

Post graduate degree course (Clinical)

Syllabus / Curriculum 2023-24 EMERGENCY MEDICINE



KLE Academy of higher education & 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 AND RESEARCH

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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 & the Seven Stars.....

The Palm is the palm of the teacher – the hand that acts, promises and 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 knowledge Domain, Our culture says; The true objectives 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 kingdom 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; the inscription at the base of the Emblem convey that our Organization with its strength, maturity & wisdom will forever strive to empower the student community to become globally competent professionals. It has been a guiding force for many students generations in the past, and will continue to inspire many forthcoming generations.

Section-I

Goals and General Objectives of Postgraduate Medical Education Program

Goal

The goal of postgraduate medical education shall be to produce a competent specialist and / or a medical teacher as stated in the Post Graduate Medical Education Regulations 2000 and its amendments thereof [May2018]

- (i) Who shall recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy.
- (ii) Who shall have mastered most of the competencies, pertaining to the specialty, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system.
- (iii) Who shall be aware of the contemporary advances and developments in the discipline concerned.
- (iv) Who shall have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology, and
- (v) Who shall have acquired the basic skills in teaching of the medical and paramedical professionals.

General Objectives

At the end of the postgraduate training in the discipline concerned the student shall be able to:

- (i) Recognize the importance of the concerned specialty in the context of the health need of the community and the national priorities in the health sector.
- (ii) Practice the specialty concerned ethically and in step with the principles of primary health care.
- (iii) Demonstrate sufficient understanding of the basic sciences relevant to the concerned specialty.
- (iv) Identify social, economic, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive and promotive measures/strategies.
- (v) Diagnose and manage majority of the conditions in the specialty concerned on the basis of clinical assessment, and appropriately selected and conducted investigations.
- (vi) Plan and advice measures for the prevention and rehabilitation of patients suffering from disease and disability related to the specialty.
- (vii) Demonstrate skills in documentation of individual case details as well as morbidity and mortality data relevant to the assigned situation.
- (viii) Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behavior in accordance with the societal norms and expectations.

- (ix) Play the assigned role in the implementation of national health programs, effectively and responsibly.
- (x) Organize and supervise the chosen/assigned health care services demonstrating adequate managerial skills in the clinic/hospital or the field situation.
- (xi) Develop skills as a self-directed learner; recognize continuing educational needs, select and use appropriate learning resources.
- (xii) Demonstrate competence in basic concept of research methodology and epidemiology, and be able to critically analyses relevant published research literature.
- (xiii) Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.
- (xiv) Function as an effective leader of a team engaged in health care, research or training.

Statement of the Competencies

Keeping in view the general objectives of postgraduate training, each discipline shall aim at development of specific competencies, which shall be defined and spelt out in clear terms. Each department shall produce a statement and bring it to the notice of the trainees in the beginning of the program so that he or she can direct the efforts towards the attainment of these competencies.

Components of the PG Curriculum

- The major components of the PG curriculum shall be:
- Theoretical knowledge
- Practical/clinical Skills
- Training in writing thesis/research articles
- Attitudes, including communication.
- Training in research methodology, medical ethics & medicolegal aspects
- Teaching skills to the undergraduates, juniors and support teams

Source: Medical Council of India, Regulations on Postgraduate Medical Education, 2000.
[amended up to May 2018]

Training Method

The postgraduate training for degree shall be of residency pattern. The post graduate shall be trained with graded responsibilities in the management and treatment of patients entrusted to his/her care. The participation of the students in all facets of educational process is essential. Every candidate should take part in seminars, group discussions grand rounds, case demonstration, clinics, journal review meetings, CPC and clinical meetings. Every candidate should be required to participate in the teaching and training program of undergraduate students. Training should include involvement in laboratory and experimental work, and research studies. Basic medical sciences students should be posted to allied and relevant clinical departments or institutions. Exposure to applied aspects of their learning should be addressed. Similarly, clinical subjects' students should be posted to basic medical sciences and allied specialty departments or institutions.

Attendance, Progress and Conduct

A candidate pursuing degree course should work in the concerned department of the institution for the full period as a full-time student. No candidate is permitted to run a clinic/laboratory/nursing home while studying postgraduate course

Each year shall be taken as a unit for the purpose of calculating attendance. Every student shall attend symposia, seminars, conferences, journal review meetings, grand rounds, CPC, case presentation, clinics and lectures during each year as prescribed by the department and not absent himself / herself from work without valid reasons. Every Candidate is required to attend a minimum of 80% of the training during each academic year of the post graduate course. This shall include assignments, assessment of full-time responsibilities and participation in all facets of educational process. Provided further, leave of any kind shall not be counted as part of academic term without prejudice to minimum 80% attendance of training period every year. Leave benefits shall be as per university rules.

A post graduate student pursuing degree course in broad specialties, MD, MS would be required to present one poster presentation, read one paper in national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him/her to be eligible to appear at the university degree examinations. (MCI, PG 2000, 13.9)

Any student who fails to complete the course in the manner stated above shall not be permitted to appear for the University Examinations.

Monitoring Progress of Studies

The learning process of students should be monitored through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring is done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment done by using checklists that assess various aspects.

The learning outcomes to be assessed include:

- Personal Attitudes,
- Acquisition of Knowledge,
- Clinical and operative skills, skills of performing necessary tests/experiments
- Teaching skills.
- Documentation skills

Personal Attitudes:

The essential items are:

- Caring attitude, empathy
- Initiative in work and accepting responsibilities
- Organizational ability
- Potential to cope with stressful situations and undertake graded responsibility
- Trust worthiness and reliability
- To understand and communicate intelligibly with patients and others
- To behave in a manner which establishes professional relationships with patients and colleagues
- Ability to work in team
- A critical enquiring approach to the acquisition of knowledge

The Methods used mainly consist of observation. Any appropriate methods can be used to assess these. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers. However, every attempt should be made to minimize subjectivity.

Acquisition of Knowledge:

Lectures: Lectures/theory classes as necessary may be conducted. It is preferable to have one class per week if possible. They may, be employed for teaching certain topics. Lectures may be didactic or integrated.

The following selected common topics for post graduate students of all specialties to be covered are suggested here. These topics can be addressed in general with appropriate teaching-learning methods centrally or at departmental level.

- History of medicine with special reference to ancient Indian medicine
- Basics of health economics and health insurance
- Medical sociology, Doctor –Patient relationship, role of family in disease
- Professionalism & Medical code of Conduct and Medical Ethics
- Research Methods, Bio-statistics
- Use of library, literature search, use of various software and databases
- Responsible conduct of research
- How to write an article, publication ethics and Plagiarism
- Journal review and evidence-based medicine
- Use of computers & Appropriate use of AV aids
- Rational drug therapy
- National Health and Disease Control Programs
- Roles of specialist in system-based practice
- Communication skills.
- Bio medical waste management
- Patient safety, medical errors and health hazards
- Patient's rights for health information and patient charter.

These topics may preferably take up in the first few weeks of the 1st year commonly for all new postgraduates and later in 2nd year or 3rd year as required during their progression of the programme. The specialty wise topics can be planned and conducted at departmental level.

- a) Integrated teaching: These are recommended to be taken by multidisciplinary teams for selected topics, e.g. Jaundice, Diabetes mellitus, thyroid diseases, etc. They should be planned well in advance and conducted.

Journal Review Meeting (Journal club):

The ability to do literature search, in depth study, presentation skills, use of audio – visual aids, understanding and applying evidence-based medicine are to be focused and assessed. The assessment is made by faculty members and peers attending the meeting using a checklist

Seminars / symposia:

The topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study, presentation skills and use of audio – visual aids are to be assessed using a checklist.

Clinico-Pathological conferences:

This should be a multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenter(s) are to be assessed using a check list similar to that used for seminar.

Medical Audit:

Periodic morbidity and mortality meeting be held. Attendance and participation in these must be insisted upon. This may not be included in the assessment.

Clinical Skills:

Day to Day Work: Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates' sincerity and punctuality, analytical ability and communication skills

Clinical Meetings:

Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list.

Group discussions:

Group discussions are one of the means to train and assess the student's ability to analyse the given problem or situation, apply the knowledge and make appropriate decisions. This method can be adopted to train and assess the competency of students in analyzing and applying knowledge.

Death review meetings/Mortality meetings:

Death review meetings is important method for reflective learning. A well conducted morbidity and mortality meetings bring about significant reduction in complications, improve patient care and hospital services. They also address system related issues. Monthly meetings should be conducted with active participation of faculty and students. Combined death review meetings may be required wherever necessary.

Clinical and Procedural Skills:

The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the log book.

Teaching Skills:

Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students

Attitude and Communication skills:

Candidates should be trained in proper communication skills towards interaction and communication with patients, attendees and society in general. There should be appropriate training in obtaining proper written informed consent, discussion and documentation of the proceedings. Structured training in various areas like consent, briefing regarding progress and breaking bad news are essential in developing competencies.

Variety of teaching –learning methods like Role play, video-based training, standardized patient scenarios, reflective learning and assisting the team leader in all these areas will improve the skills. Assessment can be done using OSCE simulated scenarios and narratives or any appropriate means. Training to work as team member, lead the team whenever situation demands is essential. Mock drills to train and assess the readiness are very helpful.

Work diary / Log Book:

Every candidate shall maintain a Work Diary/Log Book and record his/her participation in the training programs conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, conducted by the candidate. A well written and validated Log Book reflects the competencies attained by the learner and points to the gap which needs address. This Log Book shall be scrutinized by concerned teachers periodically and certified, by the Head of Department and Head of the Institution, and presented during University Practical / Clinical examination.

Periodic tests:

In case of degree courses of three years duration (MD/MS.), the concerned departments may conduct three tests, two of them be annual tests, one at the end of first year

and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practical / clinical and viva voce.

One of these practical/clinical tests should be conducted by OSPE (objective structured practical examination or OSCE (objective structured clinical examination) method.

Records and marks obtained in such tests will be maintained by the Head of Department and sent to the University, when called for,

Assessment:

Assessment should be comprehensive & objective. It should address the stated competencies of the course. The assessment needs to be spread over the duration of the course.

TEACHING AND LEARNING METHODS

Postgraduate Training

Teaching methodology

Didactic lectures are of least importance.

- Teaching should include seminars, journal clubs, symposia, tutorials, case discussions, Flip class, Case based discussions, Simulation based training and research presentations.
- Reviews and guest lectures should get priority for theoretical knowledge.
- Bedside teaching, grand rounds, interactive group discussions and clinical demonstrations should be the hallmark of clinical/practical learning.
- Student should have hands-on training in performing various procedures (medical/surgical concerning his specialty) and ability to interpret various tests/investigations.
- Exposure to newer specialized diagnostic/therapeutic procedures concerning his/her subject should be given.
- A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree

examination.

- Log books shall be maintained regularly and should be checked and assessed periodically by the faculty members imparting the training.
- The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- Department should encourage e-learning activities.

Thesis: Supervision

- The postgraduate is responsible to a Faculty member and the latter should be available to advise and assist the student in his clinical assignments
- Departmental teaching committee will be responsible for the educational activities of the department and the teaching schedule.
- This involves providing services for emergencies and it makes different demands upon the anesthesiologist. It should be learned through experience, with reduced staff. The clinical work during emergency should have a close supervision. The standards should be maintained of the agreed competence on schedule. The
- emergency duties should be properly arranged with duty off. The postgraduates may have to do emergency duty as per schedule

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of skills laboratories in medical colleges is mandatory.

Simulators:

Simulators should be used for the events of high importance but infrequent occurrence and where there may be high risks to the patients. The simulators can also be used for assessment purposes.

ASSESSMENT

FORMATIVE ASSESSMENT, during the training programme

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.

Formative assessment will be done yearly both theory and practical's. Theory will include four papers with ten questions and ten marks each. Practical's will be conducted through OSCE by DOPS and mini CEX.

Oral/Viva-voce should be conducted preferably on four tables with one examiner on each table

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and clinical examination. The thesis is assessed separately.

Quarterly assessment during the MD training should be based on:

- 1. Journal based / recent advances learning**
- 2. Patient based /Laboratory or Skill based learning**
- 3. Self-directed learning and teaching**
- 4. Departmental and interdepartmental learning activity**
- 5. External and Outreach Activities / CMEs**

The student to be assessed periodically as per categories listed in postgraduate student appraisal form.

SUMMATIVE ASSESSMENT:

The summative examination would be carried out as per the Rules given in **POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2021.**

Post graduate Examination

The examinations shall be organized on the basis of 'Grading' or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./ MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning: it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and clinical examination.

Quarterly assessment during the Postgraduate training course should be based on following educational activities:

1. Journal based/recent advances learning
2. Patient based/Laboratory or Skill based learning
3. Self-directed learning and teaching
4. Departmental and interdepartmental learning activity
5. External and outreach Activities/CMEs

Records:

Records and marks obtained in tests will be maintained by the Head of the Departments and will be made available to the University or MCI.

Procedure for defaulter:

Every department should have a committee to review such situations. The defaulting candidate is counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination, if she/he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

Dissertation:

Every candidate pursuing MD/MS degree course is required to carry out work on a selected research project under the guidance of a recognized post graduate teacher. The results of such a work shall be submitted in the form of a dissertation.

The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of hypothesis, search and 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.

Every candidate shall submit to the Registrar (Academic) of the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within six months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.

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 dissertation shall be written under the following headings:

1. Introduction
2. Aims or Objectives of study
3. Review of Literature
4. Material and Methods
5. Results
6. Discussion
7. Conclusion
8. Summary
9. References
10. Tables
11. Annexure

The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexure. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27” x 11.69”) and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the Institution.

Adequate number of copies as per norms and a soft copy of dissertation thus prepared shall be submitted to the Controller of Examinations six months before final examination on or before the dates notified by the University.

The dissertation shall be valued by examiners appointed by the university. Acceptance of dissertation work is an essential precondition for a candidate to appear in the University examination.

Guide:

The academic qualification and teaching experience required for recognition by this University as a guide for dissertation work is as per Medical Council of India Minimum Qualifications for Teachers in Medical Institutions Regulations, 1998 and its amendments thereof. Teachers in a medical college/institution having a total of eight years teaching experience out of which at least five years teaching experience as Lecturer or Assistant Professor gained after obtaining post graduate degree shall be recognized as post graduate teachers.

A Co-guide may be included provided the work requires substantial contribution from a sister department or from another medical institution recognized for teaching/training by this University / Medical Council of India. The co-guide shall be a recognized post graduate teacher of BLDE (Deemed to be University).

Change of guide:

In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the University.

Schedule of Examination:

The examination for M.D. /M.S and courses shall be held at the end of three academic years. The university shall conduct two examinations in a year at an interval of four to six months between the two examinations. Not more than two examinations shall be conducted in an academic year.

Scheme of Examination

M.D. /M.S. Degree

M.D. / M.S. Degree examinations in any subject shall consist of dissertation, written papers (Theory), Practical/Clinical and Viva Voce.

Dissertation:

Every candidate shall carryout work and submit a Dissertation as indicated above. Acceptance of dissertation shall be a precondition for the candidate to appear for the final examination.

Written Examination (Theory):

Written examination shall consist of **four** question papers, each of **three** hours duration. Each paper shall carry 100 marks. Out of the **four** papers, the 1st paper in clinical subjects will be on applied aspects of basic medical sciences and 4th paper on Recent advances, which may be asked in any or all the papers. In basic medical subjects and para-clinical -subjects, questions on applied clinical aspects should also be asked.

Practical / Clinical Examination:

In case of practical examination, it should be aimed at assessing competence and skills of techniques and procedures as well as testing students ability to make relevant and valid observations, interpretations and inference of laboratory or experimental work relating to his/her subject.

In case of clinical examination, it should aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate should examine at least one long case and two short cases minimum. However additional assessment methods can be adopted which will test the necessary competencies reasonably well.

The total marks for Practical / Clinical examination shall be 400.

Viva Voce:

Examination shall aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills.

The total marks shall be 100:

- 80 Marks, for examination of all components of syllabus
- 20 Marks for Pedagogy

Examiners:

There shall be at least four examiners in each subject. Out of them two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the Medical Council of India.

Criteria for pass & distinction:

Criteria for declaring as pass in University Examination: A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical/clinical and (3) viva voce examination. The candidate should pass independently in practical/clinical examination and Viva Voce: vide MCI pg 2000 Reg no 14(4) (Ciii)

Obtaining a minimum of 40% marks in each theory paper and not less than 50% cumulatively in all the four papers for degree examinations. Obtaining of 50% marks in Practical examination shall be mandatory for passing the examination as a whole in the said degree examination as the case may be.[amendment of MCI PG Regulations clause 14 dated 5.4.2018]

A candidate securing less than 50% of marks as described above shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Controller of Examinations.

Declaration of distinction:

A successful candidate passing the University examination in first attempt will be declared to have passed the examination with distinction, if the grand total aggregate of marks is 75 percent and above.

Distinction will not be awarded for candidates passing the examination in more than one attempt.

Number of candidates per day: The maximum number of candidates for practical / clinical and viva-voce examination shall be as under: MD / MS Courses: Maximum of 8 per day

SCHEME OF EXAMINATION KAHER

A) Theory Examination:

Written examination shall consist of four question papers each of three hours' duration.

