Tejinder Singh	AryaPulications, Sirmour(HP)
3. Text book of Medical Laboratory Technology	PrafulGodkar	Bhalani Publication House, Mumbai
4. Practical Haematology	Sir John Dacie	Churchill Livingstone, London
5. Todd & Sanford, Clinical Diagnosis & Management by Laboratory Methods	John Bernard Henry	All India Travellar Bookseller, Delhi
6. Practical Pathology	Dr. Ganga S Pilli	Prabhu Publications, Dharwad

Practical 3: Section A - Pathology
Hours

Practical 30

Basic Hematology

1. Hb Estimation-Sahli's method & Cyanmethhaemoglobin method
2. RBC Count
3. Retic Count
4. Preparation of blood smears and staining with Leishman stain
5. WBC Count
6. WBC -Differential Count
7. Platelet Count
8. Absolute Eosinophil Count
9. ESR- Westergreens & Wintrobe's method,
10. PCV.
11. Sickling test-Demonstration
12. Bone Marrow Smear preparation & staining procedure- Demonstration
13. Demonstration of Malarial Parasite.

Exam Pattern

- I. Major Experiment: Perform any two exercises: 20 Marks
 - Hb Estimation-Sahli's method
 - RBC Count
 - Preparation of blood smears and staining with Leishman stain- WBC - Differential count
 - WBC Count
 - Platelet Count
 - Absolute Eosinophil Count
- II. Minor Experiment: Any one examination 10 Marks
 - Reticulocyte Count
 - ESR- Westergreens & Wintrobe's method,
 - PCV
- III. Spotters 10 Marks
- IV. Internal Assessment: 10 Marks

Total: 50 Marks

Practical Assessment

Scheme of Practical Examination for First Semester.

(Section A Pathology -50 Marks + Section B Microbiology 50 Marks)

Sl. No.	Practical	Practical	IA	Grand Total
1	Section A	40	10	50
2	Section B	40(Major 30 + Minor 10)	10	50

Scheme of Exam for Practicals:

Major Experiment : 20 Marks

Minor Experiment : 10 Marks

Spotters : 10 Marks

Internal Assessment : 10 Marks

Total : 50 Marks

Semester I

PAPER 3:

Section B - Microbiology

Theory 25 Hours

- Introduction to Medical Microbiology: - Definition - History - Host-Microbe relationship.
- Microscopy: - Introduction and history - Types of microscopes
 - Light microscope
 - Dark ground Microscope
 - Fluorescent Microscope
 - Phase contrast Microscope
 - Electron microscope:
 - Principles and operational mechanisms of various types of microscopes
- Sterilization: - Definition -- Types and principle of sterilization methods
- Physical methods- (a) Heat (dry heat, moist heat with special Reference to autoclave -their care and maintainance.) (b) Radiation (c) Filtration, Efficiency testing to various sterilizers.
- Chemical methods
- Antiseptics and disinfectants: Definition, Types and properties - Mode of action - Uses of various disinfectants, Precautions while using the disinfectants - Qualities of a good disinfectant, In-house preparation of alcoholic hand/skin disinfectants, Testing efficiency of various disinfectants
- Antibiotics and drug resistance
- Classification of Microbes
- Bacterial Cell Growth and Nutrition
- Overview and mechanisms of Bacterial gene transfer.
- Ubiquity of microbes.

Infection – source of infection, Spread of infection, various pathogenic bacteria virus and diseases caused by them (Gastritis, Enteritis, Colitis, etc)

Scheme of Examination for Theory

Type of questions and distribution of marks for Theory examination in each subject in First Semester.

Section B - Microbiology - 50 marks

Sl. No.	Question	Question asked	Question to attempt	Marks	Max. Marks	IA	Viva	Total Marks
1	Long Essay Question	2	1	1x10	10	10	10	50
2	Short Essay Question	3	2	2x5	10			
3	Short Answers	5	5	5x2	10			

Suggested Readings:

1. Ananthanarayan and Paniker's Textbook of Microbiology. Tenth Edition. Reba Kanungo
2. Textbook of Microbiology for MLT. Second Edition. Dr. C. P. Baveja.

Practical 3: Section B - Microbiology

Practical 30 Hours

- Focusing, handling and care of Microscopes
- Hanging drop
- Simple stain
- Gram stain
- ZN stain
- Sterilization and Disinfection

Scheme of Practical Examination for First Semester: Practical Examination for First Semester.

Sl. No.	Practical	Practical	IA	Grand Total
1	Section A	40 (Major 30 + Minor 10)	10	50
2	Section B	40 (Major 30 + Minor 10)	10	50

Major : 30 Marks

Gram Stain 15 Marks

ZN Stain 15 Marks

Minor : 10 Marks

Spotter 10 Marks

IA : 10 Marks

Total 50 Marks

Suggested Readings:

Practical Microbiology, Fourth Edition. C.P Baveja

I YEAR B.Sc. ENGLISH

COURSE CONTENTS:

Subsidiary subject 60 hours for 1st year marks to be sent to university before 2nd year exam. Course description: It is designated to help the students to acquire a good command over English language for common and medical terminology used in medical practice.

Behavioural objectives:

Ability to speak and write proper English

Ability to read and understand English

Ability to understand and practice medical terminology.

Paragraph

Letter writing

Note making

Description

The use of paragraphs

Essay writing

Telegrams

Precise-writing and abstracting

Report writing

Medical Terminology

Use of dictionary

Scheme of examination

Theory: 80 Marks

Duration: 3 hours

- 1) Fill in the blanks - 10 marks
- 2) Articles (Passage/fill in the blanks) - 10 marks
- 3) Tense (Sentence identification/rewriting a sentence) - 10 marks
- 4) Voice (Rewrite) - 10 marks
- 5) Speech (Rewrite) - 10 marks
- 6) Linkers (Paragraph) - 10 marks
- 7) Paragraph writing - 10 marks
- 8) Letter writing - 10 marks

Text Books Recommended (Latest Edition)

Sl. No.	Name of the Book & Title	Author	Publisher's Name Place of Publication
1	Sharma Strengthen your writing	V R Narayan	New Delhi, Orient Longman
2	Grammar and Composition	Wren and Martin	Delhi, Chand & Co.
3	Spoken English	Shashikumar V. D'Souza P V	New Delhi, TataMergaw Hill
4	Medical Dictionary	Dorland's pocket IBH Publishing Co.	New Delhi: Oxford &

SECOND SEMESTER

Scheme of Examination

Theory	Subjects	Theory + IA + Viva Voce	Total
Paper 1	Human Anatomy	60+20+20	100
Paper 2 Section 2A	Human Physiology	30+10+10	50
Section 2B	Basics of Biochemistry	30+10+10	50
Paper 3 Section 3A	Hematology & Clinical Pathology	30+10+10	50
Section 3B	Microbiology	30+10+10	50
Paper 4 Elective	Environmental Studies	80+20	100
Grand Total			400

Practical	Subjects	Practical + IA	Total
Practical 1	Human Anatomy	80+20	100
Practical 2 2A	Human Physiology	40+10	50
2B	Basics of Biochemistry	40+10	50
Practical 3 3A	Hematology & Clinical Pathology	40+10	50
3B	Microbiology	40+10	50
Grand Total			300

Semester II

PAPER 1: Human Anatomy

Theory 40 Hours

Anatomy of the Respiratory system:

Organization of Respiratory System, Gross structure and interior of Nose, Nasal cavity, Para nasal air sinuses,

Gross structure and interior of Pharynx, Larynx, trachea, bronchial tree, Pleura

Gross structure and Histology of Lungs, Pulmonary Circulation, Pulmonary Arteries, Pulmonary Veins and Bronchial Arteries

Nerve Supply of Respiratory System and Applied aspect of Respiratory System

Anatomy of the Digestive System:

Components of Digestive system, Alimentary tube, Anatomy of organs of digestive tube, mouth,

tongue, tooth, salivary glands, liver, Biliary apparatus, pancreas, Names and positions and brief functions - with its applied anatomy.

Anatomy of Reproductive System:

Male Reproductive System: Testis, Duct system - with its applied anatomy.

Female Reproductive System: Uterus, Ovaries, Duct system, Accessory organs- with its applied anatomy.

Anatomy of the Endocrine System:

Name of all endocrine glands their positions, Hormones and their functions- Pituitary, Thyroid and parathyroid glands, Adrenal glands, Gonads and Endocrine part of pancreas- with its applied anatomy.