Total marks for each paper will be 100

<u>Type of Questions</u>	<u>Number of Questions</u>	<u>Marks for each question</u>	<u>Total Marks</u>
<u>Short essay</u>	<u>10</u>	<u>10x10</u>	<u>100</u>
<u>Grand Total</u>			<u>100</u>

THEORY

- **400 marks**

There shall be four question papers, each of three hours duration. Theory consists of four papers of 3 hours each having 10 short structured questions with 10 marks each total 100 marks each paper:

Details of distribution of topics for each paper will be as follows:

Paper I – Physiology, Biochemistry, Pathology, and Pharmacology as applied to emergency medicine. General Emergency Medicine concepts – CPR, Resuscitation, Pre-hospital systems, Disaster medicine, Blood transfusion, Shock, Multi-organ failure

Paper II - Cardiovascular, Respiratory, Gastrointestinal, Neurological, Nephrology, Endocrine and metabolic emergencies, and other medical emergencies including emergencies due to infectious diseases.

Paper III – Obstetric and gynecological emergencies, surgical emergencies including Trauma, Acute pain management including procedural sedation.

Paper IV - Pediatric, Toxicological, Ophthalmic, Oto-rhino-laryngological, Psychiatric, and Dermatological emergencies and recent advances in emergency medicine

PRACTICALS:**Total 400 marks**

Template for Practical Examination of Final Year MD Emergency Medicine candidates

Clinical cases**200 Marks****1. Long Cases-2**

Long cases of Surgical Emergency

100 Marks

Long cases of Medical Emergency

100 Marks

2. Short Cases -4**100 Marks**

Short Case 1. Orthopedics / Trauma

25 marks

Short Case 2. OBG /Pediatrics

25 marks

Short Case3.Patient on Ventilator

25 Marks

Short Case 4. Patient of ENT /Ophthalmology

25 Marks

3. Spotters + Viva**100 marks**

1. Interpretation of ECG - 10 marks
2. Interpretation of X ray - 10 marks
3. Interpretation of ABG - 10 marks
4. Interpretation of CT &MRI - 10 marks
5. Interpretation of Lab values - 10 marks
6. Evaluation of Log Book - 10 marks
7. Toxicology - 10 marks
8. Breaking Bad News -10 marks
9. USG -10 marks
10. Pedagogy -10 marks

Viva**100 marks****1. Skill stations and Spotters****80 marks**

- a) USG skills
- b) Airway station /Megacode (ACLS)
- c) Breaking bad news
- d) Toxicology
- e) Radiology, ECG, and ABG
- f) Images from ENT, Ophthalmology, Dermatology

2. Pedagogy**20 marks**

Additional annexure to be included in all curricula

Postgraduate Students Appraisal Form
Pre/Para/Clinical Disciplines

Name of Department/Unit :
 Name of the PG Student :
 Period of Training : FROM..... TO.....

Sr. No	Particulars	Not Satisfactory			Satisfactory			More Than Satisfactory			Remarks
		1	2	3	4	5	6	7	8	9	
1	Journal based/recent advances learning										
2	Patient based /Laboratory or Skill based learning										
3	Self directed learning and teaching										
4	Departmental and interdepartmental learning activity										
5	External and Outreach Activities/CMEs										
6	Thesis/Research work										
7	Log Book Maintenance										

Publications Yes/No

Remarks*

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*Remarks: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.

SIGNATURE OF ASSESSEE

SIGNATURE OF GUIDE

SIGNATURE OF HOD

SIGNATURE OF UNIT CHIEF

Section-II

Curriculum of M.D. Emergency Medicine

Goals:

The goals of postgraduate training for M.D. Emergency Medicine students are to train a M.B.B.S. doctor who will be capable and competent to:

- Practice Emergency Medicine with adequate competency and skills with sound knowledge.
- Practice Emergency Medicine in ethical manner, with empathy and due care to the needy.
- Continue to update with the advances regularly.
- Treat his/her team and juniors as learners and share his/her knowledge and skills.
- Be aware of national priorities in health and serve as per need towards achieving the goals of national health policies.

Objectives:

The following objectives are laid out to achieve the goals of the course. These objectives are to be achieved by the time the candidate completes the course. The Objectives are considered under the sub headings.

- Knowledge (Cognitive domain)
- Skills (Psycho motor domain)
- Human Values, Ethical practice and Communication abilities (Affect or domain)
- Importance of golden hour and window period etc.

Knowledge:

A list of objectives related to knowledge and higher cognitive abilities that are expected to be achieved during the course are given.

At the end of the training, the candidate must be able and competent to:

- Understand and describe etiology, pathophysiology principles of diagnosis and management of common medical , surgical, pediatric emergencies and apply the same knowledge and skills in the management of patients
- Understand, describe and practice effectively the indications and methods for fluid and electrolyte replacement therapy including blood transfusion nutrition.
- Demonstrate understanding of basic sciences relevant to emergency conditions.

- Identify social, economic, environmental and emotional determinants in a given case, and take them into account during planning therapeutic measures, advice regarding the operative or non-operative management of the case and to carry out the management effectively.
- Undertake audit, use information technology tools and carry out research, both basic and clinical, with the intent of generating knowledge & spread it through publications and presentations for the benefit of scientific community and general public.
- Recognize & refer conditions outside the competency level to appropriate expertise.
- Attend, update and upgrade professional skills regularly as required by participating in instructional courses, workshops, CMEs, conferences or training programmes.
- Be a good teacher by inculcating teaching methodology and skills so as to teach students, colleagues and support staff. .
- Use evidence based medicine and effectively & advocate them in decision making.
- Be capable of managing medico-legal aspects of trauma and other non traumatic emergency conditions.
- Be effective team leaders in secondary health care facilities & team member.
- Be capable of organizing and executing effective treatment in mass casualties.
- Develop knowledge of ventilator and its setting in different conditions.

Skills

- Be a competent clinician to take proper clinical history, examine the patient, perform essential diagnostic procedures and order relevant tests and interpret them to come to a reasonable diagnosis about the surgical conditions.
- Be a competent emergency physician to perform minor operative procedures. Competent in providing basic and advance life saving support services (BLS & ACLS) in emergencies and manage them, manage poly trauma, acute surgical emergencies including abdominal and thoracic emergencies
- Undertake thorough wound management including various traumatic wounds and burns.
- Mechanical ventilation
- Central venous line, central arterial line etc.

Human Values, Ethical practice and Communication abilities:

- Practice emergency medicine ethically and provide care irrespective of other considerations like caste, creed, religion etc. and social status. Should be sensitive and responsiveness towards patients' age, culture, religion, gender and disability etc.
- Be honest and maintain professional integrity, accountability, compassion and respect in all aspects of patient care.
- Be a good communicator who can explain patients in lay terms the outcome, various options of management and obtain true informed consent.
- Be able to respect patients' autonomy, confidentiality, right for information and decision making.

- Understand the limitations of his knowledge and skills and ask for help from experts and colleagues.
- Follow ethical guidelines during research in animals or human subjects.
- Be a motivated leader to bring about best in his team.
- The student should demonstrate a commitment to excellence and continuous professional development.

The course contents have been identified and categorized as essential knowledge as under.

A. SYSTEMWISE APPROACH TO EMERGENCIES

I. Cardiovascular Emergencies in Adults and Children

1. Arrhythmias
2. Congenital heart disorders
3. Contractility disorders, pump failure
4. Cardiomyopathies, congestive heart failure, acute pulmonary oedema, tamponade
5. Valvular emergencies
6. Inflammatory and infectious cardiac disorders
7. Endocarditis, myocarditis, pericarditis
8. Ischemic heart disease - Acute coronary syndromes, stable angina
9. Traumatic injuries
10. Vascular and thromboembolic disorders
11. Aortic dissection/aneurysm rupture, deep vein thrombosis, hypertensive emergencies, occlusive arterial disease, thrombophlebitis, pulmonary embolism, pulmonary hypertension

II. Dermatological Emergencies in Adults and Children

1. Inflammatory and Infectious disorders.
2. Skin manifestations of immunological disorders, systemic disorders & toxic disorders.

III. Endocrine and Metabolic Emergencies in Adults and Children

1. Acute presentation of inborn errors of metabolism.
2. Adrenal insufficiency, crisis and other adrenal emergencies.
3. Disorders of glucose metabolism.
4. Hyperosmolar hyperglycemic state, hypoglycemia, ketoacidosis.
5. Thyroid emergencies hyperthyroidism, hypothyroidism, myxedema, thyroid storm.

IV. Fluid and Electrolyte Disturbances

1. Acid-Base disorders.
2. Electrolyte disorders.
3. Volume status and fluid balance.

V. Ear, Nose, Throat, Oral and Neck Emergencies in Adults and Children

1. Bleeding.
2. Complications of tumors.
3. Airway obstruction, bleeding.
4. Foreign bodies.
5. Inflammatory and Infectious disorders.
6. Angioedema, epiglottitis, laryngitis, tonsillar abscess.
7. Traumatic problems.
8. Post-operative complications.

VI. Gastrointestinal Emergencies in Adults and Children.

1. Inflammatory and Infectious disorder –appendicitis, cholecystitis, cholangitis, diverticulitis.
2. Complications of inflammatory bowel diseases, gastritis, gastroenteritis, Pancreatitis, peritonitis.
3. Traumatic and mechanical problems- foreign bodies, hernia strangulation, intestinal obstruction and occlusion.
4. Acute hepatitis, Cirrhosis of liver and complication.
5. Vascular disorders: Ischemia and Bleeding.
6. Ischemic colitis, upper and lower gastrointestinal bleeding, mesenteric ischemia.

VII. Gynaecological and Obstetric Emergencies

1. Obstetric emergencies- Hypertension, diabetes, anemia, thyroid disorders, ectopic pregnancy, emergency delivery, eclampsia ,HELLP syndrome during pregnancy, hyperemesis gravidarum, placenta praevia, Abruption placentae.
2. Post-partum hemorrhage.
3. Traumatic and related problems.
4. Ovarian torsion.
5. Vaginal bleeding.
6. Cardiac arrest in pregnancy- resuscitation, peri-mortem caesarian section.

VIII. Hematology and Oncology Emergencies in Adults and Children

1. Anemias.
2. Complications of lymphomas and leukemias.
3. Congenital disorders- Hemophilia's and Von Willebrand's disease, hereditary hemolytic, anemias, sickle cell disease.
4. Inflammatory and Infectious disorders.
5. Neutropenic fever, infections in immuno-compromised patients.
6. Vascular disorders: Ischemia and Bleeding.
7. Acquired bleeding disorders (coagulation factor deficiency, disseminated intravascular coagulation), drug induced bleeding (anticoagulants, antiplatelet agents, fibrinolytics), idiopathic thrombocytopenic purpura, thromboticthrombocytopenic purpura.
8. Transfusion reactions, Massive transfusion.

IX. Immunological Emergencies in Adults and Children

1. Allergies and anaphylactic reactions.
2. Inflammatory and Infectious disorders.
3. Acute complications of vacuities.

X. Infectious Diseases and Sepsis in Adults and Children

1. Common viral and bacterial infections.
2. Food and water-borne infectious diseases.
3. HIV infection and AIDS.
4. Common tropical diseases.
5. Parasitic infestations.
6. Rabies.
7. Sepsis and septic shock.
8. Streptococcal toxic shock syndrome
9. Tetanus

XI. Musculo-Skeletal Emergencies

1. Dislocated hip, osteogenesis imperfecta
2. Inflammatory and Infectious disorders
3. Cellulitis, complications of systemic rheumatic diseases, necrotizing fasciitis, osteomyelitis, soft tissue infections
4. Complications of osteoporosis and other systemic diseases
5. Traumatic and degenerative disorders
6. Common fractures and dislocations, compartment syndromes, crush syndrome, osteoarthritis, rhabdomyolysis, soft tissue trauma

XII. Neurological Emergencies in Adults and Children

1. Inflammatory and Infectious disorders - brain abscess, meningitis, encephalitis, febrile seizures in children, Guillain-Barrè syndrome, meningitis, peripheral facial palsy (Bell's palsy), temporal arteritis
2. Traumatic and related problems - Complications of CNS devices, spinal cord syndromes, peripheral nerve trauma and entrapment, traumatic brain injury
3. Tumors - common presentations and acute complications of neurological a metastatic tumors
4. Vascular disorders: Ischemia and Bleeding Carotid artery dissection, stroke, subarachnoid hemorrhage, subdural and extramural hematoma, transient ischemic attack, venous sinus thrombosis
5. Other problems - Acute complications of chronic neurological conditions (e.g. myasthenic crisis, multiple sclerosis), acute peripheral neuropathies, seizures and Status epileptic's

XIII. Ophthalmic Emergencies in Adults and Children

1. Inflammatory and Infectious disorders: conjunctivitis, dacryocystitis, endophthalmitis, iritis, keratitis, orbital and Periorbital cellulitis, uveitis
2. Traumatic and related problems: Foreign body in the eye, ocular injuries,
3. Vascular disorders: Ischemia and Bleeding -retinal artery and vein occlusion, vitreous hemorrhage
4. Acute glaucoma, retinal detachment

XIV. Pulmonary Emergencies in Adults and Children

1. Congenital -cystic fibrosis.
2. Inflammatory and Infectious disorder -asthma, bronchitis, bronchiolitis, pneumonia, empyema, COPD exacerbation, lung abscess, pleurisy and pleural effusion, pulmonary fibrosis, tuberculosis.
3. Traumatic and related problem foreign body inhalation, haemothorax, tension pneumothorax, Pneumomediastinum.
4. Tumors - common complications and acute complications of pulmonary and metastatic tumors.
5. Vascular disorders pulmonary embolism.
6. Acute lung injury, atelectasis, ARDS, spontaneous pneumothorax, Hemoptysis.

XV. Psychiatric and Behavior Disorders

1. Behavior disorders.
2. Affective disorders, confusion and consciousness disturbances, intelligence disturbances, memory disorders, perception disorders, psycho-motor disturbances, thinking disturbances.
3. Acute psychosis, anorexia and bulimia complications, anxiety and panic attacks, conversion disorders, deliberate self-harm and suicide attempt.
4. Depressive illness, personality disorders, substance, drug and alcohol abuse.

XVI. Renal And Urological Emergencies in Adults and Children

1. Metabolic disorders- Acute kidney Injury, uremia, hemolytic uremic syndrome.
2. Traumatic and related problems.
3. Urinary retention, testicular torsion.
4. Vascular disorders: Ischemia and Bleeding.
5. Comorbidities in dialysis and renal transplanted patients.
6. Complications of urological procedures and devices.

XVII. Trauma in Adults and Children

1. Origin of trauma: Thermal Injury, Chemical injury, Ionizing radiation Injury blunt trauma, penetrating trauma.
2. Anatomical location of trauma: Head and neck, maxillo-facial, thorax, abdomen, pelvis, spine, extremities Polytrauma patient.
3. Trauma in specific populations: children, elderly, pregnant women.

B. COMMON PRESENTING SYMPTOMS

I. Acute Abdominal Pain

1. Gastrointestinal causes-appendicitis, cholecystitis, cholangitis, acute pancreatitis, complications of hernias, diverticulitis, hepatitis, hiatus hernia, inflammatory bowel disease, intestinal obstruction, ischemic colitis, mesenteric ischemia, peptic ulcer, peritonitis, hollow viscus perforation.
2. Cardiac/vascular causes - acute myocardial infarction, aortic dissection, aortic aneurysm rupture.
3. Dermatological causes - herpes zoster, other local inflammatory & infective causes.
4. Endocrine and metabolic causes- Addison's disease, diabetic ketoacidosis, other metabolic acidosis, porphyria.
5. Gynecological and Obstetric causes-complications of pregnancy, ectopic pregnancy, pelvic inflammatory disease, rupture of ovarian cyst, ovarian torsion.
6. Hematological causes- acute porphyria crisis, Familial Mediterranean fever, sickle cell crisis.
7. Musculo-skeletal causes referred pain from thoraco-lumbar spine.
8. Renal and Genitourinary causes- pyelonephritis, renal stones.
9. Respiratory causes- pneumonia, pleurisy.
10. Toxicology – poisoning.
11. Trauma- Abdominal.

II. Altered Behaviour and Agitation

1. Neurological causes- cerebral space-occupying lesions, dementia, hydrocephalus, intracranial hypertension, CNS infections.
2. Toxicology- alcohol and drug abuse, poisoning.
3. Endocrine and metabolic causes- hypoglycemia, hyperglycemia, electrolyte imbalance, hyperthermia, hypoxemia.
4. Cardiac/Vascular causes- hypertension, vasculitis.
5. Psychiatric causes- acute psychosis, depression.

III. Altered Level of Consciousness in Adults and Children

1. Neurological causes -cerebral tumor, epilepsy and status epilepticus, meningitis, encephalitis, stroke, subarachnoid hemorrhage, subdural and extradural hematoma, traumatic brain injury.
2. Cardiovascular causes- hypoperfusion states, shock.
3. Endocrine and metabolic causes-electrolyte imbalances, hepatic coma,

hypercapnia, hypothermia, hypoxia, hypoglycemia/ hyperglycemia, uremia.

4. Gynecological and Obstetric causes –eclampsia.
5. Infectious causes - septic shock.
6. Psychiatric causes - Conversion syndrome.
7. Respiratory causes - Respiratory failure.
8. Toxicology - Alcohol intoxication, carbon-monoxide poisoning, narcotic and sedative poisoning, other substances.

IV. Back Pain

1. Musculo-Skeletal causes - Fractures, intervertebral disc strain and degeneration, strain of muscles, ligaments and tendons, spinal stenosis, arthritides, arthrosis.
2. Cardiovascular causes- aortic aneurysm, aortic dissection.
3. Infectious causes- osteomyelitis, discitis, pyelonephritis, prostatitis.
4. Endocrine and metabolic causes- Paget's disease.
5. Gastrointestinal causes- pancreatitis, cholecystitis.
6. Dermatological causes- herpes zoster.
7. Gynecological causes- endometriosis, pelvic inflammatory disease.
8. Hematological and Oncological causes- abdominal or vertebral tumors.
9. Neurological cause- subarachnoid hemorrhage.
10. Renal and Genitourinary causes- renal abscess, renal calculi.
11. Trauma.