Anatomy of GIT System:

Organization of Digestive system: Location, gross features, relations, structure, blood supply, nerve supply, lymphatic drainage and with its applied anatomy.

Type of questions and distribution of marks for Theory examination in each subject in Second Semester

Sl. No.	Question	Question Asked	Question to Attempt	Marks	Max. Marks	Internal Assessment	Viva	Total Marks
1	Long Essay Question	3	2	2x10	20	20	20	100
2	Short Essay Question	7	5	5x5	25			
3	Short Answers	5	5	5x3	15			

Suggested Readings:

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Human Anatomy Regional and Applied Vol. 1, Vol. 2 & Vol. 3	B D Chaurasia	C B S Publishers, New Delhi
2. Text Book of Human Histology	Inderbir Singh	Jaypee Brothers, Medical Publishers, Delhi
3. Clinically Oriented Anatomy	Keith L. Moore	Williams and Wilkins, Baltimore
4. Gray's Anatomy	Susan Standring	Elsevier Churchill Livingstone, Edinburg
5. Text Book of Histology – A Practical Guide	J P Gunasegaran	Elsevier Publication, Gurgaon, Hariyana
6. Practical manual of Histology for Medical students	NeelakanthKote	Jaypee Brothers, Medical Publishers, Delhi

Practical 1: Human Anatomy

Practical - 20 Hours

Systemic Histology slides:

1. G.I.T - Oesophagus, stomach, small intestine, large intestine, liver, pancreas and gall bladder.
2. RS -Lungs and Trachea
3. Endocrine glands - Adrenal, Pancreas, Pituitary, Thyroid and Parathyroid
4. Uterus, Ovary, Testis.

Practical:

- 1) Demonstration of the digestive system organs
- 2) Demonstration different parts of respiratory system and normal X-rays
- 3) Demonstration of Male & Female reproductive organs
- 4) Demonstration of Endocrine glands.

Practical Assessment

Scheme of Practical Examination for Second Semester

Sl. No.	Practical	Practical	IA	GRAND TOTAL
1	Practical 1	80	20	100

Scheme of Exam for Practicals:

Practicals

Gross Anatomy

Discussion 3 x 10 marks : 30 Marks

Spotters 10 x 2 marks : 20 Marks

Histology

Spotters 15 x 2 marks : 30 Marks

IA marks : 20 Marks

Total : 100 Marks

Respiratory System:

Physiological Anatomy of Respiratory System and Functions, Dead Space.

Mechanism of Respiration, Lung volume and capacities, Surfactant, definition of compliance

Transport of Oxygen, ODC Curve and CO₂ transport.

Regulation of Respiration - Types and functions of Respiratory Centres

Cyanosis, Dyspnea, Apnea, Hypoxia - definition and types.

Cardiovascular System

Physiological Anatomy of Heart

Cardiac Cycle - Definition and Phases

Cardiac Output - Definition, and factors affecting cardiac output,

Blood pressure - Definition, Determinants & Factors affecting blood pressure, regulation of blood pressure,

Definition Hypertension, Hypotension Myocardial Ischemia and Infarction.

Normal Electrocardiogram - Definition, Waves and Uses.

Digestive System

Functional Anatomy of GIT, composition & functions of saliva

Composition of gastric juice, mechanism of secretion & function of HCL

Composition and functions of pancreatic juice

Functions of Liver and bile Juice

Definition of Jaundice and its types

Movements of GI Tract - Deglutition, Movements of Small Intestines

Endocrines

Major Endocrine glands

- Pituitary Gland: Anterior & Posterior Pituitary Hormones and functions

- Thyroid Gland: Hormones Secreted and Functions, Goitre
- Adrenal Gland: Hormones secreted by adrenal cortex and medulla and their functions
- Pancreas: Endocrine Hormones of Pancreas and their functions, Diabetes Mellitus
- Parathyroid Gland: PTH, calcitonin and its actions.

Reproductive System

Puberty: Puberty, Pubertal changes in male and female.

Male Reproductive System: Male reproductive organs, Spermatogenesis, Morphology of a sperm, Semen, Factors influencing spermatogenesis, Functions of testosterone.

Female Reproductive System: Female reproductive organs, Oogenesis, Ovulatory cycle with its hormonal basis, Tests for Ovulation, Menstrual cycle with its hormonal basis, Functions of Estrogen & Progesterone

Pregnancy & Lactation: Fertilization, Functions of Placenta, Hormones of Placenta, Pregnancy tests, Contraceptive methods, Milk Ejection Reflex, Composition of Milk, Advantages of breast feeding

Scheme of Examination

Type of questions and distribution of marks for Theory examination in each subject in Second Semester.

Sl. No.	Question	Question Asked	Question to Attempt	Marks	Max. Marks	Internal Assessment	Viva	Total Marks
1	Long Essay Question	2	1	1x10	10	10	10	50
2	Short Essay Question	3	2	2x5	10			
3	Short Answers	5	5	5x2	10			

Suggested Readings:

Recommended Text Books (Latest Edition)

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Textbook of Physiology for MLT	Prof. A K Jain	Avichal Publishing Company
2. Textbook of Medical Physiology	D. Venkatesh & H HSudhakar	WoltersKluwers
3. Concise Medical Physiology	Sujit K Choudhari	New Central Books, Calcutta
4. Textbook of Physiology	Arthurr C Guyton	Prism Publishers, Bangalore
5. Practical Physiology	Prof. A K Jain	Arya Publication

Practical 2 : Section A-Human Physiology

Practical- 30 Hours

- 1) Recording of Pulse
- 2) Blood Pressure Recording
- 3) Effect of Exercise on BP
- 4) Effect of Posture on BP
- 5) Auscultation for Heart Sounds
- 6) Spirometry - Description of Normal Findings
- 7) Electrocardiogram of a normal person - Description of ECG waves in Lead II
- 8) Artificial Respiration.

Practical Assesment

Practical	Total 50 marks
Major -	25 marks
Minor -	15 marks
Internal Assesment -	10 marks
Total -	50 marks

1. Specimen collection of blood, urine, cerebrospinal fluid and other body fluids, preservation and preparation of protein free filtrate.
2. Enzymes: definition, classification, coenzymes, factors affecting enzyme activity and inhibitors, units of measurements, iso-enzymes, Diagnostic enzymology (AST, ALT ALP, LDH,CPK and Troponin).
3. Digestion and Absorption of Carbohydrates, proteins and lipids
4. Nutrition - Calorific value and nutritional importance of Carbohydrates, Lipids, Proteins and Dietary fibers. BMR & Factors affecting BMR
5. Vitamins- Sources, RDA, functions and deficiency manifestations.
6. Minerals-Calcium, Phosphorus, Iron, copper, zinc, selenium and fluoride
7. Non Protein Nitrogenous compounds-Clinical Significance of Urea, Uric acid, creatinine, acetone and HCL
8. Overview of Metabolism

Carbohydrate Metabolism-Glycolysis, Gluconeogenesis and TCA Cycle

Protein Metabolism- General Reactions of amino acids and Urea cycle.

Scheme of Examination

Theory total 30 Marks

Duration 90 minutes

Sl. No.	Question	Question Asked	Question to Attempt	Marks	Max. Marks	Internal Assessment	Viva	Total Marks
1	Long Essay Question	2	1	1x10	10	10	10	50
2	Short Essay Question	3	2	2x5	10			
3	Short Answers	5	5	5x2	10			

Suggested Readings:

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Test Book of Biochemistry for Medical Students	Vasudevan (DM) & Sree Kumari (S)	Jaypee Brothers, New Delhi
2. Biochemistry	U. Satyanarayan	Books and Allied (P) Ltd. Kolkata – 700009. India
3. Clinical Chemistry	Varley	William Heinemann Medical Books Ltd & Inter Science Book. Inc. New York
4. Clinical Chemistry	TEITZ	W B Saunders Company Harcourt (India) Private Limited New Delhi – 110048

Practical 2 : Basics of Biochemistry

Practical - 30 hours

1. Demonstration of Colorimeter, spectrophotometer, pH meter.
2. Quantitative analysis of Glucose, Urea and creatinine
3. Estimation of urine creatinine
4. Biochemically important substance- Urea, Uric acid, Creatinine, Acetone and HCL

Practical Examination-Semester II

Major Practical

Topics	No. of Questions	No. of Questions and Marks	Total
Qualitative Analysis : of Glucose/Urea/Creatinine/Estimation of Urine Creatinine	1	1x25	25 Marks