V. Bleeding (Non-Traumatic)

1. Ear, Nose, Throat causes Ear bleeding (otitis, trauma, tumors), epistaxis.
2. Gastrointestinal causes Hematemesis and melena (acute gastritis, gastroduodenal ulcer, Mallory Weiss syndrome, esophageal varices) rectal bleeding (acute diverticulitis, hemorrhoids, inflammatory bowel disease, tumors).
3. Gynecological and Obstetric causes Menorrhagia/metrorrhagia (abortion, abruptio placentae, tumors).
4. Renal and Genitourinary causes Hematuria (pyelitis, tumors, urolithiasis)
5. Respiratory causes Hemoptysis (bronchiectasis, pneumonia, tumors, tuberculosis).

VI. Cardiac Arrest

1. Cardiac arrest treatable with defibrillation Ventricular fibrillation, pulseless ventricular tachycardia.
2. Pulseless electric activity Acidosis, hypoxia, hypothermia, hypo/hyperkalemia, hypocalcaemia, hypo/hyperglycemia, hypovolemia, tension pneumothorax, cardiac tamponade, myocardial infarction, pulmonary embolism, poisoning Asystole.

VII. Chest Pain

1. Cardiac/vascular causes Acute coronary syndrome, aortic dissection, arrhythmias, pericarditis, pulmonary embolism.
2. Respiratory causes Pneumonia, pneumomediastinum, pneumothorax (especially tension pneumothorax), pleurisy.
3. Gastrointestinal causes -Gastro-esophageal reflux, esophageal rupture, esophageal spasm.
4. Musculo-Skeletal causes costosternal injury, costochondritis, intercostal muscle pain, pain referred from thoracic spine.
5. Psychiatric causes - anxiety, panic attack.
6. Dermatological causes - herpes zoster.

VIII. Crying Baby

1. Infections: herpes stomatitis, meningitis, osteomyelitis, urinary tract infection testicular torsion, trauma, teeth problems.
2. Cardiac: arrhythmias, congestive heart failure.
3. Reaction to milk, reaction to medications, reflux.
4. Immunization and allergic reactions, insect bites.
5. Eye corneal abrasions, glaucoma, ocular foreign bodies.
6. Some gastrointestinal causes: hernia, intussusception, volvulus.

IX. Diarrhoea

1. Infectious causes: AIDS, bacterial enteritis, viral, parasites, food-borne, toxins
2. Toxicological causes: drug related, poisoning (including heavy metals, mushrooms, organophosphates, rat poison, and seafood).
3. Endocrine and metabolic causes: carcinoids, diabetic neuropathy.
4. Gastrointestinal causes: diverticulitis, dumping syndrome, ischemic colitis, inflammatory bowel disease, enteritis due to radiation or chemotherapy.
5. Hematological and Oncological causes: toxicity due to cytostatic therapies.
6. Immunology: food allergy.
7. Psychiatric disorders: diarrhea "factitia".

X. Dyspnoea

1. Respiratory Causes: airway obstruction, broncho-alveolar obstruction, parenchymal diseases, pulmonary shunt, pleural effusion, atelectasis, pneumothorax.
2. Cardiac/vascular causes: cardiac decompensation, cardiac tamponade, pulmonary embolism.
3. Ear, Nose, Throat causes: epiglottitis, croup and pseudocroup.
4. Fluid & Electrolyte disorders: hypovolemia, shock, anemia.
5. Gastrointestinal causes: hiatus hernia.
6. Immunological causes: vasculitis.

7. Metabolic causes: metabolic acidosis, uremia.
8. Neurological causes: myasthenia gravis, GuillainBarrè syndrome, amyotrophic lateral sclerosis.
9. Psychiatric disorders: conversion syndrome.
10. Toxicology: CO intoxication, cyanide intoxication.
11. Trauma: flail chest, lung contusion, traumatic pneumothorax, haemothorax.

XI. Fever and Endogenous increase in Body Temperature

1. Systemic infectious causes: sepsis and septic shock, parasitosis, flu-like syndrome.
2. Organ-specific infectious causes: endocarditis, myocarditis, pharyngitis, tonsillitis, abscesses, otitis, cholecystitis and cholangitis, meningitis, encephalitis.
3. Non-infectious causes: Lyell syndrome, Stephen-Johnson syndrome, thyroid storm, pancreatitis, inflammatory bowel disease, pelvic inflammatory disease, toxic shock.
4. Hematological and Oncological causes: leukemia and lymphomas, solid tumors.
5. Immunological causes: arteritis, arthritis, lupus, sarcoidosis.
6. Musculo-Skeletal causes: osteomyelitis, fasciitis and cellulitis.
7. Neurological causes: cerebral hemorrhage.
8. Psychiatric causes: factitious fever.
9. Renal and Genitourinary causes: pyelonephritis, prostatitis
10. Toxicology.

XII. Headache in Adults and Children

1. Vascular causes: migraine, cluster headache, tension headache, cerebral hemorrhage, hypertensive encephalopathy, ischemic stroke.
2. Hematological and Oncological causes: brain tumors.
3. Immunological causes: temporal arteritis, vasculitis.
4. Infectious causes: abscesses, dental infections, encephalitis, mastoiditis, meningitis, sinusitis.
5. Musculo-Skeletal causes: cervical spine diseases, temporomandibular joint syndrome.
6. Neurological causes: trigeminal neuralgia.
7. Ophthalmological causes: optic neuritis, acute glaucoma.
8. Toxicology: alcohol, analgesic abuse, calcium channel blockers, glutamate, nitrates, opioids and caffeine withdrawal.
9. Trauma: head trauma.

XIII. Jaundice

1. Gastrointestinal causes: cholangitis, hepatic failure, pancreatic head tumor, pancreatitis, obstructive cholestasis.
2. Cardiac/Vascular causes: chronic cardiac decompensation.
3. Hematological and Oncological causes: hemolytic anemias, thrombotic

thrombocytopenic purpura, hemolytic uremic syndrome, disseminated intravascular coagulation.

4. Infectious causes: malaria, leptospirosis, infective endocarditis.
5. Gynecological causes: HELLP syndrome.
6. Toxicology: drug induced, hemolytic anemias, snake venom.

XIV. Pain in Arms

1. Cardiac/Vascular causes: aortic dissection, deep venous thromboembolism, ischemic heart disease.
2. Musculo-skeletal causes: peri-arthritis, cervical spine arthrosis.
3. Trauma.

XV. Pain in Legs

1. Cardiac/Vascular causes: acute ischemia, arteritis, deep venous thrombosis, superficial thrombophlebitis.
2. Immunological causes: polymyositis.
3. Infectious causes: arthritis, cellulites, necrotizing fasciitis, osteomyelitis.
4. Musculo-Skeletal causes: sciatalgia.
5. Neurological causes: sciatica.
6. Nervous system causes: peripheral nerve compression.
7. Trauma.

XVI. Palpitations

1. Cardiac/Vascular causes: brady-arrhythmias (including sinus bradycardia and AV blocks), extrasystoles, tachy-arrhythmias (including atrial fibrillation, sinus tachycardia, supraventricular tachycardia, ventricular tachycardia).
2. Endocrine and metabolic causes: Thyrotoxicosis, phaeochromocytoma.
3. Toxicology – Drugs.

XVII. Seizures in Adults and Children

1. Neurological causes.
2. Generalized epilepsy, partial complex or focal epilepsy, status epilepticus.
3. Cardiac/Vascular causes: hypertensive encephalopathy, syncope, dysrhythmias, migraines.
4. Endocrine and metabolic causes: metabolic seizures.
5. Gynecological causes: eclampsia.
6. Infective causes: febrile seizures in children.
7. Psychiatric causes: narcolepsy, pseudo-seizures.
8. Respiratory causes: respiratory arrest.
9. Toxicology: drugs/toxins.

XVIII. Shock in Adults and Children

1. Anaphylactic.
2. Cardiogenic.
3. Hypovolemic.
4. Obstructive.
5. Cardiac/Vascular causes - cardiogenic shock, arrhythmias.

6. Endocrine and metabolic causes - Addison's crisis.

7. Fluid and Electrolyte disorders - hypovolemic shock.
8. Gastrointestinal causes - vomiting, diarrhea.
9. Gynecological causes - toxic shock.
10. Immunological causes - anaphylactic shock.
11. Infectious causes - septic shock.
12. Neurological causes - neurogenic shock.
13. Trauma - hypovolemic shock, neurogenic shock.

XIX. Skin Manifestations in Adults and Children

1. Dermatological causes - eczema, psoriasis, skin tumors.
2. Immunological causes -vasculitides, urticaria, Stevens-Johnson syndrome, Lyell syndrome (TENS).
3. Infectious causes - viral exanthemata, meningococemia, herpes zoster/ simplex, abscesses of the skin.
4. Psychiatric causes -Self-inflicted skin lesions or from abuse.
5. Toxicology.
6. Hematological and Oncological causes- idiopathic thrombocytopenic purpura, thrombotic thrombocytopenic purpura.

XX. Syncope

1. Cardiac/vascular causes: aortic dissection, cardiac arrhythmias (including brady-tachy syndrome, Brugada syndrome, drug overdose, long QT syndrome, sick sinus syndrome, torsades de pointes, ventricular tachycardia), other causes of hypoperfusion (including ischemia, valvular, hemorrhage, obstruction: e.g. aortic stenosis, pulmonary embolism, tamponade)orthostatic hypotension.
2. Endocrine and metabolic causes: Addison's disease.
3. Fluid and Electrolyte disorders: hypovolemia.
4. Gastrointestinal causes - vomiting, diarrhea.
5. Neurological causes - autonomic nervous system disorder, epilepsy, vasovagal reflex.
6. Toxicology - alcoholic or drug consumption.

XXI. Urinary Symptoms (Dysuria, Oligo/Anuria, Polyuria)

1. Renal and Genitourinary causes: acute renal failure, acute urinary retention, cystitis and pyelonephritis, prostatitis.
2. Cardiac/Vascular causes: cardiac decompensation.
3. Endocrine and metabolic causes - diabetes mellitus, diabetes insipidus
4. Fluid and Electrolyte disorders: Hypovolemia.

XXII. Vertigo and Dizziness

1. Ear and Labyrinth causes: benign postural vertigo, Meniere's disease, otitis, vestibular neuritis, viral labyrinthitis.
2. Cardiac/Vascular causes: arrhythmias, hypotension.
3. Endocrine and metabolic causes: hypoglycemia.
4. Hematological and Oncological causes: anemias.
5. Nervous system causes: acoustic neuroma, bulbar or cerebellar lesions, multiple sclerosis, temporal lobe epilepsy.
6. Psychiatric causes: anxiety.
7. Respiratory causes: hypoxia.
8. Toxicology: alcohol abuse, drugs and substances.

XXIII. Vomiting

1. Gastrointestinal causes: appendicitis, cholecystitis, gastroparesis, gastric obstruction and retention, gastroenteritis, hepatitis, pancreatitis, pyloric stenosis, small bowel obstructions.
2. Cardiac/Vascular causes - myocardial ischemia.
3. Ear, Nose, Throat causes, vestibular disorders.
4. Endocrine and metabolic causes -diabetic ketoacidosis, hypercalcemia
5. Fluid and Electrolyte disorders – hypovolemia.
6. Gynecological and Obstetric causes – pregnancy.
7. Infectious causes -sepsis, meningitis.
8. Neurological causes - cerebral edema or hemorrhage, hydrocephalus, intracranial space occupying lesions.
9. Ophthalmological causes - acute glaucoma.
10. Psychiatric causes - eating disorders.
11. Renal and Genitourinary causes - renal calculi, uremia.
12. Toxicology.

C. SPECIFIC ASPECTS OF EMERGENCY MEDICINE

I. Abuse and Assault in Adults and Children

1. Abuse in the elderly and impaired.
2. Child abuse and neglect.
3. Intimate partner violence and abuse.
4. Sexual assault.
5. Patient safety in Emergency Medicine.
6. Violence management and prevention in the Emergency Department.

II. Analgesia and Sedation in Adults and Children

1. Pain transmission (anatomy, physiology, pharmacology).
2. Pain assessment.
3. Pharmacology of sedative and pain relieving drugs.
4. Psychological and social aspects of pain in pediatric, adult and elderly

patients.

III. Disaster Medicine

1. Disaster preparedness.
2. Major incident planning/procedures/practice.
3. Disaster response.
4. Mass gatherings.
5. Specific medical topics (triage, bioterrorism, blast and crush injuries, chemical agents, radiation injuries).
6. Debriefing and mitigation.

IV. Environmental Accidents in Adults and Children

1. Electricity (electrical and lightning injuries).
2. Flora and Fauna (injuries from exposure, bites and stings).
3. High-altitude (medical problems).
4. NBCR (nuclear, biological, chemical and radiological; decontamination, specific aspects).
5. Temperature (heat and cold related emergencies).
6. Travel medicine.
7. Water (near-drowning, dysbarism and complications of diving, marine fauna).

V. Problems in the Elderly

1. Atypical presentations (e.g. abdominal pain, infections, myocardial infarction).
2. Delirium.
3. Dementia.
4. Falls (causes & investigations).
5. Immobility.
6. Multiple pathology and multiple therapies.
7. Self-dependency.
8. Trauma & co-morbidity.

VI. Toxicology in Adults and Children

1. General principles of toxicology and management of poisoned patients.
2. Principles of drug interactions.
3. Specific aspects of poisoning
 - a) Drugs (including paracetamol, amphetamine, anticholinergics, anticonvulsants, antidepressants, antihypertensives, benzodiazepines, digitalis, monoamine oxidase inhibitors, neuroleptics).
 - b) Industrial, chemicals.
 - c) Plants & mushrooms.
 - d) Alcohol abuse and alcohols poisoning.
 - e) Drugs of abuse.
4. Organization and information (e.g. poison centers, databases).

VII. Pre-Hospital Care

1. Emergency Medical Services organization (administration, structure, staffing, resources).
2. Medical transport (including neonates and children, air transport).
3. Paramedic training and function.
4. Safety at the scene.
5. Collaboration with other emergency services (e.g. police, fire department).

VIII. Psycho-Social Problems

1. Social wellbeing of specific populations
2. Patients with social issues
3. Frequent visitors
4. Social care following discharge

D. CORE CLINICAL PROCEDURES AND SKILLS

I. CPR Skills

1. Cardio-pulmonary resuscitation procedures in a timely and effective manner according to the current AHA-ECC guidelines for adults and children.
2. BLS, ACLS Certification Mandatory.

II. Airway Management Skills

1. Open and maintain the airway in the emergency setting (insertion of oropharyngeal or nasopharyngeal airway).
2. Endotracheal intubation.
3. Alternative airway techniques in the emergency setting (e.g. laryngeal mask insertion, surgical airway).
4. Difficult airway management algorithm.
5. Use of rapid sequence intubation in the emergency setting.

III. Analgesia and Sedation Skills

1. Assessment of the level of pain and sedation.
2. Monitor vital signs and potential side effects during pain management.
3. Provide procedural sedation and analgesia including conscious sedation (including testing of life support equipment).
4. Use of appropriate local, topical and regional anaesthesia techniques.

IV. Breathing and Ventilation Management Skills

1. Assessment of breathing and ventilation.
2. Oxygen therapy.
3. Interpretation of blood gas analysis, pulse oximetry and capnography.
4. Bag-mask-valve ventilation.
5. Thoracentesis.
6. Chest tube insertion, connection to under-water drainage and assessment of functioning.
7. Non-invasive ventilation techniques.
8. Invasive ventilation techniques.

V. Circulatory Support and Cardiac Skills and Procedures

1. Administration of fluids including blood and substitutes.
2. Monitoring of ECG and the circulation.
3. Defibrillation and pacing (e.g. cardioversion, transcutaneous pacing).
4. Emergency pericardiocentesis .
5. ED thoracotomy.
6. Vascular access (peripheral venous, arterial, and central venous catheterization, intraosseous access).

VI. Diagnostic Procedures and Skills

1. Interpretation of ECG.
2. Appropriate request and interpretation of laboratory investigations (blood chemistry, blood gases, respiratory function testing and biological markers).
3. Appropriate request and interpretation of imaging (e.g. x-rays, ultrasound, CT/MRI).
4. Performance of focused sonographic assessment.

VII. ENT Skills and Procedures

1. Anterior rhinoscopy.
2. Insertion of nasal pack.
3. Inspection of oropharynx and larynx.
4. Otoscopy.
5. Removal of foreign body if airway is compromised.
6. Insertion and replacement of tracheostomy tube.

VIII. Gastrointestinal Procedures

1. Insertion of nasogastric tube.
2. Gastric lavage.
3. Peritoneal lavage.
4. Abdominal paracentesis.
5. Measurement of abdominal pressure.
6. Proctoscopy.

IX. Genitourinary Procedures

1. Insertion of indwelling urethral catheter.
2. Suprapubic cystostomy.
3. Testicular torsion reduction.
4. Evaluation of patency of urethral catheter.
5. Management of paraphimosis.
6. Dorsal slit operation.

X. Hygiene Skills and Procedures

1. Decontamination of patient and the environment.
2. Patient isolation and staff protection.
3. Hand hygiene and surgical hand scrub.
4. Aseptic technique of performing procedures.