Minor Practical

Topics	No. of Questions	No. of Questions and Marks	Total
Analysis of biochemically important substances	1	1x15	15 Marks

Practical Marks 40 Marks

IA Marks: 10 Marks

Grand Total 50 Marks

PAPER 3:

Section A –Hematology& Clinical Pathology

Theory 25 Hours

Hematology:

1. Bone marrow

- a. Techniques of aspiration, preparation and staining of films
- b. Bone marrow biopsy

2. Preparation of buffy coat smears

3. Laboratory tests used in the investigation of anemia's

a. B 12 and folate assay Normal values, derangements and interpretation of results.

b. Schilling test - Method and interpretation

c. Serum iron and iron binding capacity and other tests for Iron deficiency anemia-Normalvalues, derangements and interpretation of results

4. Laboratory test used in investigation of hemolytic anemia's

a. Osmotic fragility

b. Investigation of G-6 PD deficiency

c. Test for sickling

d. Estimation on of Hb-F, Hb-A2

e. Plasma haemoglobin and Haptoglobin, demonstration of haemosiderin in urine

f. Haemoglobin electrophoresis

g. Coomb's test (Direct & Indirect) - Test for auto immune hemolytic Anaemias.

Clinical Pathology

1. Urine examination: Physical, Chemical & Microscopic

2. Semen analysis

BLOOD BANKING

(Blood transfusion and Immunohaematology).

1. Collection & processing of Blood –Donor selection, Registration, Medical history,Physical examination.
 2. Collection of Blood
 3. Processing of Donor Blood
 4. Storage & preservation of Blood.
 5. ABO Blood group System
 6. Rh typing and weaker variants in R.h system
 7. Subgroup and weaker various of A and B and Bombay Phenotype
 8. Preparations and standardization of Anti Human globulin reagent
 9. Coomb's test.
 10. Blood grouping and cross-matching in blood bank.
 11. Diseases transmitted by Blood and their screening - Australia Antigen and Hepatitis
- C. Virus (HCV), HIV, Syphilis, CMV & Malaria in Blood transfusion
12. Investigation of transfusion reaction.
 13. HLA Antigens and their significance in blood transfusion.
 14. Blood Components- its preparation and their use in clinical practice.
 15. Haemapheresis- Apheresis using cell separators Leucapheresis, plateletpheresis,plasmapheresisAdverse effects on donors.
 16. Blood Bank Administration.
 17. Record keeping
- Immuno - cytochemistry:
1. Introduction
 2. Basic concepts of immunochemistry

3. Monoclonal antibodies and their preparations
4. Fluorescence reactions
5. PAP Technique - principle, preparation of reagents and Procedure

Scheme of Examination

Type of questions and distribution of marks for Theory examination in each subject in Second Semester.

(Section A - Pathology - 50 marks + Section B - Microbiology - 50 marks)

Sl. No.	Question	Question Asked	Question to Attempt	Marks	Max. Marks	Internal Assessment	Viva	Total Marks
1	Long Essay Question	2	1	1x10	10	10	10	50
2	Short Essay Question	3	2	2x5	10			
3	Short Answers	5	5	5x2	10			

Suggested Readings:

Reference books (Latest Edition)

Name of the Books & Title	Author	Publisher's Name, Place of Publication
1. Practical Pathology	P. Chakraborty Gargi Chakraborty	New Central Book Agency, Kolkata
2. Text book of Haematology	Dr. Tejinder Singh	Arya Publications, Sirmour (HP)
3. Text book of Medical Laboratory Technology	Praful Godkar	Bhalani Publication House, Mumbai
4. Practical Haematology	Sir John Dacie	Churchill Livingstone, London

5.Todd & Sanford, Clinical Diagnosis & Management by Laboratory Methods	John Bernard Henry	All India TravellarBooksellar, Delhi
6.Practical Pathology	Dr. Ganga S Pilli	Prabhu Publications, Dharwad
7.Hematology Blood Banking & Transfusion (PB)	Dutta B A	CBS Publishers & Distributors Pvt. Ltd
8.Blood Transfusion in Clinical Practice (HB)	Kochhar P K	CBS Publishers & Distributors Pvt. Ltd
9.Transfusion Medicine, 3e (PB)	McCullough	CBS Publishers & Distributors Pvt. Ltd
10.Practical Transfusion Medicine, 4e (HB)	Murphy	CBS Publishers & Distributors Pvt. Ltd

I. HAEMATOLOGY

- Sickling test-Demonstration
- Bone Marrow Smear preparation & staining procedure- Demonstration
- Demonstration of Malarial Parasite.
- Blood grouping. , Cross matching, Blood Transfusion and immunohaematology.
- Coomb’s Test (Demonstration).

II. CLINICAL PATHOLOGY

- Visit to pathology laboratory – Postings in batches - 15 days for 2 hours
- Urine examination
 - Physical
 - Chemical – Reducing substances ketone bodies, proteins and blood
 - Microscopy
 - Dipstick method – Demonstration
- Semen Analysis Demonstration

Practical Assesment

Scheme of Practical Examination for Second Semester.

(Section A Pathology 50 Marks + Section B Microbiology -50 Marks)

Sl. No.	Practical	Practical	IA	Grand Total
1	Section A	40 (Major 30 + Minor 10)	10	50
2	Section B	40 (Major 30 + Minor 10)	10	50

Pathology Practicals

I. Major 30 marks

a. Urine Examination 10 marks

b. Urine Microscopy 10 marks

c. Blood Grouping 10 marks

II. Minor 10 marks

a. Spotters 05 marks

b. Coombs (Direct / Indirect) test

Interpretation/Procedure writing	05 marks
IA	10 marks
Total	50 marks

PAPER 3 : Section B - Microbiology

Theory 25 Hours

- Culture media and different methods of cultivation.
- Immunology– Introduction, Specific and non-specific immunity, Antigens, Antibodies- Structure and function, Complement and antigen-antibody reaction.

Scheme of Examination

Theory 40 Marks

Duration 90 minutes

Sl. No.	Question	Question Asked	Question to Attempt	Marks	Max. Marks	Internal Assessment	Viva	Total Marks
1	Long Essay Question	2	1	1x10	10	10	10	50
2	Short Essay Question	3	2	2x5	10			
3	Short Answers	5	5	5x2	10			

Suggested Readings:

- 1) Ananthanarayan and Paniker's Testbook of Microbiology. Tenth Edition. Reba Kanungo
- 2) Textbook of Microbiology for MLT. Second Edition .Dr.C.P.Baveja.

Practical 3 : Section B - Microbiology

Practical: 25 Hours

- Biomedical waste management
- Collection of various clinical specimens.

- Serological tests
- Un-inoculated culture media and culture techniques.

Practical Exam Pattern

Major : -	25 marks
• Biomedical waste management -	10 marks
• Serological tests/Inoculation techniques -	15 marks
Minor : -	15 marks
• Spotters -	15 marks
IA -	10 marks
Total -	50 marks

ENVIRONMENTAL STUDIES

GOAL:

The students should gain knowledge to understand the multidisciplinary nature of the environment and the awareness of the eco system, which maintains the natural environment.

OBJECTIVES:

a) KNOWLEDGE

At the end of the II Phase 1st term MBBS Course the student is expected to know:

1. The natural resources like forest, water, mineral, food, energy and land.
2. Functions of the eco system.
3. Bio-diversity and its conservation.
4. Environmental pollution & its prevention.
5. Social issues.

b) SKILLS

At the end of the second term Course the student is expected to:

1. Visit local areas to understand and document environmental assets like river, forest, grassland, hill and mountain.
2. Visit an industrial area or agricultural area to know about local pollutants.
3. Identify common plants, insects and birds in their local areas.
4. Identify rivers, hills and mountains in their local areas.
5. To make use of the knowledge to protect natural resources.

COURSE CONTENTS

Theory and Field work: 50 Hours

- Theory - 45 hours
- Field work - 5 hours

1: Multi-disciplinary nature of environmental Studies: Definition, scope and importance, need for public awareness.

2 hours

2: Natural Resources:

Renewable and non-renewable resources:

Natural resources and associated problems.

a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.

b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.

f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

g) Role of an individual in conservation of natural resources.

h) Equitable use of resources for sustainable lifestyles
hours

8

3: Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following

ecosystems:-

- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

6 hours

4: Biodiversity and its conservation

8 hours

- Introduction - Definition : genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

5: Environmental Pollution

8 hours

Definition

Cause, effects and control measures of:-

- a. Air pollution
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution

g. Nuclear hazards

Solid waste Management : Causes, effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution.

Pollution case studies.

Disaster management : floods, earthquake, cyclone and landslides.

6: Social Issues and the Environment

7 hours

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case Studies
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and control of Pollution) Act.
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation.

7: Human Population and the Environment 6 hours

- Population growth, variation among nations.
- Population explosion - Family Welfare Programme.
- Environment and human health.
- Human Rights.
- Value Education.
- HIV/AIDS
- Women and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies.

8: Field work

- Visit to a local area to document environmental assets river/forest/grassland/hill/mountain
- Visit to a local polluted site - Urban / Rural/ Industrial/Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)

SCHEME OF EXAMINATION

A. Theory: 80 Marks

- Long Essay 2 X 10 = 20
- Short Essay 8 X 5 = 40
- Short Answers 5 X 4 = 20

B. Field Work: 20 Marks

Recommended Books

Sl. No.	Title	Author	Edition & Year	Publisher
1	Environmental Biology	Agarwal, K C	2001	Nidi Publication Ltd. Bikaner
2	The Biodiversity of India	Bharucha Erach		Mapin Publishing Pvt. Ltd., Ahmedabad – 380013
3	Environmental Encyclopedia	Cunningham W P Copper T H Gorhani E & Hepworth M T	2001	Jaico Publication House, Mumbai
4	Global Biodiversity Assessment	Heywood V H & Waston R T	1995	Cambridge University Press 1140p
5	Environmental Protection and Laws	Jadhav H & Bhosale V M	1995	Himalaya Publishing House, Delhi 284p

6	Environmental Science Systems & Solutions	Mckinney M L & School R M	1996	
---	--	---------------------------------	------	--

THIRD SEMESTER
Scheme of Examination

Sl. No.	Theory	Subjects	Theory+Viva+IA	Grand Total
1	Paper 1	Basics of gastroenterology (Symptomatology)	60+20+20	100
2	Paper 2	Applied aspects of Pathology & Microbiology	60+20+20	100
3	Paper 3	Pathology – Practical	100	100
4	Paper 4	Microbiology – Practical	100	100
5	Paper 5	Sociology	100	100
6	Paper 6	Communication Skills	100	100

Scheme of Examination

Theory Examination (Total Marks 100)							
Topic	No of Questions	Questions to be answered	Number of Questions & Marks	Total Marks	Internal Assessment	Viva	Total Marks
Long Essay Questions	2	2	2x10	20	20	20	20
Long Essay Questions	5	5	5x5	25			
Short answers	5	5	5x3	15			

PRACTICAL ASSESMENT

Scheme of Practical Examination

Theory	Practical	IA	Grand Total
Practical paper	80	20	100

Semester III

PAPER I

Theory 30 Hours

Basics of Gastrointestinal disease- Symptomatology

1. Abdominal pain
2. Nausea and vomiting
3. Dyspepsia
4. Diarrhea
5. Bloating
6. Constipation
7. Jaundice
8. GI bleed
9. Fecal incontinence
10. Abdominal distension
11. Nutrition in gastroenterology disease

Scheme of Examination

Type of Questions	Questions to be asked	Questions to be answered	Marks
Long Essay Questions	2	2	20
Short Essay Questions Topics not covered in long questions	5	5	25
Short Essay Questions Topics not covered in long questions	5	3	15
		Total Marks	60

Books

Semester III

PAPER II

Theory 30 Hours

Applied aspects of Pathology & Microbiology

Pathology: 50 marks

1. Congenital anomaly of Gastrointestinal system
2. Classification of Gastrointestinal diseases
3. Dysphagia- causes, types, pathology
4. Constipation – causes, types, pathology
5. Peptic ulcer diseases - causes, types & pathology
6. Malabsorption syndrome
7. Cirrhosis of liver - causes & pathology
8. Pathology of Gastrointestinal tract tumor

Microbiology: 50 marks

1. Hepatotrophic viruses in detail - mode of transfusion, universal precautions, vaccinations
2. Human immunodeficiency virus (HIV), mode of transfusion, universal precautions
3. Opportunistic infections
4. Microbiology of Gastrointestinal tract infections

Scheme of Examination

Type of Questions	Questions to be asked	Questions to be answered	Marks
Long Essay Questions	2	2	20
Short Essay Questions Topics not covered in long questions	5	5	25
Short Essay Questions Topics not covered in long questions	5	3	15
		Total Marks	60

Semester III
PAPER III
Pathology – Practical

Total Marks - 100

- I. Stool routine
 - 1. Macroscopic 20 marks
 - A) Physical and B) Chemical
 - 2. Microscopic 20 marks
 - Ova, cyst, parasite
 - RBC /WBC / Occult blood

- II. Spotters 20 marks
 - 1. Cirrhosis of liver
 - 2. Stomach with ulcer / tumor
 - 3. Small intestine pathology
 - 4. Large intestine pathology
 - 5. Gall bladder pathology

- III. Specimens – Grossing 20 marks

- IV. Internal Assessment 20 marks

Semester III
PAPER IV
Microbiology – Practical

Total Marks 100

- | | | |
|------|--|----------|
| I. | Spotters | 20 marks |
| II. | Bacteriology | 20 marks |
| III. | Virology Exercise | 20 marks |
| IV. | Sample collection & Universal Precaution | 20 marks |
| V. | Internal assessment | 20 marks |

Semester III Paper V

Sociology

Theory 30 Hours

Course Description

This course will introduce student to the basic sociology concepts, principles and social process, social institutions in relation to the individual, family and community and the various social factors affecting the family in rural and urban communities in India will be studied.

Introduction:

Meaning - Definition and scope of sociology

Its relation to Anthropology, Psychology, Social Psychology

Methods of Sociological investigations - Case study, social survey, questionnaire, interview and opinion poll methods.

Importance of its study with special reference to health care professionals

Social Factors in Health and Disease:

Meaning of social factors

Role of social factors in health and disease

Socialization:

Meaning and nature of socialization

Primary, Secondary and Anticipatory socialization

Agencies of socialization

Social Groups:

Concepts of social groups influence of formal and informal groups on health and sickness. The role of primary groups and secondary groups in the hospital and rehabilitation setup.

Family:

The family, meaning and definitions

Functions of types of family

Changing family patterns

Influence of family on individual's health, family and nutrition, the effects of sickness in the family

and psychosomatic disease and their importance to physiotherapy

Community:

Rural community: Meaning and features - Health hazards to rural communities, health hazards to tribal community. Urban community - Meaning and features - Health hazards of urbanities

Culture and Health:

Concept of Health

Concept of culture

Culture and Health

Culture and Health Disorders

Social Change:

Meaning of social changes

Factors of social changes

Human adaptation and social change

Social change and stress

Social change and deviance

Social change and health programme

The role of social planning in the improvement of health and rehabilitation

Social Problems of disabled:

Consequences of the following social problems in relation to sickness and disability remedies to prevent these problems

Population explosion

Poverty and unemployment

Beggary

Juvenile delinquency

Prostitution

Alcoholism

Problems of women in employment

Social Security:

Social Security and social legislation in relation to the disabled

Social Work:

Meaning of Social Work

The role of a Medical Social Worker

Semester III

PAPER VI

Communication Skills

Theory 30 Hours

Unit-I:

Communication, its types and significance: Communication, Process of communication its kinds, channels and role in the society.

Methods of Communication (Oral, Written, One way, two way communication skills).

Reading skills: - Process of reading, reading purpose, models, strategies methodologies, reading activities, structure of meaning techniques.

Unit-II

Précis and Communication.

Writing skills :- Elements of effective writing, writing styles, scientific and technical writing.

Grammar: - Transformation of sentences, words used as different parts of speech, one word substitution, abbreviations, technical terms etc.

Unit-III

Listening skills: - Process of listening, barriers to listening, effective listening skills, feedback skills.

Speaking skills :- Speech mechanism, organs of speech, production and classification of speech sounds, phonetic transcription, skills of effective speaking components of an effective talk, oral presentation and the role of audio visual aids in it.

Reading of text book.

Unit-IV

Barriers of communication and technique to overcome those.

Meaning of effective communication.

Technical Report writing.

Practice of writing personal resume and writing application for employment.