XI. Musculoskeletal Techniques

1. Aseptic joint aspiration.
2. Fracture immobilization.
3. Reduction of joint dislocation.
4. Log roll and spine immobilization.
5. Splinting (plasters, braces, slings, tapes and other bandages).
6. Management of compartment syndrome.
7. Fasciotomy, escharotomy.

XII. Neurological Skills and Procedures

1. Evaluation of consciousness.
2. Evaluation of Stroke.
3. Fundoscopy.
4. Lumbar puncture.
5. Interpretation of neuro-imaging.

XIII. Obstetric and Gynecological Skills and Procedures

1. Emergency delivery.
2. Vaginal examination using speculum.
3. Assessment of the sexual assault victim.
4. Peri-mortem caesarian section.

XIV. Ophthalmic Skills and Procedures

1. Removal of foreign body from the eye.
2. Fundus examination.
3. Slit lamp use.
4. Lateral canthotomy.

XV. Temperature Control Procedures

1. Measuring and monitoring of body temperature.
2. Cooling techniques (evaporative cooling, ice water or slush immersion).
3. Internal cooling methods.
4. Warming techniques.
5. Monitoring heat stroke patients.
6. Treatment and prevention of hyper- and hypothermia.

XVI. Transportation of the Critically ill Patient

1. Telecommunication and telemedicine procedures
2. Preparation of the EMS vehicle
3. Specific aspects of monitoring and treatment during transportation

XVII. General Surgical Skills

1. Abscess incision and drainage.
2. Aseptic techniques.
3. Treatment of lacerations and soft tissue injuries.
4. Wound irrigation and wound closure.
5. Wound debridement.
6. Minor amputations.
7. Minor surgical procedures.
8. Abdominal hernia reduction.
9. Resuscitation and Management of burns patient including dressing burns patient.
10. ATLS Certification is mandatory.

Teaching and Learning Activities

A candidate pursuing the course should work in the institution as a full-time student. No candidate should be permitted to run a clinic/nursing home while studying postgraduate course. Each year should be taken as a unit for the purpose of calculating attendance.

Every student shall attend teaching and learning activities during each year as prescribed by the department and not absent himself/herself from work without valid reasons.

A list of teaching and learning activities designed to facilitate students acquired essential knowledge and skills outlined is given below:

Lectures:

Lectures should be employed for teaching certain topics. Lectures may be didactic or integrated.

Didactic Lectures:

Recommended for selected common topics for post graduate students of all specialties.

Integrated Lectures and group discussions:

These are recommended to be taken by multidisciplinary teams for selected topics, eg. Jaundice, Diabetes mellitus, thyroid disorders etc.

Attendance and participation of Orientation programme and workshop regarding research methodology, literature search, synopsis and dissertation writing, biostatistics and basics of teaching skills, research ethics and other topics of common interest is compulsory.

Journal Club:

Recommended to be held once a week. All the post graduate students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. Further, every candidate must make a presentation from the allotted journal(s) selected articles at least four times a year. The presentations would be evaluated using checklists. (See checklists in section IV). A time table with names of the student and the moderator should be announced well in advance.

Subject Seminar/Clinical seminar:

Recommended to be held once a week. All the Post graduate students are expected to attend and actively participate in discussion and enter in the Log Book relevant details.

Further, every candidate must present on selected topics at least four times a year. The presentations would be evaluated using checklists (See checklist in Section IV). A timetable for the subject with names of the student and the moderator should be scheduled well in advance.

Clinical case discussions:

Case presentations may be held weekly. Cases can be clinically interesting cases or problem based case discussions. Spotters and short case discussions can be conducted.

Clinico Pathological Conference:

Recommended at regular intervals for all post graduate students. Presentation should be done by rotation. If cases are not available due to lack of clinical postmortems, it could be supplemented by published CPC.

Death review meetings:

Death review meetings should be held regularly once a month for objective discussion on the deaths. It is an important method of reflective learning. It improves patient care and system of service.

Group discussions:

Group discussion is a good method of learning. It can be adopted in problem-based case discussions, decision making and plan for complex situations. It trains the students in leadership skills, analysis of situation and problem-solving approach.

Interdepartmental Meetings/Integrated teaching:

Interdepartmental meetings should be held mainly with pathology, radiodiagnosis, anesthesiology or any other relevant departments at regular intervals. Interesting cases should be discussed and relevance of recent advances can be discussed.

Radiology:

Adequate exposure to conventional radiology and training in modern imaging like Ultrasound, Doppler, CT scan MRI and angiography should be planned and done.

Attitude and Communication skills:

Candidates should be trained in proper communication skills towards interaction and communication with patients, attendees and society in general. There should be appropriate training in obtaining proper written informed consent, discussion and documentation of the proceedings. Structured training in various areas like consent, briefing regarding progress and breaking bad news are essential in developing competencies. Variety of teaching – learning

methods like Role play, video-based training, standardized patient scenarios, reflective learning and assisting the team leader in all these areas will improve the skills. Assessment can be done using OSCE simulated scenarios and narratives or any appropriate means. Training to work as team member, lead the team whenever situation demands is essential. Mock drills to train and assess the readiness are very helpful.

Teaching Skills:

Post graduate students must teach under graduate students (Eg. medical, nursing) by taking demonstrations, bed side clinics, tutorials, lectures etc. Assessment is made using a checklist by surgery faculty as well students. (See model check in Section IV). Record of their participation should be entered in Log book. Training of post graduate students in Educational Science and Technology is recommended.

Guest lecturers:

Guest lecture by eminent personalities, super specialties, administrators and specialists in the concerned field should be arranged regularly.

Continuing Medical Education Programmes & Workshops:

Recommended that at least 2 state level CME programmes and workshops should be attended by each student in 3 years.

Conferences:

Attending conferences is compulsory. One state level conference and one national conference should be attended in 3 years.

Please note:

As per recent MCI guidelines every post graduate is required to present a poster, present oral presentation in national/state conference. He/she is also required to present one research publication which should be published/accepted for publication/sent for publication so as to be eligible for appearing final university examination. The guide is required to guide regarding these presentations.

Rotation and posting in other departments:

The listed knowledge and skills are to be learnt over a period of 3 years. The process is a continuous one. However, the recommended period and timing of training in basic subjects, allied departments and specialty departments is given below. Basic Science Basic science should be an essential part of training. It should be done as concurrent studies during the 1st year of training. At least two hours daily may be in the first six months of the course. In the first year, during the morning session, time is spent in the parent department. In the afternoons basic science teaching relevant to emergency medicine can be done in the respective departments. Topics for study include anatomy, physiology, pathology, microbiology, pharmacology, anesthesia and radiology. Radiology: concurrent study. Adequate exposure to modern imaging modalities like ultrasound, CT, MRI and angiography.

Allied Specialty Training Postings to other specialty departments and duration of postings are as under scheduled in second year.

Department	Duration in weeks
ICCU	2
Cardiology	2
Neurosurgery	1
Neurology	1
Labour room	2
Pediatrics	2
ENT OPD	1
Oph OPD	1
Total	12 weeks

Dissertation:

Every candidate pursuing MD degree course is required to carry out work on a selected research project under the guidance of a recognized post graduate teacher. The results of such work shall be submitted in the form of a dissertation. The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results, and drawing conclusions. Every candidate shall submit to the Registrar (Academic) of the Deemed to be University in the prescribed form, a synopsis containing particulars of proposed dissertation work within six months from the date of commencement of the course, on or before the dates notified by the Deemed to be University. The synopsis shall be sent through proper channel. Such synopsis will be reviewed and the dissertation topic will be registered by the Deemed to be University. No change in the dissertation topic or guide shall be made without prior approval of the Deemed to be University.

The dissertation should be written under the following headings:

1. Introduction
2. Aims or Objectives of study
3. Review of Literature
4. Material and Methods
5. Results
6. Discussion
7. Conclusion
8. Summary
9. References
10. Tables
11. Annexures

The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexures. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27” x 11.69”) and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the Institution. Four copies of dissertation thus prepared shall be submitted to the Registrar (Evaluation), six months before final examination, on or before the dates notified by the Deemed to be University. The dissertation shall be valued by examiners appointed by the Deemed to be University. Approval of dissertation work is an essential precondition for a candidate to appear in the Deemed to be University examination.

G. Monitoring the Learning Progress:

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects.

The learning outcomes to be assessed should include:

1. Personal attitudes,
2. Acquisition of knowledge,
3. Clinical and operative skills,
4. Teaching skills and
5. Dissertation.

1. Personal Attitudes:

The essential items are:

- a) Caring attitudes.
- b) Initiative.
- c) Organizational ability.
- d) Potential to cope with stressful situations and undertake responsibility.
- e) Trust worthiness and reliability.
- f) To understand and communicate intelligibly with patients and others.
- g) To behave in a manner that establishes professional relationships with patients and colleagues.
- h) Ability to work in team.
- i) A critical enquiring approach to the acquisition of knowledge.

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

2. Acquisition of Knowledge:

The methods used comprise of ‘Log Book’ which records participation in various teaching / learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The log book should be periodically validated by the supervisors. Some of the activities are listed.

- a) Journal Review Meeting (Journal Club): The ability to do literature search, in-depth study, presentation skills, and use of audio- visual aids are to be assessed. The assessment is made by faculty members and peers attending the meeting using a checklist
- b) Seminars / Symposia: The topics should be assigned to the student well in advance to facilitate detailed study. The ability to do literature search, in-depth study, presentation skills and use of audio- visual aids are to be assessed using a checklist
- c) Clinico-Pathological conferences: This should be a multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenter(s) are to be assessed using a check list similar to that used for seminar.
- d) Audit: Periodic morbidity and mortality meeting be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.

3. Clinical skills:

- a) Day to Day work: Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates' sincerity and punctuality, analytical ability and communication skills.
- b) Clinical meetings: Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list.
- c) Clinical and Operative skills: The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the log book.

4. Teaching skills:

Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students.

5. Dissertation in the Department:

Periodic presentations are to be made in the department. Initially the topic selected is to be presented before submission to the Deemed to be University for registration, again before finalization for critical evaluation and another before final submission of the completed work.

6. Periodic tests:

The departments may conduct three tests, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practical / clinical and viva voce.

7. Work diary / Log Book:

Every candidate shall maintain a work diary and record his/her participation in the training programs conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate. Log Book: The log book is a record of the important activities of the candidates during his training. Internal assessment should be based on the evaluation of the log book. Collectively, log books are a tool for the evaluation of the training program of the institution by external agencies. The record includes academic activities as well as the presentations and procedures carried out by the candidate.

8. Records:

Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the Deemed to be University or MCI. Procedure for defaulters: Every department should have a committee to review such situations. The defaulting candidate is counselled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination, if she/he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

Recommended books and Journals

Text books:

1. Tintinallis Emergency Medicine- Comprehensive study guide, Judith E .Tintinallis, 9th edition , MC Graw Hill
2. Rosen's Emergency Medicine: Concepts and Clinical Practice ,9th edition, by Ron M. Walls, Robert S. Hockberger, Marianne Gausche-Hill, Katherine Bakes, Jill Marjorie Baren, Timothy B. Erickson, Andy S. Jagoda, Amy H. Kaji, Michael VanRooyen, and Richard D. Zane., Elsevier
3. Robert and Hedge clinical Procedures in Emergency Medicine, Robert S Custalow Thomsen, 6th edition , Elsevier
4. Goldfrank's Toxicologic Emergencies, 11th ed Lewis S. Nelson, Mary Ann Howland, Neal A. Lewin, Silas W. Smith, Lewis R. Goldfrank, Robert S. Hoffman.
5. Atlas of Emergency Medicine, Keith Stone , 8th ed ,Mc Graw Hill
6. Ma and Matters Emergency Ultrasound, 3rd ed , O. John Ma , James R .Mateer, Robert F, Reardon, Scott A . Joing
7. Clinical Application of Mechanical Ventilation 4th ed, David W. Chang
8. Pilbeam's Mechanical Ventilation Physiological and Clinical Applications , 6th Ed, Cairo, J. M.
9. An introduction to electrocardiography 8th ed, by Leo Schamroth
10. Reichman's Emergency Medicine Procedures, 3rd ed , Eric F. Reichman
11. Simon's Emergency Orthopedics, 8th ed Scott C. Sherman
12. Hagberg and Benumof's airway management 4th ed, Carin A Hagberg; Carlos A

Arttime; Michael F Aziz.

13. Irwin and Rippe's Intensive Care Medicine, 7th ed. Richard S. Irwin, M.D., F.C.C.P., and James M. Rippe, M.D. Philadelphia, Lippincott Williams & Wilkins,
14. Marino's The ICU Book, 4th ed Paul L. Marino Published By: Lippincott Williams & Wilkins
15. Rapid Interpretation Of ECG , Dale Dubin, 6th ed
16. Practical Guidelines On Fluid Therapy, Dr sanjay Pandya 2nd ed
17. Current Emergency Diagnosis and Treatment, Keith Stone , Mc Graw Hill 8th ed
18. Textbook of Pediatric Emergency Medicine ,Peter Cameroon, Elsevier 3rd ed
19. Interpretation Of Emergency Head CT, Erskine J Holmes, 2nd ed , Cambridge University Press
20. Washington Manual of Emergency Medicine, Washington, Lippincott Williams and Wilkins 1st ed

Journals

1. The BMJ -Academic edition.
2. American Journal of Emergency Medicine.
3. Journal of Emergencies, Truma and shok.
4. Annals of Emergency Medicine.
5. The New England Journal of Medicine.
6. The Lancet.
7. Indian Journal of Critical care Medicine.
8. Indian Journal of Nephrology.
9. Indian Heart Journal
10. Indian Journal Of Clinical

SECTION - IV

MEDICAL ETHICS & MEDICAL EDUCATION

Sensitization and Practice

Introduction

There is now a shift from the traditional individual patient, doctor relationship, and medical care. With the advances in science and technology and the needs of patient, their families and the community, there is an increased concern with the health of society. There is a shift to greater accountability to the society. Doctors and health professionals are confronted with many ethical problems. It is, therefore necessary to be prepared to deal with these problems. To accomplish the Goal (i), General Objectives (ii) stated in Chapter II (pages 2.1 to 2.3), and develop human values it is urged that **ethical sensitization** be achieved by lectures or discussion on ethical issues, clinical case discussion of cases with an important ethical component and by including ethical aspects in discussion in all case presentations, bedside rounds and academic postgraduate programs.

Course Contents

1. Introduction to Medical Ethics
 - What is Ethics?
 - What are values and norms?
 - Relationship between being ethical and human fulfillment
 - How to form a value system in one's personal and professional life
 - Heteronymous Ethics and Autonomous Ethics
 - Freedom and personal Responsibility
2. Definition of Medical Ethics
 - Difference between medical ethics and bio-ethics
 - Major Principles of Medical Ethics 0
 - Beneficence = fraternity
 - Justice = equality
 - Self-determination (autonomy) = liberty
3. Perspective of Medical Ethics
 - The Hippocratic Oath
 - The Declaration of Helsinki
 - The WHO Declaration of Geneva
 - International code of Medical Ethics (1993)
 - Medical Council of India Code of Ethics
4. Ethics of the Individual
 - The patient as a person
 - The Right to be respected

Truth and confidentiality
The autonomy of decision
The concept of disease, health and healing
The Right to health
Ethics of Behavior modification
The Physician – Patient relationship
Organ donation

5. The Ethics of Human life

What is human life?

Criteria for distinguishing the human and the non-human

Reasons for respecting human life

The beginning of human life

Conception, contraception

Abortion

Prenatal sex-determination

In vitro fertilization (IVF), Artificial Insemination by Husband (AIH)

Artificial Insemination by Donor (AID)

Surrogate motherhood, Semen Intra fallopian Transfer (SIFT),

Gamete Intra fallopian Transfer (GIFT), Zygote Intra fallopian Transfer (ZIFT),

Genetic Engineering

6. The family and society in Medical Ethics

The Ethics of human sexuality

Family Planning perspectives

Prolongation of life

Advanced life directives – The Living Will

Euthanasia

Cancer and Terminal Care

7. Profession Ethics

Code of conduct

Contract and confidentiality

Charging of fees, Fee-splitting

Prescription of drugs

Over-investigating the patient

Low – Cost drugs, vitamins and tonics

Allocation of resources in health cares

Malpractice and Negligence

8. Research Ethics
 - Animal and experimental research / humanness
 - Human experimentation
 - Human volunteer research – Informed Consent
 - Drug trials\
 - ICMR Guidelines for Ethical Conduct of Research – Human and Animal
 - ICH / GCP Guidelines
 - Schedule Y of the Drugs and Cosmetics Act.
9. Ethical work -up of cases
 - Gathering all scientific factors
 - Gathering all human factors
 - Gathering value factors
 - Identifying areas of value – conflict, setting of priorities,
 - Working our criteria towards decisions

Recommended Reading

1. Francis C. M., **Medical Ethics**, 2nd Ed, 2004 Jaypee Brothers, Bangalore/-
2. Ethical guidelines for biomedical research on human participants, ICMR publication 2017
3. Santosh Kumar: the elements of research, writing and editing 1994, Dept of Urology, JIPMER, Pondicherry
4. Srinivas D.K et al, Medical Education Principles and Practice, 1995, National Teacher Training Centre, JIPMER, Pondicherry
5. Indian National Science Academy, Guidelines for care and use of animals in scientific Research, New Delhi, 1994
6. International committee of Medical Journal Editors, Uniform requirements for manuscripts submitted to biomedical journals, N Engl J Med 1991
7. Kirkwood B.R, Essentials of Medical Statistics, 1st Ed., Oxford: Blackwell Scientific Publications 1998
8. Mahajan B.K. Methods in bio statistics for medical students, 5th Ed, New Delhi, Jaypee, Brothers Medical Publishers, 1989
9. Raveendran, B. Gitanjali: A Practical approach to PG dissertation, New Delhi, Jaypee Publications, 1998.
10. John A Dent. Ronald M Harden, A Practical guide for medical teacher, 4th Edition, Churchill Livingstone, 2009.
11. Tejinder Singh Anshu, Principles of Assessment in Medical Education, Jaypee brothers
12. Dr. K.Lakshman, A Hand Book on Patient Safety, RGUHS & Association of Medical Consultants, 2012
13. Bernard Mogs, Communication skills in health & social care, 3rd Edition, (S) SAGE, 2015
14. Manoj Sharma, R. Lingyak Petosa, Measurement and Evaluation for Health Educators, Jones & Bartlett Learning.