Theory : 80 Marks

IA : 20 Marks

FOURTH SEMESTER

Scheme of Examination:

Sl. No.	Theory	Subjects	Theory+Viva+IA	Grand Total
1	Paper 1	Concepts in Gastroenterology diseases (Luminal – esophagus, stomach, small and large intestine)	60+20+20	100
2	Paper 2	Pharmacology related to Endoscopic technology	60+20+20	100
3	Paper 3	Basics in Endoscopy Technology (introduction to endoscopes, Indication, how to use, cleaning, storage)	100	100
4	Paper 4	Law – Indian Constitution	100	100

Scheme of Examination:

Theory Examination (Total Marks 100)							
Topic	No of Questions	Questions to be answered	Number of Questions & Marks	Total Marks	Internal Assessment	Viva	Total Marks
Long Essay Question	2	2	2x10	20			

ns					20	20	100
Long Essay Questions	5	5	5x5	25			
Short answers	5	3	5x3	15			

PRACTICAL ASSESMENT

Scheme of Practical Examination

Theory	Practical	IA	Grand Total
Practical paper	80	20	100

Semester IV

Paper I

Applied anatomy & physiology related to Endoscopy technology Theory 30 Hrs
Applied Anatomy

1. Basic Anatomy Of Gastrointestinal System - Structural Anatomy Of Oesophagus, Stomach, Small and large intestine, Liver, Pancretico- Biliary tract
2. Histology Of Small and Large intestine
3. Blood Supply Of Oesophagus, Stomach, Small and large intestine, Liver, Pancretico- Biliary tract
4. Development Of Gastrointestinal Tract In Brief

Physiology

1. Mechanism Of Swallowing, Defecation, Bile acid formation
2. Physiological Values –Saliva, Gastric acid, Pancreatic juice, Bile.
3. Hormones Produced By Gastrointestinal tract
4. Haemostasis - Coagulation Cascade, Cogulation Factors, Auto Regulation, Bt, Ct, Pt, Ptt, Thrombin Time
5. Basic Nutrition In Gastrointestinal Diseases

Scheme of Examination

Type of Questions	Questions to be asked	Questions to be answered	Marks
Long Essay Questions	2	2	20
Short Essay Questions Topics not covered in long questions	5	5	25
Short Essay Questions Topics not covered in long questions	5	3	15
		Total Marks	60

Semester IV

Paper II

Pharmacology related to Endoscopy technology Theory 30 Hrs

1. IV fluid therapy with special emphasis in Gastrointestinal diseases
2. Formalin, sodium hypochlorite, Enzymatic solution, Gluteroldehyde - role as disinfectants and adverse effects of residual particles applicable to formalin
3. Drugs used for sedation & anaesthesia : midazolam , propofol , ketamine , pethidine , fentanyl , dexmedetomidine
4. Drugs used for pain control : nsaid , opioids ,
5. Drugs used for bowel anatomy : hyoscine , glucagon
6. Drugs used for preventing post ercp pancreatitis : rectal suppository of indomethacin
7. Sclerosant drugs : polidocanol , sodium tetradecyl sulfate(sts) , alcohol
8. Cyanoacrylate glue : n-butyl 2-cyanoacrylate.

Scheme of Examination

Type of Questions	Questions to be asked	Questions to be answered	Marks
Long Essay Questions	2	2	20
Short Essay Questions Topics not covered in long questions	5	5	25
Short Essay Questions Topics not covered in long questions	5	3	15
		Total Marks	60

NO PRACTICAL EXAMINATION

Semester IV

Paper III

Basics in endoscopy Technology Theory 30 Hrs

1. Indications of endoscopy
2. Types of scopes & their structure & function
3. Principles of endoscopies
4. Introduction to endoscopic machine
5. Common complications of endoscopic procedure
6. Monitoring of patients during endoscopy

Semester IV

Paper IV

Constitution of India

Theory 30 Hrs

Unit-I: Meaning of the term 'Constitution' making of the Indian Constitution 1946-1940.

Unit-II: The democratic institutions created by the constitution Bicameral system of Legislature at the Centre and in the States.

Unit-III: Fundamental Rights and Duties their content and significance.

Unit - IV: Directive Principles of States Policies the need to balance Fundamental Rights with Directive Principles.

Unit - V: Special Rights created in the Constitution for: Dalits, Backwards, Women and Children and the Religious and Linguistic Minorities.

Unit-VI: Doctrine of Separation of Powers legislative, Executive and Judicial and their functioning in India.

Unit - VII: The Election Commission and State Public Service commissions.

Unit - VIII: Method of amending the Constitution.

Unit - IX: Enforcing rights through Writs:

Unit - X: Constitution and Sustainable Development in India.

Books:

1. J.C. Johari: The Constitution of India- A Politico-Legal Study-Sterling Publication, Pvt. Ltd. New Delhi.
2. J.N. Pandey: Constitution Law of India, Allahbad, Central Law Agency, 1998.
3. Granville Austin: The Indian Constitution - Corner Stone of a Nation-Oxford,

New Delhi, 2000.

FIFTH SEMESTER
Scheme of Examination

S NO	THEORY	SUBJECTS	THEORY+IA+VIVA	GRAND TOTAL
1	PAPER 1	CONCEPTS OF GASTROENTEROLOGY DISEASES (Hepato- Pancreatico-Biliary tract Disease)	60+20+20	100
2	PAPER2	APPLIED ENDOSCOPY TECHNOLOGY 1 (Details of Gastroscope, Colonoscope)	60+20+20	100
3	PAPER 3	APPLIED ENDOSCOPY TECHNOLOGY 2 (Side view Scope- ERCP, Biopsy, foreign body removal, Band ligation, Sclerotherapy)	60+20+20	100
4	PAPER 4	APPLIED ENDOSCOPY TECHNOLOGY 3 (Cholangioscopy, EUS, EMD, EMR, Manometry, HBT, FibroScan)	60+20+20	100
5	PAPER 5	FUNDMENTALS OF COMPUTERS	60+20+20	100

Type of questions and distribution of marks for Theory examination in each subject in Fifth Semester.

Sl. No.	Question	Question Asked	Question to Attempt	Marks	Max. Marks	Internal Assessment	Viva	Total Marks
1	Long Essay Question	2	1	2x10	20	20	20	100
2	Short Essay Question	5	5	5x5	25			
3	Short Answers	5	5	5x3	15			

PRACTICAL ASSESMENT

Sr NO	THEORY	PRACTICAL	IA	GRAND TOTAL
1	PRACTICAL PAPER	160	40	200

Semester V

PAPER 1

BASICS OF GASTROENTEROLOGY (Hepato- Pancreatico-Biliary tract Disease)

Theory 30 hours

1. Clinical feature and management of Alcoholic hepatitis
2. Clinical feature and management of viral hepatitis
3. Clinical feature and endoscopic management of portal HTN
4. Clinical feature and management of acute and chronic pancreatitis
5. Clinical feature and management of cholecystitis
6. Clinical feature and management of cholangitis
7. Clinical feature and management of CBD calculi
8. Clinical feature and management of biliary stricture

Scheme of Examination

Type of questions	No of questions	Questions to be answered	Number of questions	Total marks
Long Essay	2	2	2×10	20
Short Essay	5	5	5×5	25
Short answers	5	3	3×5	15
			Total marks	60

PAPER 2

APPLIED ENDOSCOPY TECHNOLOGY 1

Theory 30 Hours

1. Gastroscope- indication, uses, technique and complication
2. Colonoscope - indication, uses, technique and complication

Scheme of Examination

Type of questions	No of questions	Questions to be answered	Number of questions	Total marks
Long Essay	2	2	2×10	20
Short Essay	5	5	5×5	25
Short answers	5	3	3×5	15
			Total marks	60

PAPER 3

APPLIED ENDOSCOPY TECHNOLOGY 2

Theory 60 Hours

1. Side view Scope- ERCP indication, uses, technique and complication
2. Biopsy- how to take biopsy and different sites
3. Foreign body removal
4. Band ligation- indication, uses, technique and complication
5. Sclerotherapy- indication, uses, technique and complication

Scheme of Examination

Type of questions	No of questions	Questions to be answered	Number of questions	Total marks
Long Essay	2	2	2×10	20
Short Essay	5	5	5×5	25
Short answers	5	3	3×5	15
			Total marks	60

PAPER 4

APPLIED ENDOSCOPY TECHNOLOGY 3

Theory 60 Hours

1. Cholangioscopy- indication, uses, technique and complication
2. EUS- indication, uses, technique and complication
3. EMD and EMD- indication, uses, technique and complication
4. Manometry- indication, uses, technique and complication
5. HBT- indication, uses, technique and complication
6. FibroScan- indication, uses, technique and complication

Scheme of Examination

Type of questions	No of questions	Questions to be answered	Number of questions	Total marks
Long Essay	2	2	2×10	20
Short Essay	5	5	5×5	25
Short answers	5	3	3×5	15
			Total marks	60

Practical 50 Hours

1. Setting up endoscopy machine and endoscope
2. Cleaning and disinfection of endoscope
3. Assisting during Foreign body removal, Band ligation, Sclerotherapy.
4. Performing and assisting in HBT, Manometry, FibroScan
5. Assisting during EUS.