1. David E. Kern, Patricia A, Thomas Mark T, Hughes, Curriculum Development for Medical Education. A six-step approach, The Johns Hopkins University press/Baltimore.
2. Tejinder Singh Piyush Gupta Daljit Singh, Principles of Medical Education (Indian Academy of Paediatrics), 4th Edition, Jaypee Brothers, 2013.
3. Robert Reid, Torri Ortiz Linenemann, Jessica L. Hagaman, Strategy, Instruction for Students with learning disabilities, 2nd Edition, The Guilford Press London.
4. Lucinda Becker Pan Demicolo, Teaching in higher education, (S) SAGE, 2013.
5. C.N. Prabhakara, Essential Medical Education (Teachers Training), Mehta publishers.
6. Tejinder Singh Piyush Gupta, Principles of Evaluation & Research for health care programmes, 4th Edition, IAP National Publication House (Jaypee Brothers).
7. R.L.Bijlani, Medical Research, Jaypee Brothers, 2008
8. Stephen Polgar Shane A. Thomas, Introduction to Research in the Health Sciences, Churchill Livingstone Elsevier, 2013.
9. Amar A, Sholapurkar. Publish & Flourish -A practical guide for effective scientific writing, Jaypee Brothers, 2011
10. Charles R.K.Hind, Communication Skills in Medicine, BMJ, 1997.

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH (KAHER)

JAWAHARLAL NEHRU MEDICAL COLLEGE, BELGAUM

DEPARTMENT OF DERMATOLOGY, VENERELOGY AND LEPROSY

FORMAT FOR DESIGNING CURRICULUM FOR FELLOWSHIP PROGRAMME

1. Name of the subject : **Fellowship in Medical Cosmetology**

2. Please describe:

- a. Preamble: Medical cosmetology is upcoming branch of dermatology, this course aims to empower professionals with necessary skills and knowledge in this domain.
- b. Goals: To formally train dermatologists in the field of Medical Cosmetology
- c. Duration: 12 months
- d. Statement of objectives of the course

- Knowledge: The students should acquire knowledge as regards to various cosmetological procedures and be aware of the recent trends in the field.
- Skills and Attitudes : The students will have to acquire basic and advanced skills of performing cosmetological procedures like Lasers, injectables, chemical peels.
- Communication abilities: Counselling the patients before the procedures and after the procedures

e. Course Contents (Syllabus) - attached

- Essential Knowledge:
- Essential Investigation and diagnostic procedures
- Procedural and Operative Skills

* Graded responsibility in care of patients and operative work (Structured Training Schedule) for Fellowship

+ Key

O:- **Washes** up and observes

A:- Assisted a more senior Surgeon

PA:-Performed procedure under the direct supervision of a senior specialist

PI:- Performed independently

f. Teaching / Learning Activities: The student should participate in Seminars, Journal club, Workshops, Demonstrations and Continued Medical Education programmes.

g. (1). Participation in departmental activities:

1. Journal review meetings – 2 per month
2. Seminars – 2 per month
3. Clinico Pathological Conferences – one per month
4. Inter Departmental Meetings – one per month
5. Community Work – Camps / field visits – one per month
6. Clinical rounds - NA
7. Participation in Conferences / presentation of papers – 2 per year
8. Any other

(2). Rotation and Posting in other departments (Duration and Learning requirements to be specified for a, b, & c):

1. Basic Medical Sciences related subjects – general surgery 1week
2. Applied Subjects – Plastic surgery 3 weeks

(3). Orientation Programme:

Eg. (a) Use of Library – on day to day basis

(b) Laboratory Procedures - on day to day basis

(c) National Programmes – NLEP, observing programs like vitiligo day, Psoriasis Day

(d) Any other

(4). Training in Teaching Skills and Research Methodology:

Hands-on training will be given to perform medical cosmetology procedures during the course of the study. The candidates will also be encouraged to conduct clinical research in the field of medical cosmetology and encouraged to publish papers.

h. Monitoring of Teaching / Learning activities:

(a) Methods – Written tests and Viva

(b) Frequency – Quarterly

(c) Schedules or Checklists, log books, dairy – will be checked weekly

i. Scheme of Examination:

Kindly Note that: One Publication/Poster/Paper Presentation in the topic of medical Cosmetology at Local/ State/ National Level is mandatory to appear Theory exam.

1. Theory : Two papers of 100 marks each

Content : 10 marks 10 questions each paper.

Paper-1 : Basic principles in cosmetology

Paper-2 : a) Approach to cosmetology problems in dermatology
b) surgical procedures in cosmetology
c) recent advances aesthetics

2. Clinical : Number & Type of cases: One long case and two short cases (50, 25 and 25 Marks each)

3. Viva-Voce : **50 marks** – Distribution

a) Instruments viva- 25marks b) OSCE -25marks

h. Recommended Books and Journals: attached

Signature of the
Programme Co-ordinator

Signature of the
Head of the Institution

Place:

Date :

**DURATION OF TEACHING IN HOURS PRESCRIBED FOR FELLOWSHIP
PROGRAM IN MEDICAL COSMETOLOGY**

SYLLABUS (CURRICULUM)

Syllabus (curriculum) basic principles of cosmetology

- | | |
|--|---------|
| 1. Introduction to Cosmetology | - 2hrs |
| 2. Documentation | - 2hrs |
| 3. Principles governing Cosmetological procedures | - 6hrs |
| 4. Subspecialties of Cosmetology (Protective, Decorative and Remedial or Active Cosmetology) | -10hrs |
| 5. Dermatological disorders coming under the purview of cosmetology | - 20hrs |
| 6. Cosmeceuticals | - 5hrs |
| 7. Instruments, Equipments and Universal precautions | - 5hrs |

8. Adverse reactions to cosmetics 5hrs	-
9. Professional ethics 2hrs	-
10. Moisturizers	- 3hrs
11. Personal care and Cosmetic products	- 3hrs
12. Household cosmetics	- 3hrs
13. Facials	- 3hrs
14. Cosmetic care and counselling for normal and problematic skin	- 3hrs
15. Nonsurgical hair replacement	- 3hrs
16. Cosmetic camouflage	- 3hrs
17. Adverse reactions in cosmetology	- 6hrs
18. Common cosmetic techniques in beauty parlours	- 6hrs

Approach to cosmetic problems in dermatology

1. Acne and it's scars	-10hrs
2. Diffuse non-scarring alopecia	- 4hrs
3. Androgenic alopecia	- 6hrs
4. Hirsutism	- 6hrs
5. Dandruff	- 6hrs
6. Pigmentary disorders	-15hrs
7. Palmo-planter keratoderma	- 4hrs
8. Cosmetic problems of nails	- 6hrs
9. Hyperhidrosis/Bromhidrosis/Chromhidrosis	- 4hrs
10. Aging skin problems	- 6hrs

Surgical procedures in cosmetology

1. Surgery for active acne	- 6hrs
2. Electroepilation	- 4hrs
3. Mole surgery	- 2hrs
4. Ear and Nose piercing	- 3hrs
5. Ear lobe repair	- 3hrs
6. Decorative Cosmetic tattooing	- 3hrs
7. Iontophoresis	- 2hrs
8. Electric Stimulation of skin (ESS)	- 2hrs
9. Non ablative radio frequency	- 2hrs
10. Non ablative lasers	
11. Botulnum toxin and filler injections	- 5hrs
12. Microblading	-1 hr

Total 200 hrs

LIST OF RECOMMENDED BOOKS FOR MEDICAL COSMETOLOGY FELLOWSHIP

1. ACS (I) Textbook of Cutaneous and Aesthetic surgery, Jaypee Publications, New Delhi, 2017
2. Acs(I) Procedural Dermatosurgery A Step By Step Approach Jaypee Publications, New Delhi, 2016
3. Textbook Of Dermatosurgery & Cosmetology Principles and Practice Dr Satish Savant
4. Textbook Of Laser And Light Dermatology In The Asian by Yong-Kwang Tay (Editor), Yuin-Chew Chan (Editor)
5. Textbook of Cosmetic Dermatology, Fourth Edition, Robert Baran

LIST OF RECOMMENDED JOURNALS FOR MEDICAL COSMETOLOGY FELLOWSHIP

1. Journal of cutaneous and aesthetic surgery
2. Lasers in Surgery and Medicine
3. Clinical, Cosmetic and Investigational Dermatology
4. Lasers in Medical Science
5. Journal of Cosmetic Dermatology
6. Journal of Clinical and Aesthetic Dermatology
7. International Journal of Cosmetic Science
8. Journal of Cosmetic and Laser Therapy
9. International Journal of Trichology
10. Journal of Cosmetic Science
11. Surgical and Cosmetic Dermatology

List of Books cosmetic Dermatology :

SL No	Name	Edition	Editor	Publication	Year
1	Cutaneous & Aesthetic Surgery	2nd	Mysore Venkataram	Jaypee Brothers Medical	2017
2	Treatment Of Dry Skin Syndrome		Marie Loden - Maibach	Springer	2013
3	The Manual Of Dermatology		Cafardi	Springer	2013
4	Evidence -Based Procedural Dermatology		Alam	Springer	2013
5	Rook's Textbook of Dermatology	8th	Tony Burns, Stephen	Wiley-Blackwell	2010
6	Interesting cases in Dermatology			IJCP Academy of CME	2014

7	Concise Textbook of Dermatology	1st	Vishalakshi Viswanath	Wiley-Blackwell	2012
8	Modern Cosmetic Dermatology	1st	Prof Chakarvathi Srinivas	Prof Chakarvathi Srinivas	2015
9	Cosmetic Dermatology	2nd		Tata Mcgraw-Hill	2009
10	Dermatologic Surgery with Radiofrequency		Bipin Deshpande	Taylor & Francis	2018
11	100 Interesting cases in Dermatology		Dr.Koushik Lahiri	IJCP Academy of CME	2009
12	European Handbook of Dermatological Treatments	2nd	A.D.Katsambas & T.M.Lotti	Springer	2005
13	Dermatology in General Medicine	7th	Dr.Stephen Katz's	Fitzpatrick's	2008
14	IADVL Textbook of Dermatology	4th	S.Sacchidanad	Bhalani	2015
15	Contact Dermatitis 6		Margaret Holmes	CBS	2008
16	Year Book of Dermatology & Dermatologic Surgery		Bruce.H	Mosby	2005
17	Advances In Dermatology		William D. James	Mosby	2004
18	Dermatosurgery Cosmetology	2nd	Satis s Savant	ASCAD	2005
19	Infections in Dermatology		Archana Singal & Chander Grover	Jaypee Brothers Medical	2015
20	Cosmetic Dermatology & Surgery	1st	Niti Khunger & Mukta Sachdev	Mehta	2010
21	Cosmetic Dermatology		Dirk M Elston	Elesvier	2009
22	IADVL Book on Medical Ethics & CPA	1st	Putta Srinivas	IADVL	2007
23	History of the IADVL		Uday Khopkar	IADVL	2010
24	The Sanford Guide to Antimicrobial Therapy	36th	David n.Gilbert	B.I	2006
25	Signs & syndromes In Dermatology	1st	Laxman Mavrkar And Inamadar	Fulford	1996
26	Color Atlas of Nails		Antonella Tosti	Springer	2010
27	Dermatology-The year in Review 2002		Giles Dunnill, Jane McGregor	Current Technical Literature	2002
28	Atlas & Synopsis of Contact &	1st	Sanjay Ghose	Jaypee Brothers	2008

	Occupational Dermatology			Medical	
29	Laser and Light	1st	David J Goldberg	Elesvier	2006
30	Color Atlas of Allergic Diseases	International	M. Roecken, G. Grevers, W. Burgdorf	Georg Thieme Verlag	2006
31	Monthly Index of Medical Specialities		Dr. Chandra M. Gulhati	Dr. Chandra M. Gulhati	2010
32	Dermatologic Therapy- Wound Healing	#1	Michael D. Tharp	Blackwell	2007
33	Dermatologic Therapy-Diagnosis & Treatment Of	#2	Michael D. Tharp	Blackwell	2007
34	Study of Clinical Cosmetology-1	1st	Sonia Tekchandani	Jaypee Brothers Medical	2015
35	Cutaneous Laser Therapy		Niwat Polnikorn	Holistic	2000
36	Cutaneous & Aesthetic Surgery	1st	Mysore Venkataram	Jaypee Brothers Medical	
37	Treatment Of Skin Disease	3rd	Mark G Lebwohi, Warren R Heymann	Elesvier	
38	Infections of the Skin		Raza Aly & Howard I.Maibach	Churchill Livingstone	
39	Complication in Cosmetic Dermatology Crafting cures	1st	Ganesh s Pai	Jaypee Brothers Medical	
40	Sclerotherapy in Dermatology	1st	Sacchindanand s /Nagesh TS	Jaypee Brothers Medical	
41	Ferri's Fast Facts in Dermatology		Fred F Ferri	Elesvier	
42	IADVL Textbook of Trichology	1st	BS Chandrashekar	Jaypee Brothers Medical	
43	IADVL Textbook of Dermatology	4th	S.Sacchidanad	Bhalani	
44	Skin Clinical Dermatology	1st	Nilendu Sarma	Jaypee Brothers Medical	
45	Clinical Guideline alopecia		Dirk M Elston/elizabeth cw Hughes		
46	Sensitive Skin Syndrome	2nd	Golara Honari/Rosa M. Andersen	Taylor & Francis	
47	A Treatise on Topical Corticosteroids in Dermatology		Koushik Lahiri	Springer	
48	Atlas of Pigmentary		Thierry Passeron	Springer	

	Disorders			
49	Textbook and Atlas of Dermatology		Michael Tirant	Kothari
50	Medico-Legal Aspects of Dermatology & Plastic Surgery	1st	Venkataram/Satish Bhat/Subodh	Jaypee Brothers Medical
51	Hand Book of Eczema for Dermatologists	2nd	Kabir Sardana	CBS
52	Tattoo-The Invaluable Compendium for dermatologists		Shashikumar BM/Savitha AS/	Jaypee Brothers Medical
53	Textbook of Dermatosurgery & Cosmetology	2nd	Satis s Savant	Association of Science
54	Clinical Dermatology	8th	Kluas Wolff/Richard Allen Johnson	McGraw Hill Education
55	Laser in Dermatology and Medicine	2nd	Keyvan Nouri	Springer
56	Dermoscopy & Trichoscopy in Diseases Of the Brown Skin	1st	Uday Khopkar	Jaypee Brothers Medical
57	IADVL Handbook for Dermatology Residents		Uday Khopkar	IADVL by Medknow
58	Hair Loss and Restoration	2nd	Jerry Shapiro/Nina Otberg	Taylor & Francis
59	Dermoscopy of the Hair and Nails	2nd	Antonella Tosti	Taylor & Francis
60	Chemical Peels	2nd	Niti Khunger	Jaypee Brothers Medical
61	Acne Scars-Classification & Treatment	2nd	Antonella Tosti/Maria Pia De Padova	Taylor & Francis
62	Manual Dermatologic Therapeutics	7th	Kenneth A.Arndt/Jeffrey T.S. Hsu	Lippincott Williams & Wilkins
63	Nail & Its Disorders	1st	S Sacchidanada/Savitha A S	Jaypee Brothers Medical
64	Guidelines for Dermatosurgery		D.M Thappa	Medknow
65	Fundamentals of Pathology of Skin	3rd	Venkataram Mysore	B.I
66	Clinical Pediatric Dermatology		Thappa	Elesvier
67	Psoriasis and other Common	1st	Miniatlas	Jaypee Brothers

	Dermatoses			Medical
68	Signs & Syndromes in Dermatology	1st	Arun Inamada/Laxman Mavarkar	Ahuja
69	Patch Testing		Sanjay Ghosh	IAISD
70	Dermato-Venereo-Leprology	1st	K. Pavithran	V
71	Diseases of The Skin Clinical Dermatology	10th	William D. James/Timothy G Berger	Elesvier
72	Handbook of Dermatology Drug Therapy		S.Sacchidanad/Savitha A S	Tree Life Media
73	Dermatology Secrets In Color	3rd	James E. Fitzpatrick/Joseph G .Morelli	Elesvier
74	Perspectives in Clinical Dermatology Photodermatology		S.Criton	
75	Perspectives in Clinical Dermatology Systemic		Sandipan Dhar	
76	Dermatology	3rd	Samuel L.Moschella/Harry J. Hurley	W.B.Saunders Company
77	Skininspection Bangalore Dermatology Society		Anil Abraham	

• FUNCTIONAL LIMITATION:

Need to work upon the follow,

- i. Need dedicated & trained faculty with certificate course in laser aesthetics
- ii. Need clarity on venue & time to conduct training of fellows
- iii. Upgradation of Q-switched & NdYAG lasers to active laser for laser toning
- iv. Need for Diode laser for hair reduction
- v. Need for Cryogun + Cryocan,
- vi. Microblading with dye's
- vii. Cost of consumables, like botulinum toxin, fillers, threads, peels, etc.

EQUIPMENT LIST FOR FELLOWSHIP IN MEDICAL COSMETOLOGY

Therapeutic equipments

Sl no	Type of equipment	Details	Equipment availability in the department
1	Phototherapy	1. Full body UVB chamber	✓
		2. Hand and foot UVB & UVA unit	✗
		3. Targeted phototherapy	✗
		4. Excimer LAMP	✓
2	Lasers	1. Intense Pulse light - 4 hand pieces	1 hand pieces
		2. High intensity Focused	✗

		Ultrasound	
		3. Diode Laser	✓
		4. Q S NdYAG laser	✓
		5. Fractional CO2	✓
		6. Microneedling Radiofrequency	✓
		7. Long pulse Nd-yag laser	✓
3	Chemical Peels	1. Glycolic acid 30 and 50%	✓
		2. Salicylic acid 30%	✓
		3. Sesglico peel KH	✓
		4. Jessners peel 1	x
		5. Modified Jessners peel	x
		6. Mandelic peel	✓
		7. lactic acid peel	x
		8. Melaspeel KH	x
		9. Retinol peel/Yellow Peel	✓
		10. Nomelan phenol peel	x
		11. Ferulic peel	✓
4	Dermaroller		✓
5	Platelet rich plasma therapy	1. Vacutainers	✓
		2. Centrifuge	✓
		3. PRP kits	✓
6	Electro cautery	2 units	1 units
7.	Radiosurgery	2 units	1 units
8	Cryotherapy	Cryogun and liquid nitrogen Cryocan	✓
10	Surgical instruments	1. Towel Clips, Hole towels	✓
		2. BP handles	✓
		3. Forceps- Adsons, toothed & Non toothed, jewellers	✓
		4. Artery forceps, Strait & curved, mosquito, all sizes	✓
		5. Scissors – Iris, curved, strait, suture cutting, Castroviejo's, all sizes	✓
		6. Needle holders- all sizes	✓
		7. Skin graft blades	

		8. Skin hooks	✓
		9. Chalazion clamps	✓
		10. Cheatle forceps	✓
		11. Curettes	✓
		12. Manual dermabraders	✓
		13. Comedone extractors	✓
		14. Diamond fraize dermabraders	✓
11	Nail Surgery	1. Nail spatula	✓
		2. Nail plate cutter	✓
12	Skin Biopsy	Skin Biopsy punches	✓
13	Vitiligo Surgery	Epidermal cell suspension-reagents, incubator Motorized dermabraders with various burrs	x ✓
14		Bins – all sizes Trays – all sizes	✓

LIST OF EQUIPMENT FOR FELLOWSHIP IN MEDICAL COSMETOLOGY

Diagnostic Equipment's

Sl no	Type of equipment	Equipments availability in the department
1	Light Microscope	✓
2	Woods lamp	✓
3	Trichoscope	x
4	Dermatoscope- polarised and non polarised	✓
5	USB microscope	x

6	Magnifier	✓
7	KOH mount	✓
8.	Slides, cover slips	✓

Ordinance Governing Fellowship in Pediatric Hematology and Oncology Syllabus/Curriculum 2023-24



Accredited '**A+**' Grade by **NAAC** (3rd Cycle)
Placed in '**A**' Category by MoE (GoI)

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)]

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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...

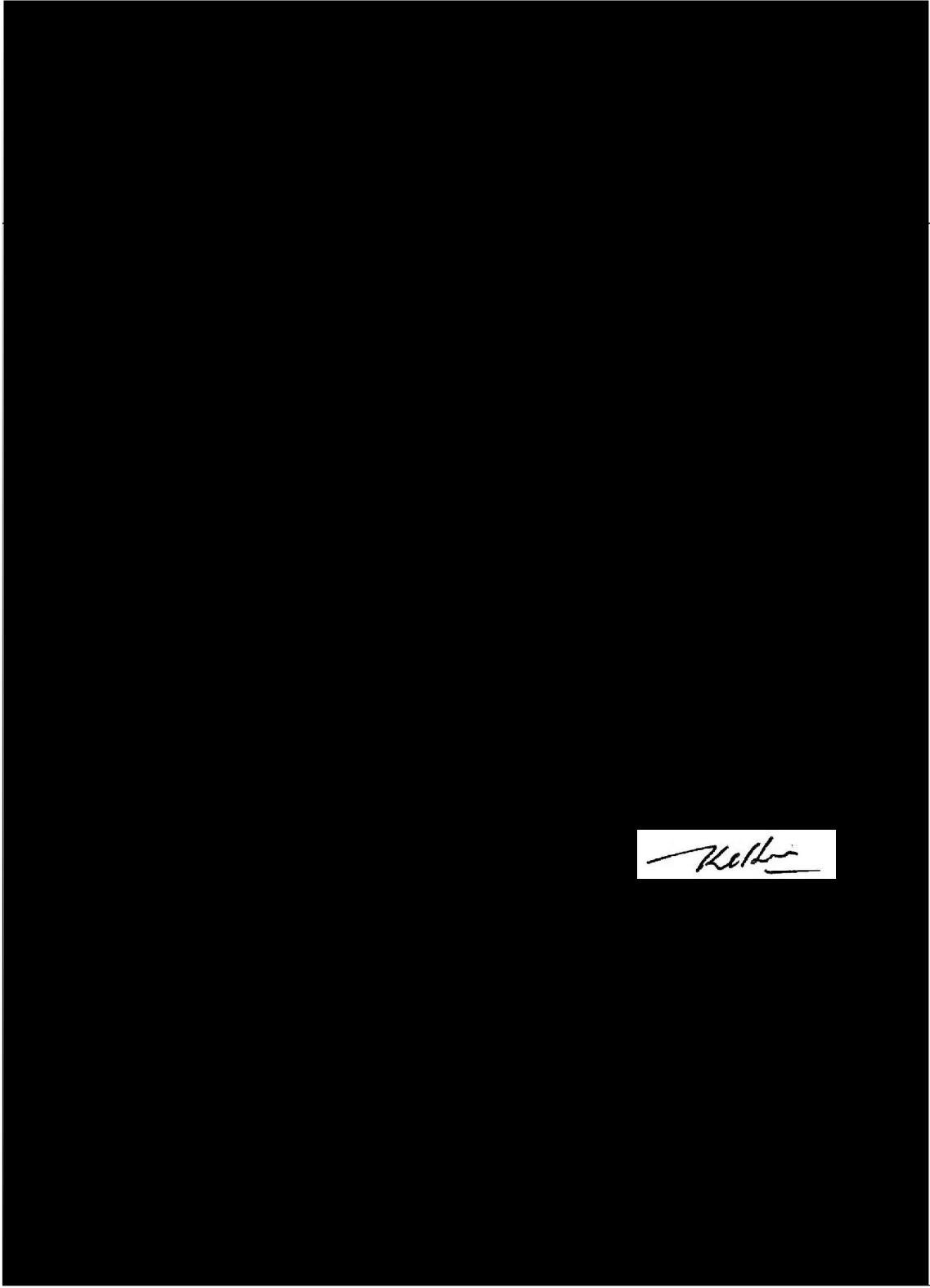
The Seven Stars signify the 'Saptarishi Dnyanamandal', the Great Bear-a constellation made of Seven Stars in the sky, each signifying a particular Domain. Our culture says: The true objective of human birth is to master these Knowledge Domains.

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 forthcoming generations.



Kelley

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III		

1. PREAMBLE

The field of pediatrics is rapidly expanding. With increase in knowledge and concomitant increase in investigative modalities and therapeutic avenues, specialization has become necessary to maintain excellence in health care. To meet the demands of our vast population we have an urgent need for subspecialty training.

Our country is now on the threshold of better basic pediatric care and improving child health, so now gradually the focus is shifting on chronic and rare diseases. Pediatric hematology – oncology is an upcoming field. There has been great development in this field in the western countries with better modes of investigations, risk stratification, supportive care and definitive therapies; so that children with cancer have survival rates approximately 70-80%. We are lagging far behind the developed countries. We need to develop in all fields of hematology and oncology and developing the manpower in this subspecialty is the keystone of this project.

Pediatric Hematology–Oncology has developed in selected pockets of larger cities. Some large centre also offers training opportunities, but these need to increase in number tremendously and in widespread centers so that access to such programs is better.

We invite you to join us in this exciting journey and to support the future leaders in pediatric hematology oncology. We look forward to seeing the positive impact that this program will have on the field and on the children and families we serve.

We are thrilled to officially launch our Pediatric Hematology Oncology Fellowship Training Program, which will provide comprehensive and in-depth training in the diagnosis, treatment, and management of pediatric cancer and blood disorders. Our program is designed to equip fellows with the skills, knowledge, and experience needed to become leaders in this critical field of medicine. The program will be led by an experienced pediatric hematologist and oncologist who will provide mentorship, guidance, and support to the fellows. The training curriculum will include a combination of didactic instruction, hands-on experience in the clinic and procedures, and opportunities for research and academic growth.

Fellows will receive training in the latest treatments and technologies, as well as in the compassionate care of children and families affected by cancer and blood disorders. They will also have the opportunity to participate in research projects, which will further enhance their understanding of this complex and challenging field.

We believe that our Pediatric Hematology Oncology Fellowship Training Program will provide a one-of-a-kind experience for those seeking to specialize in this area of medicine. Our goal is to support and encourage our fellows as they pursue their professional aspirations, and we are committed to making a positive impact in the lives of children and families affected by cancer and blood disorders.

2. OBJECTIVES OF THE FELLOWSHIP PROGRAM

The training should impart sound understanding of Pediatric Hematology and Oncology so that trainee achieves following competencies.

- Proficiency in the clinical diagnosis and medical treatment of a wide variety of pediatric hematology conditions and cancers
- Proficiency in the selection, performance, and evaluation of investigations and procedures necessary for the assessment and management of pediatric hematological and malignant conditions.
- Developing a comprehensive knowledge of the pathophysiology, clinical presentations and diagnosis of pediatric hematology and cancers through self-study and formal course work, lectures and seminars offered as part of the training program
- Proficiency in preparing management plan for acute and chronic pediatric hematological and malignant conditions Acquiring effective teaching and communication skills

Learning Outcomes:

- A) Demonstrates proficiency in providing comprehensive care to a wide variety of acute and chronic pediatric hematological and malignant conditions
 - B) Demonstrates tertiary level specialist skills to diagnose and plan a comprehensive care plan for common and rare pediatric hematological conditions like hemoglobinopathies, bleeding disorders, bone marrow failure syndromes, etc
 - C) Demonstrates an in depth understanding of diagnosing and staging various pediatric cancers, ability to plan an appropriate protocol for its management and understand acute and late toxicities of therapy.
 - D) Demonstrates effective and empathetic communication skills for counseling families, garnering all round support for children with cancers and their families.
3. **Eligibility for Admission:** Pediatrician holding MCI recognized MD or DNB degree in Pediatrics.

4. **Duration of the course:** 1.5 years from the date of joining the course
5. **Medium of instruction:** English
6. **Attendance:** 80% (minimum)
7. **Number of candidates:** One per year
8. **Course design and contents**

There are 14 key competencies in Hematology and Oncology, derived from the Syllabus, which all sub-specialty trainees will achieve. Each is divided into three levels. All trainees must achieve Level 3 for each key competency.

It is an interdisciplinary program involving mentors in the Department of Radiation Oncology, as well as in the Departments of Pathology, (Hematology and histopathology), transfusion medicine.

Twelve months of training is devoted to intensive clinical training in the outpatient department, inpatient ward, pathology department, transfusion medicine department at the KAHER'S JNMC.

The busy inpatient ward forms a referral base for children with hematological disorders like hemoglobinopathy, bleeding disorders, etc. We also get an opportunity to look into and manage hematological issues in the inpatient like nutritional deficiencies, bleeding and clotting.

Children with malignancies like acute leukemia, solid tumor like neuroblastoma, Wilm's tumor, germ cell tumors are admitted in a separate section of the ward. These children are managed according to the established international protocols. The fellows will be required to participate in rounds, discussions, treatment planning and counseling sessions. They will be rotated in the hematology and histopathology laboratory for a better insight into the laboratory work.

This will equip them with better understanding of laboratory procedures and interpretation of reports. The log book of all the cases seen will be maintained. The program will include, but is not limited to training in basic concepts of hematology, oncology infectious diseases, pharmacology of chemotherapeutic drugs and intensive care management of patients.

The fellows will participate in the teaching programs (case presentations, seminar, and journal club) radiology/nuclear medicine meetings and pathology/mortality/research project presentation, tumour board meetings, etc

During clinical training, the fellow is expected to develop an understanding of the etiologies, pathogenesis, management, treatment and prevention of the following:

- Basic biology and pathology of pediatric hematology and oncology diseases
- Diagnosis and interpretations of clinical symptomatology
- Laboratory procedures and interpretations of reports.
- Various newer modalities of diagnosis, staging and managing these children.
- Chronic ongoing care of children with chronic disorders like hemoglobinopathies.
- Get familiar with protocols of managing pediatric cancer like acute leukemia, Wilm's, neuroblastoma, etc.
- Hands on management of hematology and oncological emergencies like acute bleeding thrombosis, febrile neutropenia, tumour lysis, etc.
- Holistic quality of life issues in pediatric hematology and oncology, providing palliative care in children with end stage diseases.

Curriculum:

Hematology

- a. Neonatal Hematology:** this will deal with neonatal red blood cell disorders, immune hemolytic disorders and developmental hemostasis and its relevance to new born bleeding and clotting disorders.
- b. Bone marrow failure syndromes:** this will include the anatomy and physiology of hematopoiesis, acquired aplastic anemia's pure red cells aplasia, inherited bone marrow failure syndromes.

- c. **Disorders of RBC production:** Diagnosis and approach to patient with anemia, megaloblastic anemia and iron deficiency anemia and sideroblastic anemia.
- d. **Hemolytic anemia's:** This includes hemoglobinopathies like the thalassemias and sickle cell diseases, autoimmune hemolytic anemia, RBC membrane disorders and enzymopathies like G6PD and pyruvate kinase deficiencies.
- e. **Primary immunodeficiency Diseases (PID):** T cells, B cells deficiencies, severe combined immune deficiency and disorders of phagocytic system.
- f. **Hemostasis:** This will include physiology of hemostasis, clinical and laboratory approach to the patient with bleeding, bleeding related to acquired and inherited platelet disorder, bleeding due to inherited coagulation factor deficiencies e.g. hemophilia. This will also includes acquired and congenital disorders of thrombosis.
- g. **Supportive therapy:** This includes transfusion medicine and principles of blood component therapy. It will also deal with treatment of infectious disorders.
- h. **Bone marrow transplantation (BMT):** Introduction and principles of BMT in hematology, oncology and PID.

Oncology

- a. **Biological basis of childhood cancer:** This includes epidemiology, heredity, molecular, genetic and immunological basis of cancer in children.
- b. **Diagnosis and evaluation of childhood cancers:** This includes clinical assessment and approach to pediatric cancer. This will also includes the use of pathology and imaging studies in evaluation of pediatric cancers.
- c. **Principles of multimodal therapy:** This will includes use of chemotherapy, surgery and radiation therapy in treatment of pediatric cancer. This will also includes newer concepts like molecularly targeted therapies, use of BMT and finally palliative treatment.

d. Management of common cancers of childhood :

1. Acute leukemias – Lymphoblastic and myeloid leukemias
2. Chronic leukemias
3. Myeloproliferative and myelodysplastic disorders
4. Lymphomas, Hodgkin's and Non-Hodgkin's lymphomas
5. The histiocytoses
6. Tumors of the central nervous systems
7. Retinoblastoma
8. Tumors of the liver
9. Renal tumors
10. Neuroblastoma
11. Rhabdomyosarcoma and the undifferentiated sarcoma
12. Ewing sarcoma family of tumors
13. Osteosarcoma
14. Germ cell tumors
15. Infrequent cancers

e. Supportive care of children with cancers

1. Oncologic emergencies
2. Hematologic supportive care
3. Infectious complications
4. Nutritional supportive care
5. Nursing support of the child with cancer
6. Rehabilitation of the child with cancer
7. Psychological support of the child and his family with cancer.