Practical examinations

Four papers	40×4= 160
IA	40
Total	200 marks

PAPER 5

Fundamentals of Computers

Theory 45 Hours

Introduction to computer: introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.

Input output devices: input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices),output devices(monitors, pointers, plotters, screen image projector, voice response systems).

Processor and memory: The Central Processing Unit (CPU), main memory. Storage Devices: sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.

Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.

Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.

Introduction to power-point: introduction, creating and manipulating presentation, views formatting and enhancing text, slide with graphs.

Introduction of Operating System: introduction, operating system concepts,types of operating system.

Introduction to MS-DOS: History of DOS, featuresof MS-DOS, MS-DOS Commands (internal and external).

Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving,resizing, minimizing and maximizing, etc.).

Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree hybrid), components of network.

Internet and its Applications:definition, brief history, basic services(E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW), wwwbrowsers, use of the internet.

Application of Computers in various fields:Medical, Education, Railway, Defense, Industry, Management, Sports, Commerce,Internet.

Introduction to installation of different software and introductionabout different software related to MLS.

Practicals :Learning to use MS Office: MS WORD, MS EXCEL & MS
PowerPoint
Practical Examination : 80 Marks
IA : 20 Marks

SIXTH SEMESTER

Scheme of Examination

Sl. No.	Theory	Subjects	Theory Max. + IA	Grand Total
1	Paper 1	Professional training (Six Months)	180 + 20	200
2	Paper 2 Practical	Internal assessment + Project/Practical file (Log Book) + Practical (Performance) + viva	100 + 150 + 100 + 50	400
3	Paper 3	Human Values and Professional Ethics	80 + 20	100

Paper 2

Internal assessment + Project/Practical file + Practical (Performance) + viva

- Internal Assessment

1. Work behavior
2. Clinical work (compulsory for all students)

- Project/Practical file

Every candidate shall maintain a work diary and record. His/her participation in the training programmes conducted by the department such as journal reviews, seminars etc. special mention may be made of the presentation by the candidate as well as details of procedures. The work diary shall be scrutinized and certified by the Head of the department and presented in the university practical/clinical examination.

Guest Lecture/ Tutorial/ Seminar/visit to any medical research institution or reputed clinical laboratory (Compulsory). For evaluation of Professional Training, out of 200 marks, 100 will be awarded by the Department where the candidate has taken training. The Candidate has to submit his/her project report (Log Book and Small Project on Instrument) before end of sixth semester. Then at the end of the semester he/she will appear for the Practical examinations in the presence of Internal & external Examiners. Out of rest 400 marks 150 will be for Project/Practical file and 100 for Practical and 50 for Viva voce (by external examiner)

The Practicals learned in all five semester will be part of final practical exam at the end of sixth semester

Paper 3

Human Values and Professional Ethics

Theory 45 Hours

Unit-I

1. Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

- Understanding the need, basic guidelines, content and process for Value Education.
- Self Exploration–what is it?- its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self exploration.
- Continuous Happiness and Prosperity- A look at basic Human Aspirations Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority
- Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Unit-II

2. Understanding Harmony in the Human Being - Harmony in Myself!

- Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’
- Understanding the needs of Self (‘I’) and ‘Body’ - SukhandSavidha
- Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer)
- Understanding the characteristics and activities of ‘I’ and harmony in ‘I’

- Understanding the harmony of I with the Body: SanyamandSwasthya; correct appraisal of Physical needs, meaning of Prosperity in detail
- Programs to ensure SanyamandSwasthya(6 Hrs)

Unit-III

3. Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

- Understanding harmony in the Family- the basic unit of human interaction
- Understanding values in human-human relationship; meaning of Nyayaandprogram for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship
- Understanding the meaning of Vishwas; Difference between intention and competence
- Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship
- Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitvaas comprehensive Human Goals
- Visualizing a universal harmonious order in society- Undivided Society (AkhandSamaj),
- Universal Order (SarvabhaumVyawastha)- from family to world family! (6 Hrs.)

Unit-IV

4. Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

- Understanding the harmony in the Nature
- Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature
- Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space
- Holistic perception of harmony at all levels of existence (4 Hrs)

5. Implications of the above Holistic Understanding of Harmony on Professional Ethics

- Natural acceptance of human values
- Definitiveness of Ethical Human Conduct

- Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
- Competence in professional ethics:
- Ability to utilize the professional competence for augmenting universal human order
- Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems
- Ability to identify and develop appropriate technologies and management patterns for above production systems.
- Case studies of typical holistic technologies, management models and production systems
- Strategy for transition from the present state to Universal Human Order:
- At the level of individual: as socially and ecologically responsible engineers, technologists and managers
- At the level of society: as mutually enriching institutions and organizations (6 Hrs.)

Text Book:

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Value Education.

Other Suggested Readings / Books:

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. A Nagraj, 1998, Jeevan Vidyaek Parichay, Divya Path Sansthan, Amarkantak.
4. Susan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
5. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A.N. Tripathy, 2003, Human Values, New Age International Publishers
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.

9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd
11. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
12. B L Bajpai, 2004, Indian Ethos and Modern Management, New

Internal Assessment

Internal Assessment will be undertaken for theory and practical periodically as per the semester system and the average marks of the tests will be calculated and reduced to 20 or 10 as applicable and the marks are to be communicated to the university.

Declaration of result

Criteria for pass

- a. Main subject: A Candidate is declared to have passed the examination in a subject, if he/she secures 40% of the total marks in Theory and Practical separately.
- b. Elective Subjects: The minimum marks for a pass in a elective subject shall be 35% of the maximum marks prescribed for a subject and the marks shall be communicated to the University before the commencement of the Practical examination.
- c. In case a candidate fails in either theory or practical, he/she has to appear for both theory and Practical in the subject in any subsequent examination and he/she must obtain the minimum for a pass in the subject (theory and practical separately)
- d. A candidate shall be declared to have passed the examination if he/she passes in all the main subjects.

Carry over System:

At any given point of time a candidate shall have subjects pending to clear of only previous semester in addition to the subjects of the current semester that he/she is appearing for.

Example:-

- If the candidate has not cleared semester I, he/she can appear for semester II and pending subjects of semester I simultaneously.
- For appearing for semester III he/she should have cleared semester I and can appear for papers pending from semester II along with semester III subjects.
- For appearing for semester IV he/she should have cleared semester II and can appear for papers pending from semester III along with semester IV subjects.
- For appearing for semester V he/she should have cleared semester III and can appear for papers pending from semester IV along with semester V subjects.
- For appearing for semester VI he/she should have cleared semester IV and can appear for papers pending from semester V along with semester VI subjects.

Examiners:

There should be minimum two examiners, one internal from the same university and one external Examiner for the First year subjects and for Pharmacology in the second year shall have Postgraduate degree in the respective subject with 3 years teaching experience of M.Sc. (Medical) with 5 years teaching experience.