8. Ethical issues in pediatric cancers

f. Late effects of childhood cancer and treatment

CLINICAL SKILLS

Learn all relevant procedures like

- Bone marrow aspiration and biopsy,
- Lumbar puncture,
- Intrathecal administration of chemotherapy drugs,
- PICC line insertion,
- Handling and care of chemoport

ASSESSMENT OF KEY COMPETENCIES AND SKILLS

Hematology

1. Neonatal Hematology

Level 1 _

- a. Understanding the physiology of Neonatal hematology

Level 2 _

- a. Interpretation of clinical and routine hematology investigation

Level 3 _

- a. To plan an appropriate management strategy accordingly

2. Bone marrow failure syndromes

Level 1 _

- 3.** Anatomy and physiology of normal hematopoiesis

Level 2 _

- a. Appropriate interpretation of clinical and lab investigations

Level 3 _

- a. Planning proper strategy of further investigations and management of the disorders
- b. Getting well versed with acquired and inherited bone marrow failure syndromes

3. Approach to a child with anemia

Level 1 _

- a. Basics of erythrocyte production
- b. Understanding Iron, B₁₂, Folic acid, metabolism

Level 2 _

- a. Diagnostic approach to a child with deficiency anemia
 - i. Evaluation
 - ii. Investigations

Level 3 _

- a. Planning an appropriate strategy to diagnose the cause of anemia
- b. Adequate management of iron deficiency, B₁₂ and folic acid deficiency anemia

4. Hemolytic anemia's

Level 1 _

- a. Basic physiology and pathology of abnormal RBC destruction

Level 2_

- a. Interpretation of clinical and routine hematological laboratory parameters
- b. Getting well versed with diagnosis of
 - 1. Auto immune hemolytic anemia
 - 2. Red cell membrane disorders
 - 3. Enzymopathies like G6PD deficiency, Pyruvate kinase deficiency ect.
- c. Learning to see peripheral smears and bone marrow aspiration slides

Level 3 _

- a. Planning appropriate short term and long term management strategy of hemolytic anemia's
- b. Learning to counsel parents of children's with chronic hemolytic anemia's

5. Hemoglobinopathies

Level 1_

- a. Physiology & development of the hemoglobin molecule
- b. Pathology of thalassemia of syndromes
- c. Pathology of sickle cell diseases

Level 2_

- a. Clinical presentation of the hemoglobinopathies
- b. Interpretation of common lab parameters of hemoglobinopathies

Level 3_

- a. Comprehensive multidisciplinary long term management of children with thalassemia syndromes and sickle cell diseases.

6. Hemostasis

Level 1 _

- a. Basic physiology of bleeding, clotting, fibrinolysis and platelet function,
- b. Understanding the laboratory investigations for bleeding and clotting disorders
- c. Pathophysiology of thrombotic disorders

Level 2_

- a. Clinical presentation of children with bleeding and clotting disorder
- b. Adequate interpretation and identification of the laboratory parameters of children with bleeding and clotting disorder.

Level 3_

- a. Comprehensive multi disciplinary management of children with Hemophilia, Thrombosis, acquired and congenital platelet defects, fibrinolytic disorders

7. Immune systems

Level 1 _

- a. Basics anatomy and physiology of immune systems

Level 2 _

- a. Understanding clinical presentation and simple laboratory investigation of children with primary immune deficiency.

Level 3 _

- a. Comprehensive management of common primary immune deficiency.

8. Transfusion medicine:

Level 1 _

- a. Understanding the basic physiology of the various blood components like. Packed RBC's Platelets, Fresh frozen plasma, etc.

Level 2 _

- a. Visit to the transfusion medicine department in the hospital and understanding the practical aspects of collection, making and storing of the various blood components

Level 3 _

Managing day to day issues and complications of blood component administration in the pediatric ward.

Oncology

1. Biological basis of childhood cancer

Level 1 _

- a. Understand the epidemiology and biology of childhood cancer

Level 2 _

- a. Molecular and genetic basis of childhood cancers

Level 3_

- a. Molecular and genetic basis of the individual cancers in detail and understanding its clinical implications

2. Diagnosis and evaluation of the child with cancer

Level 1 _

- a. Varied clinical presentations of individual cancers in children including leukemia, lymphoma and other solid tumors.

Level 2 _

- a. Understanding the relevant lab workup like light microscopy, histopathology, flow cytometry, immunohistochemistry etc.
- b. Radiological diagnosis using various modalities like x rays, USG, CT scan, MRI and PET CT.

Level 3 _

- a. Comprehensive understanding of the diagnostics of each individual childhood cancer using varied modalities.
- b. Understanding the work up and for diagnostic, staging and routine workup for the eligibility for giving chemotherapy

3. Principles of multimodal therapy

Level 1 _

- a. General principles of chemotherapy

- b. Pharmacology of the chemotherapeutic drugs
- c. Principles of surgery
- d. Principles of radiation oncology

Level 2 _

- a. Understanding newer modalities in cancer therapy like, molecularly targeted therapy, principles of pharmacogenomics, biotherapeutics, cell and gene therapies and hematopoietic transplantation.

Level 3 _

- a. Understanding integrated therapies for individual cancers
- b. Cancer clinical trial design and analysis and understanding individual protocols

4. Common cancers of the childhood

- Acute leukemia
- Myeloproliferative disorder
- Hodgkin and Non Hodgkin lymphoma
- Histiocytosis
- Tumours of the CNS
- Neuroblastoma
- Renal tumours
- Rhabdomyosarcoma and other soft tissue sarcoma
- Ewings sarcoma family of tumours
- Osteosarcoma
- Germ cell tumour
- Other rare and miscellaneous tumours

Level 1 _

- a. Common clinical presentation of each of the cancers
- b. Epidemiology of each of the cancers
- c. Molecular and genetic basis of each of the cancers

Level 2_

- a. Diagnostics like pathology, immunohistochemistry, molecular diagnosis, radiology to be used for each individual tumour.
- b. Using the above modalities for diagnosis, staging and risk stratification.

Level 3 _

- a. Comprehensive management using multimodal treatment strategies like chemotherapy, surgery and radiation for individual cancer.
- b. Counseling of parents at various stages of cancer and supportive care of children with cancer

5. Supportive care of children with cancer

Level 1 _

- a. Understanding basic pathophysiology of oncologic emergencies, infection, transfusion, support and principles of nutrition

Level 2 _

- a. Identifying the need for supportive care at various stages in each of individual cancer at appropriate time point.

Level 3 _

- a. Principle of management of supportive care like
 - 1) Oncologic emergencies
 - 2) Transfusion and growth factor support

- 3) Infectious complications
- 4) Nutritional support
- 5) Nursing care
- 6) Long term IV access
- 7) Psychosocial and ethical issues
- 8) End of life support of the child and family

6. Management of other issues arising at diagnosis and at cessation of therapy

Level 1 _

- a. Late effects of cancer
- b. Rehabilitation of cancer

Level 2 _

- a. Palliative care of child with advanced cancer

Level 3 _

- a. Financial issues in pediatric cancer
- b. Advocacy and organizing awarenessfor pediatric oncology

TEACHING LEARNING ACTIVITIES

Learning will be self – directed and will take place as continuous process but in addition the following formal sessions are recommended

Academic Session

In addition to attending all the academic sessions the candidate needs to make a minimum number of presentations in these academic sessions during the training period of 1year

	Frequency	Minimum number of presentations
Seminars/Symposia	1 per month	5
Journal club	1 per month	5
Clinical case conference	1 per month	3
Bedside Presentation	1 per month	5
Interdepartmental meeting with Pathology/Radiation Oncology/Onco-surgery/Transfusion medicine	Once in 2months	
Grand Rounds	1 per week	
Mortality meeting and audit meeting	Once in 2 months	
Record meetings	Once in 2weeks	

The candidate should do atleast one research project during the training

Conference, CME'S and workshops :

During the 1year training period he/she should attend atleast

- One STATE/NATIONAL conference
- One CME programme
- Should present a paper in the State/ National Conference

LOG BOOK

Log book for evaluation of the following

- Interpersonal and communication skills
- Medical knowledge
- Patient care
- Practice based learning and improvement
- Professionalism
- Systems- based practice
- Attendance and availability
- Enthusiasm and responsiveness

SCHEME FOR EXAMINATION

Theory -2 papers	100 marks each
Case presentation and Viva Voice	200marks
Total	400marks

THEORY (Total 200 marks)

Paper I – Hematology (100 marks)

- 2 long questions – 20 marks each
- 6 short questions – 10 marks each

Paper II – Oncology (100 marks)

- 2 long questions – 20 marks each
- 6 short questions – 10 marks each

Practical Examination(Total 200 marks)

- One long case – 70 marks
- Two short cases – 40 marks each
- 1) Hematology/Oncology general viva voce 50 marks
- 2) Viva voice- Laboratory procedures and interpretations (OSCE) 50 marks

Declaration of results

The trainee shall have to appear for a theory examination (2 separate papers of pediatric hematology and pediatric oncology) followed by a practical and viva voce session to a constituted board to be conducted at KLE University. The constituted board would include one internal assessor and one external assessor. The certificate would be granted after the SATISFACTORY completion of ONE year's training and examination.

Declaration of class

- 50% and above – Pass
- 65% and above – First class
- 75% and above – Distinction

Recommended books

1. Nelson, Textbook of Pediatrics – 21st Edition, Kleignman, Stanton
2. Hematology of Infancy and Childhood 8th edition Nathan and Oski
3. Principles and Practice of Pediatric Oncology 8th edition Philip Pizzo, David Poplack
4. Practical Hematology Dacie and Lewis 12th edition, Editors – SM Lewis, B.J. Bain, I. Bates
5. Manual of Pediatric Hematology and Oncology 07th edition, Philip Lanzkowsky
6. Handbook of Blood Banking and Transfusion Medicine. Editor Gundu Rao, Ted Easthend, LathaJaganathan

7. Practical Pediatric Hematology 3rd Edition. Editor Anupam Sachedev.
8. Practical Pediatric Oncology Third Edition Editor Gauri Kapoor.
9. Atlas and Text of Hematology Dr. Tejinder Singh

Recommended Journals

1. Pediatric blood and cancer
2. Blood
3. Journal of pediatric hematology and oncology
4. Leukemias
5. Pediatric hematology and oncology journal
6. Annals of immunology

*Ordinance Governing
B.Sc. Respiratory Care
Technology
Degree Course
(Semester System)
Syllabus/Curriculum*

2023-24



Accredited 'A+' Grade by NAAC (3rd 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)]

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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 the programs effectively through creativity and innovation in teaching, learning and evaluation.
- To make existing programs more careers oriented through an 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 a sense of lifelong learning.
- To promulgate a 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 strives 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 forthcoming generations.

NOTIFICATION

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B.Sc. Respiratory Care Technology

1. PREAMBLE

This course has an international reputation and is a dynamic course which is based on contemporary best practice. It creates the opportunity for students who intend to pursue this course to be challenged both academically and clinically in the area of Respiratory Care. It will be an Intensive full time course, which will include Bedside teaching, Classroom lectures and practical training in the Surgical Intensive Care Unit, Medical Intensive Care Unit, Neuro-Intensive Care Unit, High Dependency Unit, Coronary Care Unit, Cardio Thoracic Surgical Unit, Emergency, Respiratory Labs and Operation theaters. A high level of expert tuition is provided for all units and clinical placements. This course focuses on the integration between evidence-based practice and current clinical practice. Clinical reasoning is fundamental to all assessment, treatment, management and rehabilitation for both cardiovascular and pulmonary disorders. It is designed to enhance knowledge, skill and clinical competencies in clinical practice, research and issues related to respiratory diseases and related surgeries. Pathophysiology of various Cardio-Pulmonary disorders and newly emerging cardio-respiratory disorders with their rehabilitation are integrated into clinical practice. Throughout the course, students review the literature critically and apply this information in the evaluation and management of cardio-pulmonary diseases and related surgeries.

2. OBJECTIVES

The objectives of this program are to:

1. Provide students with focused training in Cardio-Pulmonary Medical Procedures and Rehabilitation theory and practice, including the use of other advanced modalities.
2. Ensure that students practice Cardio-Pulmonary Medical Procedures and Rehabilitation, whilst integrating western medical information as appropriate, to ensure that candidates are safe and competent in the practice of Critical care.
3. Provide students with quality clinical experiences in various ICU setups and Respiratory Care Units in hospitals for practical experience.

3. CAREER OPPORTUNITIES

Candidates with a degree in Bachelors in Respiratory Care Technology are in demand and graduates with this qualification shall be recognized throughout India and internationally. As there is a shortage of respiratory therapists and an increase in the demand at any point of time, employment opportunities are excellent. This qualification is recognized and commands increasing employment remuneration. They can be employed in all types of ICU setups and Emergency care units.

4. ELIGIBILITY

A candidate seeking admission to the Bachelors in Respiratory 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.

5. TOTAL INTAKE OF STUDENTS

The total intake of students per year will be per academic year.

6. COURSE FEES STRUCTURE

The tuition fees and other fees structure will be as per the notifications issued by KAHER from time to time. The fees structure is different for resident Indians, nonresident Indians and foreign students.

7. COURSE DURATION

The course of study including internship shall be of 4 years duration. The first Three years will consist of six semesters each of 6 months duration.

8. MEDIUM OF INSTRUCTION

Medium of instruction shall be in English for theory lectures, practical, laboratory work and clinical teaching.

9. METHODS OF TRAINING

Bachelors in Respiratory Care Technology students shall be trained to acquire responsibilities in the management of patients with ethical standards of practice. They will be made to actively involve themselves in case presentations and clinical discussions with reflective practice.

10. MONITORING PROCESS

Every candidate shall maintain a work diary and record of his/her participation in the training programs conducted by the department. The work diary shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the university practical examination if called for. Special mention may be made of the presentations by the candidate as well as details of experiments or laboratory procedures, conducted by the candidate.

11. ATTENDANCE

A candidate pursuing Bachelors in Respiratory Care Technology shall study in the concerned department of the institution for the entire period as a full time student. No candidate is permitted to work in any other hospital/clinic/college etc., while studying this course. No candidates should join another 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. Candidates who have put in a minimum of 80% of attendance in the theory and practical assignments separately shall be permitted to appear for examination any student who fails to complete the course in the manner stated above shall not be permitted to appear for the university examination.

12. ASSESSMENT

The final assessment of the student in this course will be by written, oral and practical examination at the completion of every semester.

13. CRITERIA FOR QUESTION PAPER SETTING/ ANSWER SHEET EVALUATION

For all theory subjects question paper setter and answer sheet evaluator must have a minimum of 3 years of postgraduate teaching experience.

14. CRITERIA FOR PRACTICAL EXAMINERS

There shall be two examiners, one of them external, outside the university and the other internal, preferably from the same college or as decided by the University. The examiners must have minimum of 3 years of postgraduate teaching experience

15. INTERNAL ASSESSMENT

1. There shall be a minimum of two periodical tests preferably one in each term in theory and practical of each subject in an semester, and the average marks of the two tests will be calculated and reduced to 20 or 10 as applicable and the marks are to be communicated to the University at least 15 days before the commencement of the University examination.
2. The marks of the internal assessment must be displayed on the notice boards of the respective departments.
3. If a candidate is absent for anyone of the tests due to genuine and satisfactory reasons, such a candidate may be given a re-test.

16. 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.

17. 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 semesterV 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.

18. CRITERIA FOR COMPLETION OF COURSE

It's mandatory for every student to present a Research Synopsis in 6th Semester and submit the same before competition of Internship. The guide shall be a faculty from the General Medicine, Critical care medicine or Respiratory Medicine Department.

19. EXAMINERS:

- There should be minimum two examiners, one internal from the same University and one external
- Examiners for the First year subjects shall have Postgraduate degree in the respective subject with 3 years teaching experience or M.Sc. (Medical) with 5 years teaching experience.

Course Structure

S. NO	Year	Theory	Marks (Theory + IA + Viva)	Practical	Marks (Practical + IA)
First Year					
1.	1st Semester	Human Anatomy	60 + 20 + 20	Human Anatomy	80 + 20
		Human Physiology	30 + 10 + 10	Human Physiology	40 + 10
		Basics of Biochemistry	30 + 10 + 10	Basics of Biochemistry	40 + 10
		Haematology & Clinical Pathology	30 + 10 + 10	Haematology & Clinical Pathology	40 + 10
		Microbiology	30 + 10 + 10	Microbiology	40 + 10
2.	2nd Semester	Human Anatomy	60 + 20 + 20	Human Anatomy	80 + 20
		Human Physiology	30 + 10 + 10	Human Physiology	40 + 10
		Basics of Biochemistry	30 + 10 + 10	Basics of Biochemistry	40 + 10
		Haematology & Clinical Pathology	30 + 10 + 10	Haematology & Clinical Pathology	40 + 10
		Microbiology	30 + 10 + 10	Microbiology	40 + 10
Second Year					
3.	3rd Semester	Pharmacology 1	60 + 20 + 20	Pharmacology 1	80+20
		Physical Examination and Health Assessment in Respiratory Diseases	60 + 20 + 20	Physical Examination and Health Assessment in Respiratory Diseases	80+20
		Respiratory Diagnostics	60 + 20 + 20	Respiratory Diagnostics	80+20
4.	4th Semester	Pharmacology 2	60 + 20 + 20	Pharmacology 2	80+20
		Physical Examination and Health Assessment in Cardiac Diseases	60 + 20 + 20	Physical Examination and Health Assessment in Cardiac Diseases	80+20
		Cardiac Diagnostics	60 + 20 + 20	Cardiac Diagnostics	80+20

Third Year					
5.	5th Semester	Respiratory Care Technology 1- Clinical	60 + 20 + 20	Respiratory Care Technology 1- Clinical	80+20
		Life Support System	60 + 20 + 20	Life Support System	80+20
		Equipment in Respiratory Care	60 + 20 + 20	Equipment in Respiratory Care	80+20
6.	6th Semester	Respiratory Care Technology 2	60 + 20 + 20	Respiratory Care Technology 2	80+20
		Cardio- pulmonary Rehabilitation	60 + 20 + 20	Cardio- pulmonary Rehabilitation	80+20
		CSSD Procedures and Medical Ethics	60 + 20 + 20	CSSD Procedures	80+20
One Year Compulsory Rotatory Internship					

List of Electives

Sl .No	Semester	Name of the Subject	Marks
1	First Semester	Choice Based (Any one Subject)	80+20=100
		1. English	
		2. Kannada	
2	Second Semester	Choice Based (Any one Subject)	80+20=100
		1. Computer Skills	
		2. NSS	
3	Third Semester	Choice Based (Any one Subject)	80+20=100
		1. Communication Skills	
		2. Basic Statistics	
4	Fourth Semester	Choice Based (Any one Subject)	80+20=100
		1. Research Methodology & Bioethics	
		2. Fundamentals of Health Education & Communication	
5	Fifth Semester	Choice Based (Any one Subject)	80+20=100
		1. Basics of Hospital Administration	
		2. Disaster Management	
6	Sixth Semester	Choice Based (Any one Subject)	80+20=100
		1. Basic of Biomedical Engineering	
		2. Basics of Electricity and Electronics	