PROGRAMS WITH CGPA/ ELECTIVE COURSE – AQAR 2022- Total 22

Name of all programmes adopting CBCS course system	Programme code	Names of all programmes adopting elective course system	Name of all the Programmes adopting CBCS system	Year of implementation of CBCS/elective course system	Link to the relevant document
JNMC (Allied- B.Sc) -					
B.Sc. Nutrition and Dietetics	AN	Faculty of science	B.Sc. Nutrition and Dietetics	2021	1.
B.Sc. Critical Care Technology	AO	Faculty of science	B.Sc. Critical Care Technology	2021	2.
B.Sc. Emergency Medicine Technology	AQ	Faculty of science	B.Sc. Emergency Medicine Technology	2021	3.
B.Sc. Endoscopy Technology	AP	Faculty of science	B.Sc. Endoscopy Technology	2021	4.
B.Sc in Hotel Management	QA	Faculty of science	B.Sc in Hotel Management	2019	5.
Bachelor of Public Health (BPH)	AI	Medicine	Bachelor of Public Health (BPH)	2018	6.
Bachelor of Public Health Hons.	AJ	Medicine	Bachelor of Public Health Hons.	2018	7.
JNMC (Allied- M.Sc) -					
M.Sc Biotechnology	FP	Science	M.Sc Biotechnology	2018	8.
M.Sc. Nutrition & Dietetics	FN	Medicine	M.Sc. Nutrition & Dietetics	2017	9.
M.Sc. in Psychology	FM	Medicine	M.Sc. in Psychology	2017	10.
JNMC (MPH) -					
MPH in Epidemiology	FQ	Public Health	MPH in Epidemiology	2018	11.

MPH in Health Economics and Outcomes Research	FR	Public Health	MPH in Health Economics and Outcomes Research	2018	12.
MPH in Health Care Quality and Safety	FS	Public Health	MPH in Health Care Quality and Safety	2018	13.
Master in Public Health	FL31	Master in Public Health	Master in Public Health	2010	14.
Ayurveda -					
BAMS	KA	Ayurveda	BAMS	2022	15.
Pharmacy -					
B Pharm	BP	Pharmacy	B Pharm VIII Semester	2016	16.
M.Pharm Pharmaceutics	NB	M.Pharm Pharmaceutic s	M.Pharm Pharmaceutics	2017	17.
M.Pharm Pharmacology	NC	M.Pharm Pharmacolog y	M.Pharm Pharmacology	2017	18.
M.Pharm Pharmaceutical chemistry	ND	M.Pharm Pharmaceutic al chemistry	M.Pharm Pharmaceutical chemistry	2017	19.
M.Pharm Pharmacognosy	NE	M.Pharm Pharmacogno sy	M.Pharm Pharmacognosy	2017	20.
M.Pharm Pharmacy Practice	NF	M.Pharm Pharmacy Practice	M.Pharm Pharmacy Practice	2017	21.
M.Pharm Pharmaceutical Quality Assurance	NP	M.Pharm Pharmaceutic al Quality Assurance	M.Pharm Pharmaceutical Quality Assurance	2017	22.

**Ordinance Governing
Master of Pharmacy
M. Pharm. Degree Course**

**Syllabus / Curriculum
2017 - 18**



Accredited 'A' Grade by NAAC
Placed in Category 'A' by MHRD(GoI)

KLE UNIVERSITY

JNMC Campus, Nehru Nagar, Belgaum - 590 010. Karnataka, INDIA.
Phone : +91 0831-2472777, 2493779 FAX : +91 0831-2493777
E-mail : info@kleuniversity.edu.in Website : www.kleuniversity.edu.in

CHAPTER – I:

REGULATIONS

1. Short Title and Commencement

These regulations shall be called as “The Revised Regulations for the Master of Pharmacy (M. Pharm.) Degree Program - Credit Based Semester System (CBSS) of the Pharmacy Council of India, New Delhi”. They shall come into effect from the Academic Year 2016-17. The regulations framed are subject to modifications from time to time by the authorities of the university.

2. Minimum qualification for admission

A Pass in the following examinations

- a) B. Pharm. Degree examination of an Indian university established by law in India from an institution approved by Pharmacy Council of India and has scored not less than 55 % of the maximum marks (aggregate of 4 years of B.Pharm.)
- b) Every student, selected for admission to post graduate pharmacy program in any PCI approved institution should have obtained registration with the State Pharmacy Council or should obtain the same within one month from the date of his/her admission, failing which the admission of the candidate shall be cancelled.

Note: It is mandatory to submit a migration certificate obtained from the respective university where the candidate had passed his/her qualifying degree (B.Pharm.)

3. Duration of the program

1. The program of study for M.Pharm. shall extend over a period of four semesters (two academic years). The curricula and syllabi for the program shall be prescribed from time to time by Pharmacy Council of India, New Delhi.

4. Medium of instruction and examinations

Medium of instruction and examination shall be in English.

5. Working days in each semester

Each semester shall consist of not less than 100 working days. The odd semesters shall be conducted from the month of June/July to November/December and the even semesters shall be conducted from the month of December/January to May/June in every calendar year.

6. Attendance and progress

A candidate is required to put in at least 80% attendance in individual courses considering theory and practical separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.

7. Program/Course credit structure

As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, practical classes, seminars, assignments, etc. are measured in terms of credits. On satisfactory completion of the courses, a candidate earns credits. The amount of credit associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly the credit associated with any of the other academic, co/extra-curricular activities is dependent upon the quantum of work expected to be put in for each of these activities per week/per activity.

7.1. Credit assignment

7.1.1. Theory and Laboratory courses

Courses are broadly classified as Theory and Practical. Theory courses consist of lecture (L) and Practical (P) courses consist of hours spent in the laboratory. Credits (C) for a course is dependent on the number of hours of instruction per week in that course, and is obtained by using a multiplier of one (1) for lecture and a multiplier of half (1/2) for practical (laboratory) hours. Thus, for example, a theory course having four lectures per week throughout the semester carries a credit of 4. Similarly, a practical having four laboratory hours per week throughout semester carries a credit of 2.

The contact hours of seminars, assignments and research work shall be treated as that of practical courses for the purpose of calculating credits. i.e., the contact hours shall be multiplied by 1/2. Similarly, the contact hours of journal club, research work presentations and discussions with the supervisor shall be considered as theory course and multiplied by 1.

7.2. Minimum credit requirements

The minimum credit points required for the award of M. Pharm. degree is 95. However based on the credit points earned by the students under the head of co-curricular activities, a student shall earn a maximum of 100 credit points. These

credits are divided into Theory courses, Practical, Seminars, Assignments, Research work, Discussions with the supervisor, Journal club and Co-Curricular activities over the duration of four semesters. The credits are distributed semester-wise as shown in Table 14. Courses generally progress in sequence, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester-wise schedule of courses given in the syllabus.

8. Academic work

A regular record of attendance both in Theory, Practical, Seminar, Assignment, Journal club, Discussion with the supervisor, Research work presentation and Dissertation shall be maintained by the department / teaching staff of respective courses.

9. Course of study

The specializations in M.Pharm program is given in Table 1.

S.No.	Specialization	Code
1.	Pharmaceutics	MPH
2.	Pharmaceutical Chemistry	MPC
3.	Pharmaceutical Quality Assurance	MQA
4.	Pharmacy Practice	MPP
5.	Pharmacology	MPL
6.	Pharmacognosy	MPG

The course of study for M.Pharm. specializations shall include Semester wise Theory & Practical as given in Table – 2 to 7. The number of hours to be devoted to each theory and practical course in any semester shall not be less than that shown in Table – 2 to 7.

Table – 2: Course of study for M. Pharm. (Pharmaceutics)

Course Code	Course	Credit Hours	Credit Points	Hrs./Week	Marks
Semester I					
MPH101T	Modern Pharmaceutical Analytical Techniques	4	4	4	100
MPH102T	Drug Delivery System	4	4	4	100
MPH103T	Modern Pharmaceutics	4	4	4	100
MPH104T	Regulatory Affair	4	4	4	100
MPH105P	Pharmaceutics Practical I	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650

Semester II					
MPH201T	Molecular Pharmaceutics (Nano Tech and Targeted DDS)	4	4	4	100
MPH202T	Advanced Biopharmaceutics & Pharmacokinetics	4	4	4	100
MPH203T	Computer Aided Drug Delivery System	4	4	4	100
MPH204T	Cosmetic and Cosmeceuticals	4	4	4	100
MPH205P	Pharmaceutics Practical II	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650

Table – 3: Course of study for M. Pharm.

(Pharmaceutical Chemistry)

Course Code	Course	Credit Hours	Credit Points	Hrs./Wk	Marks
Semester I					
MPC101T	Modern Pharmaceutical Analytical Techniques	4	4	4	100
MPC102T	Advanced Organic Chemistry-I	4	4	4	100
MPC103T	Advanced Medicinal Chemistry	4	4	4	100
MPC104T	Chemistry of Natural Products	4	4	4	100
MPC105P	Pharmaceutical Chemistry Practical I	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650
Semester II					
MPC201T	Advanced Spectral Analysis	4	4	4	100
MPC202T	Advanced Organic Chemistry -II	4	4	4	100
MPC203T	Computer Aided Drug Design	4	4	4	100
MPC204T	Pharmaceutical Process Chemistry	4	4	4	100
MPC205P	Pharmaceutical Chemistry Practical II	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650

**Table – 4: Course of study for M. Pharm.
(Pharmaceutical Quality Assurance)**

Course Code	Course	Credit Hours	Credit Points	Hrs./Week	Marks
Semester I					
MQA101T	Modern Pharmaceutical Analytical Techniques	4	4	4	100
MQA102T	Quality Management System	4	4	4	100
MQA103T	Quality Control and Quality Assurance	4	4	4	100
MQA104T	Product Development and Technology Transfer	4	4	4	100
MQA105P	Pharmaceutical Quality Assurance Practical I	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650
Semester II					
MQA201T	Hazards and Safety Management	4	4	4	100
MQA202T	Pharmaceutical Validation	4	4	4	100
MQA203T	Audits and Regulatory Compliance	4	4	4	100
MQA204T	Pharmaceutical Manufacturing Technology	4	4	4	100
MQA205P	Pharmaceutical Quality Assurance Practical II	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650

**Table – 5: Course of study for M. Pharm.
(Pharmacy Practice)**

Course Code	Course	Credit Hours	Credit Points	Hrs./Wk	Marks
Semester I					
MPP101T	Clinical Pharmacy Practice	4	4	4	100
MPP102T	Pharmacotherapeutics-I	4	4	4	100
MPP103T	Hospital & Community Pharmacy	4	4	4	100
MPP104T	Clinical Research	4	4	4	100
MPP105P	Pharmacy Practice Practical I	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650
Semester II					
MPP201T	Principles of Quality Use of Medicines	4	4	4	100
MPP202T	Pharmacotherapeutics II	4	4	4	100
MPP203T	Clinical Pharmacokinetics and Therapeutic Drug Monitoring	4	4	4	100
MPP204T	Pharmacoepidemiology & Pharmacoeconomics	4	4	4	100
MPP205P	Pharmacy Practice Practical II	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650

Table – 6: Course of study for M. Pharm. (Pharmacology)

Course Code	Course	Credit Hours	Credit Points	Hrs./Wk	Marks
Semester I					
MPL101T	Modern Pharmaceutical Analytical Techniques	4	4	4	100
MPL102T	Advanced Pharmacology-I	4	4	4	100
MPL103T	Pharmacological and Toxicological Screening Methods-I	4	4	4	100
MPL104T	Cellular and Molecular Pharmacology	4	4	4	100
MPL105P	Pharmacology Practical I	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650
Semester II					
MPL201T	Advanced Pharmacology II	4	4	4	100
MPL202T	Pharmacological and Toxicological Screening Methods-II	4	4	4	100
MPL203T	Principles of Drug Discovery	4	4	4	100
MPL204T	Clinical Research and Pharmacovigilance	4	4	4	100
MPL205P	Pharmacology Practical II	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650

Table – 7: Course of study for M. Pharm.**(Pharmacognosy)**

Course Code	Course	Credit Hours	Credit Points	Hrs./Wk	Marks
Semester I					
MPG101T	Modern Pharmaceutical Analytical Techniques	4	4	4	100
MPG102T	Advanced Pharmacognosy-1	4	4	4	100
MPG103T	Phytochemistry	4	4	4	100
MPG104T	Industrial Pharmacognostical Technology	4	4	4	100
MPG105P	Pharmacognosy Practical I	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650
Semester II					
MPG201T	Medicinal Plant biotechnology	4	4	4	100
MPG202T	Advanced Pharmacognosy-II	4	4	4	100
MPG203T	Indian system of medicine	4	4	4	100
MPG204T	Herbal cosmetics	4	4	4	100
MPG205P	Pharmacognosy Practical II	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650

Table – 8: Course of study for M. Pharm. III Semester**(Common for All Specializations)**

Course Code	Course	Credit Hours	Credit Points
MRM 301T	Research Methodology and Biostatistics*	4	4
-	Journal club	1	1
-	Discussion / Presentation (Proposal Presentation)	2	2
-	Research Work	28	14
Total		35	21

* Non University Exam

**Table – 9: Course of study for M. Pharm. IV Semester
(Common for All Specializations)**

Course Code	Course	Credit Hours	Credit Points
-	Journal Club	1	1
-	Research Work	31	16
-	Discussion/Final Presentation	3	3
	Total	35	20

Table – 10: Semester wise credits distribution

Semester	Credit Points
I	26
II	26
III	21
IV	20
Co-curricular Activities(Attending Conference, Scientific Presentations and Other Scholarly Activities)	Minimum = 02 Maximum = 07*
Total Credit Points	Minimum = 95 Maximum = 100*

*Credit Points for Co-curricular Activities

Table – 11: Guidelines for Awarding Credit Points for Co-curricular Activities

Name of the Activity	Maximum Credit Points Eligible / Activity
Participation in National Level Seminar/Conference/Workshop/Symposium/ Training Programs (related to the specialization of the student)	01
Participation in international Level Seminar/Conference/Workshop/Symposium/ Training Programs (related to the specialization of the student)	02
Academic Award/Research Award from State Level/National Agencies	01
Academic Award/Research Award from International Agencies	02
Research / Review Publication in National Journals (Indexed in Scopus / Web of Science)	01
Research / Review Publication in International Journals (Indexed in Scopus / Web of Science)	02

Note: International Conference: Held Outside India

International Journal: The Editorial Board outside India

*The credit points assigned for extracurricular and or co-curricular activities shall be given by the Principals of the colleges and the same shall be submitted to the

Table – 22: Letter grades and grade points equivalent to Percentage of marks and performances

Percentage of Marks Obtained	Letter Grade	Grade Point	Performance
90.00 – 100	O	10	Outstanding
80.00 – 89.99	A	9	Excellent
70.00 – 79.99	B	8	Good
60.00 – 69.99	C	7	Fair
50.00 – 59.99	D	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

A learner who remains absent for any end semester examination shall be assigned a letter grade of AB and a corresponding grade point of zero. He/she should reappear for the said evaluation/examination in due course.

18. The Semester grade point average (SGPA)

The performance of a student in a semester is indicated by a number called 'Semester Grade Point Average' (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester. For example, if a student takes five courses (Theory/Practical) in a semester with credits C_1, C_2, C_3 and C_4 and the student's grade points in these courses are G_1, G_2, G_3 and G_4 , respectively, and then students' SGPA is equal to:

$$\text{SGPA} = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4G_4}{C_1 + C_2 + C_3 + C_4}$$

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F and ABS grade awarded in that semester. For example if a learner has a F or ABS grade in course 4, the SGPA shall then be computed as:

$$\text{SGPA} = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4 * \text{ZERO}}{C_1 + C_2 + C_3 + C_4}$$

19. Cumulative Grade Point Average (CGPA)

The CGPA is calculated with the SGPA of all the IV semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all IV semesters and their courses. The CGPA shall reflect the failed status in case of F grade(s), till the course(s) is/are passed. When the course(s) is/are passed by obtaining a pass grade on subsequent examination(s) the CGPA shall only reflect the new grade and not the fail grades earned earlier. The CGPA is calculated as:

$$\text{CGPA} = \frac{C_1S_1 + C_2S_2 + C_3S_3 + C_4S_4}{C_1 + C_2 + C_3 + C_4}$$

where C_1, C_2, C_3, \dots is the total number of credits for semester I, II, III, \dots and S_1, S_2, S_3, \dots is the SGPA of semester I, II, III, \dots

20. Declaration of class

The class shall be awarded on the basis of CGPA as follows:

First Class with Distinction = CGPA of 7.50 and above

First Class = CGPA of 6.00 to 7.49

Second Class = CGPA of 5.00 to 5.99

21. Project work

All the students shall undertake a project under the supervision of a teacher in Semester III to IV and submit a report. 4 copies of the project report shall be submitted (typed & bound copy not less than 75 pages).

The internal and external examiner appointed by the University shall evaluate the project at the time of the Practical examinations of other semester(s). The projects shall be evaluated as per the criteria given below.

Evaluation of Dissertation Book:

Objective(s) of the work done	50 Marks
Methodology adopted	150 Marks
Results and Discussions	250 Marks
Conclusions and Outcomes	50 Marks
Total	500 Marks