Ability Enhancement (Compulsory) Subjects

Sl .No	Semester	Name of the Subject	Marks
1.	Third Semester	1. Environmental Studies	80+20=100
2.	Fourth Semester	2. Law - Indian Constitution	80+20=100

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
40-49.99	P (Pass)	5	Pass
Less than 40	F	0	Fail
Absent	AB	0	Fail

Conversion of Grades in to **Semester Grade Point Average (SGPA)**:

$$\text{SGPA} = \frac{\text{Credits X grade points}}{\text{Total Credits}}$$

1. **Cumulative Grade Point Average (CGPA)** of all six semesters will be calculated as:
Total No. of SGPA /No. of Semester

FIRST SEMESTER

Sr.No	Subject code	Name of the Subject	Theory Credits	Practical Credits	Total Credits
1	RESCT01	Human Anatomy	02		02
2	RESCT 02(A)	Human Physiology	02		02
	RESCT 02(B)	Basics of Biochemistry	02		02
3	RESCT 03(A)	Pathology	02		02
	RESCT 03(B)	Microbiology	02		02
4	ELS01	Elective Subject: English / Spoken Kannada	02		02
5	RESCT 04	Human Anatomy		02	02
6	RESCT 05 (A)	Human Physiology		02	02
	RESCT 05(B)	Basics of Biochemistry		02	02
7	RESCT 06(A)	Hematology & Clinical Pathology		02	02
	RESCT 06(B)	Microbiology		02	02
Grand Total					22
1-hour lecture =1 credit, 2-hour Practical= 1 credit					

FIRST SEMESTER

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA +Viva Voce	Total
1	RESCT01	Paper 1	Human Anatomy	60 + 20 + 20	100
2	RESCT02	Paper 2 Section A	Human Physiology	30 + 10 + 10	50
		Section B	Basics of Biochemistry	30 + 10 + 10	50
3	RESCT03	Paper 3 Section A	Pathology Basic Hematology	30 + 10 + 10	50
		Section B	Microbiology	30 + 10 + 10	50
4	ELS01	Paper 4	<u>Elective Subject:</u> English / Spoken Kannada	80 + 20	100
Grand Total					400

Sr. No.	Subject Code	Practical	Subjects	Practical + IA	Total
5	RESCT04	Practical 1	Human Anatomy	80 + 20	100
6	RESCT05	Practical 2A	Human Physiology	40 + 10	50
		2B	Basics of Biochemistry	40 + 10	50
7	RESCT06	Practical 3A	Hematology & Clinical Pathology	40 + 10	50
		3B	Microbiology	40 + 10	50
Grand Total					300

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, names of all the bones and their parts, joints - 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, spinal reflex- arc. Applied Anatomy of spinal cord Applied Anatomy of brain

Anatomy of circulatory system:

Heart: Size, location, coverings, chambers, pericardium and valves, Blood supply and Nerve supply.

External features, Interior of chambers of heart, 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, Venous drainage 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, Bronchopulmonary segments.

Nerve Supply of Respiratory System and Applied aspects of Respiratory System

General Histology:

Epithelial, Types of connective tissue, types & Histology of Cartilage, Microscopic structure of bones, types & Microscopic structure of blood vessels, Histology of Lymphoid Organs, Type & Microscopic structure of muscles, Histology of peripheral nerve.

**Type of questions and distribution of marks for Theory examination in each subject
in First Semester for Subject Codes: BNST01**

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	5X5	25			
3.	Short Answers	5	5	5 x 3	15			

Practical 1: RESCT04
Human Anatomy –

Practical 30 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 **different parts of Brain & Spinal Cord**

7. Demonstration of different parts of respiratory system and normal X-rays

PRACTICAL ASSESMENT

Scheme of Practical Examination for First Semester for subject code BMLS04:

Sr. no	Practical	Practical	IA	Grand Total
1	Practical - 1	80	20	100

Scheme of Exam for Practicals:

Practicals

Histology

Spotters- 10 X 2marks =20 marks

Gross Anatomy

Discussion- 2 X 20 marks =40 marks

Spotters- 10 X 2marks =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
5. Gray's Anatomy	Susan Standring	Elsevier Churchill Livingstone, Edinburg
6. Text Book of Human Histology	Inderbir Singh	Jaypee Brothers, Medical Publishers, Delhi

SEMESTER I

PAPER 2: RESCT02 **Section A- Human Physiology**

Theory: 30 Hours

GENERAL PHYSIOLOGY

Structure & Functions of Cell, Cell membrane and Cell Organelles, Intercellular junctions

Classification of Body fluid compartments & composition, Homeostasis

Transport across cell membrane —Active transport, Passive transport & Vesicular transport

NERVE MUSCLE PHYSIOLOGY

Definition of Resting Membrane Potential & Action Potential - Phases & ionic basis

Neuron and Neuroglia

Classification and Properties of Nerve fibers

Classification of Muscles

Structure and Properties of Skeletal Muscle, Molecular mechanism of skeletal muscle contraction

Neuromuscular Junction - Definition, Structure and Mechanism of neuromuscular transmission, Myasthenia gravis.

Excitation-contraction coupling of skeletal muscles.

BLOOD

Composition and functions of blood

Plasma proteins: types & functions

Red Blood Cells: Morphology & functions, Erythropoiesis

Hemoglobin: structure, types, functions & fate of Hb

Definition and Classification of Anaemia & Jaundice

White blood cells: Morphology, functions & variations, Leucopoiesis, Immunity – definition and classification

Platelets and Blood Coagulation: Morphology & functions of platelets, Mechanism of Haemostasis, 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 to Nervous System

Functional organization of CNS, Structure of Spinal Cord

Autonomic Nervous System - Divisions & their Functions

Synapse- Definition, Classification, Structure and Properties of synapse, Mechanism of Synaptic transmission

Receptor- Definition, Types & Properties in brief

Reflex- Definition & Classification, Reflex arc

Sensory system-

Overview of sensory system, Ascending tracts – Anterior Column, Lateral Column and Posterior Column Tract – Course, termination and functions, Referred pain

Motor system-

Overview of motor system, Pyramidal tract– Course, termination and functions, Extra-pyramidal tracts & their functions, Upper & Lower Motor Neuron lesions, Lumbar Puncture.

Cerebrum, Cerebellum, Basal ganglia, Thalamus, Hypothalamus, Limbic system & Vestibular Apparatus- Functions

Temperature Regulation-

Normal temperature of body, Regulation of body temperature & Fever

Sleep- REM & NREM

CSF: composition, formation, circulation & functions

Blood brain barrier

SPECIAL SENSES

Vision

Structure of Eye, Structure & Functions of rods and cones, Visual pathway, Visual acuity
Refractive errors of eye & correction, Color vision, Light reflex, Accommodation

Hearing

Structure and functions of external ear, middle and inner ear, Mechanism of hearing,
Deafness & its types

Taste: Taste buds, pathway and primary taste sensations

Olfaction: olfactory receptors and pathway

PRACTICAL 2A - RESCT05

Practical: 30 Hours

Section 2A: Physiology

- Study of Microscope and its use
- Collection of Blood and study of Haemocytometer

- Haemoglobinometry
- White Blood Cell count
- Red Blood Cell count
- Determination of Blood Groups
- Leishman's staining and Differential WBC Count
- Determination of Bleeding Time
- Determination of Clotting
- Tests for Visual acuity, Colour vision & Hearing

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: RESCT02

Theory 30 Hours

Section B: Basics of Biochemistry

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 and buffer

5. Introduction to Nutrition and balanced diet

6. Chemistry of Carbohydrates:

a. Definition, Classification and biological importance.

b. Monosaccharides, Oligosaccharides, Disaccharides & Polysaccharides:

7. 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.

8. 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

9. Plasma Proteins: Definitions, Classifications and functions

10. Chemistry of Nucleic acids:

a) Nucleosides, Nucleotides and their functions

b) DNA Structure and function

c) RNA: Types, Structure (only t RNA) and Functions.

11. Minerals-RDA, sources, biochemical functions, deficiency manifestations and toxicity of Calcium, Phosphorus, Iron, copper, zinc, selenium and fluoride

PRACTICAL 2B: RESCT05
Section B: Biochemistry

Practical 30 Hours

1. Introduction to apparatus, Instruments and use of Chemical Balance.
2. Maintenance of Laboratory Glassware and apparatus.
- 3. Different grades of water**
4. Reactions of Carbohydrates (Glucose, fructose, maltose, lactose, sucrose and starch)
5. Reactions Proteins (Albumin and Casein)
6. Colour reactions of Proteins
7. Identification of Unknown Carbohydrates and proteins
- 8. Introduction to Colorimeter**
- 9. Visit to BSRC and to Hitech laboratory**

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
1	Manipal Manual of Clinical Biochemistry	Shivananda Naik	JAYPEE
2.	Textbook of Medical laboratory technology	Prafull Godkar	BHALANI
3.	Textbook of Clinical Biochemistry	Ramnik Sood	CBS Publishers
4.	Text Book of Medical Biochemistry	TEITZ	W.B. Saunders Company Harcourt(India) Private Limited New Delhi-110048.
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)

Semester I

PAPER 3 - RESCT03

Theory 30 Hours

Section A – Haematology and Clinical Pathology

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			
2.	Short Essay Question	3	2	2 x 5	10	10	10	50

3.	Short Answers	5	5	5 x 2	10			
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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: RESCT06

Practical 30 Hours

Section A – Haematology and Clinical Pathology

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- RESCT03 **Section B – Microbiology**

Theory 30 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
- **Classification and Morphology of Bacteria.**
 - **Physiology of Bacteria**
 - **Sterilization:** - Definition -- Types and principle of sterilization methods.
 - (a) 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.
 - (b) 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, Testing efficiency of various disinfectants.
 - **Antibiotics and drug resistance**
 - **Bacterial genetics 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: RESCT06
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=15Marks
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.

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 &

ELS01
KANNADA

GOAL:

The students should gain knowledge of local language (Kannada) so as to communicate and reciprocate with local people in general and patients in particular to impart proper patient care during the course of their study and future.

OBJECTIVES:

a) KNOWLEDGE

At the end of the 1st semester course the student is expected to know:

1. The basic of Kannada Language.
2. To communicate and interact in Kannada Language with patients and colleagues.

b) SKILLS

At the end of the 1st semester course the student is expected to:

1. Identify and write small words and sentences.
2. Acquire communicative skills.
3. Be compassionate towards patient in treatment delivery.

COURSE CONTENTS

Theory: 100 Hours

- 1) Interaction (Small words & sentences)
- 2) Introducing each other
- 3) Enquiring about the College
- 4) Enquiring about Room
- 5) Vegetable market
- 6) About Medical college
- 7) In a Cloth Shop
- 8) Plan for a Picnic
- 9) Enquiring about one's family
- 10) Conversation between Doctor and Patient
- 11) Enquiring about friend's family
- 12) Conversation between friends
- 13) Routine activities of students
- 14) About children's education
- 15) Halebidu and Belur
- 16) Discussion about examination and future plan
- 17) Karnataka : Lesson for reading
- 18) Lesson for reading
- 19) Presentation by students

Scheme of Examination

Institutional Theory Examination at the 1st semester B.Sc. Allied

Reference Books:

Sl.No	Title	Author	Yr. of Publ.	Publisher
1.	nnada Kali	ngadevaru Halemane	2002	nnada University

SECOND SEMESTER

Sr.No	Subject code	Name of the Subject	Theory Credits	Practical Credits	Total Credits
1	RESCT07	Anatomy	02		02
2	RESCT08(A)	Physiology	02		02
	RESCT08(B)	Biochemistry	02		02
3	RESCT09(A)	Pathology	02		02
	RESCT09(B)	Microbiology	02		02
4	ELS02	Elective Subject: Computer Skills / NSS	02		02
5	RESCT10	Human Anatomy		02	02
6	RESCT11 (A)	Human Physiology		02	02
	RESCT11(B)	Basics of Biochemistry		02	02
7	RESCT12 (A)	Hematology & Clinical Pathology		02	02
	RESCT12(B)	Microbiology		02	02
Grand Total					22
1-hour lecture =1 credit, 2-hour Practical= 1 credit					

SECOND SEMESTER

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	RESCT07	Paper 1	Human Anatomy	60 + 20 + 20	100
2	RESCT08	Paper 2 Section 2A	Human Physiology	30 + 10 + 10	50
		Section 2B	Basics of Biochemistry	30 + 10 + 10	50
3	RESCT09	Paper 3 Section 3A	Haematology & Clinical Pathology	30 + 10 + 10	50
		Section 3B	Microbiology	30 + 10 + 10	50
4	ELS02	Paper 4	<u>Elective Subject:</u> Computer Skills / NSS	80 + 20	100
Grand Total					400

Sr. No.	Subject Code	Practical	Subjects	Practical + IA	Total
5	RESCT10	Practical 1	Human Anatomy	80 + 20	100
6	RESCT11	Practical 2 2A	Human Physiology	40 + 10	50
		2B	Basics of Biochemistry	40 + 10	50
7	RESCT12	Practical 3A	Hematology & Clinical Pathology	40 + 10	50
		3B	Microbiology	40 + 10	50
Grand Total					300

Semester II

PAPER 1 - RESCT07 **Human Anatomy**

Theory 30 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 with its applied anatomy.

Ureters and urinary bladder-Location, gross features, structure - 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.

Names 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

Systemic Histology

1. G.I.T – oesophagus, stomach, small intestine, large intestine, liver, pancreas and gall bladder.
2. Renal System - Kidney, ureter and urinary bladder.
3. Endocrine glands – Adrenal, Pancreas, Pituitary, Thyroid and Parathyroid
4. Reproductive System Uterus, Ovary, Testis.

Type of questions and distribution of marks for Theory examination in each subject in Second Semester for Subject Codes: BNST08

Sl. 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			

Practical 1: - RESCT10 Human Anatomy

Practicals-30 Hours.

Gross Anatomy 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

Systemic Histology Practical:

G.I.T – oesophagus, stomach, small intestine, large intestine, liver, pancreas and gall bladder.

1. Kidney, ureter and urinary bladder.
2. Endocrine glands – Adrenal, Pancreas, Pituitary, Thyroid and Parathyroid
3. Uterus, Ovary, Testis.

PRACTICAL ASSESMENT

Scheme of Practical Examination for First Semester for subject code BNST11:

Sr. no	Practical	Marks	IA	Grand Total Marks
1	Practicals 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

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

SEMESTER II

PAPER 2 – RESCT08 Section A - Physiology

Theory : 30 Hours

RESPIRATOR SYSTEM

Physiological Anatomy of Respiratory System and Functions

Mechanics of Breathing - Mechanism of Respiration, Lung volume and capacities, Surfactant, Dead Space, Compliance

Transport of Gases - Transport of Oxygen, ODC Curve and forms of CO₂ transport.

Respiratory Centers - Types and functions

Applied Aspects - Hypoxia – definition and types, Cyanosis, Dyspnea, Apnea

CARDIOVASCULAR SYSTEM

Physiological Anatomy of Heart, **Conducting system, Types of blood vessels & blood flow**

Cardiac Cycle – Definition and Phases

Normal Electrocardiogram – Definition and Waves of ECG

Cardiac Output - Definition, Regulation of CO

Blood pressure - Definition, Determinants & Factors affecting blood pressure, Regulation

Coronary Circulation

Applied Aspects - Definition of Hypertension and Hypotension, Myocardial Ischemia and Infarction, **Shock- definition & types**

EXCRETORY SYSTEM

Functional anatomy of kidneys, structure of a nephron & functions of each part, juxtaglomerular apparatus

Mechanism of Urine formation

Glomerular Filtration – glomerular filtration rate, factors affecting GFR

Tubular Reabsorption and **Secretion - Na⁺, Glucose, Water, K⁺ & Urea**

Micturition

Innervation of urinary bladder, Micturition reflex & concept of Artificial Kidney

DIGESTIVE SYSTEM

Functional Anatomy of GIT

Saliva - Composition & Functions

Gastric Juice - Mechanism of Secretion, Composition & Functions **Pancreatic**

Juice - Composition & Functions

Functions of Liver

Bile Juice - Composition & Functions

Small Intestinal Juice - Composition & Functions

Movements of GI Tract - Deglutition, Movements of Small Intestine

ENDOCRINES

Pituitary Gland: Anterior & Posterior Pituitary Hormones and their actions

Thyroid Gland: Hormones secreted and their actions, Goiter

Adrenal Gland: Hormones secreted by adrenal cortex and medulla and their actions

Endocrine Pancreas: Hormones and their actions, Diabetes Mellitus

Parathyroid Gland - Hormones and their actions

Calcium Regulating Hormones

REPRODUCTIVE SYSTEM

Puberty

Pubertal changes in male and female

Male Reproductive System

Male reproductive organs, Spermatogenesis & factors influencing it, Morphology of a sperm, Semen, Actions of Testosterone

Female Reproductive System

Female reproductive organs, Menstrual cycle with its hormonal basis, Actions of Estrogen & Progesterone, Tests for Ovulation, **Menopause**

Pregnancy & Lactation

Functions of Placenta, Pregnancy tests, Contraceptive methods, Milk Ejection Reflex

PRACTICAL 2A – RESCT 11
Section A – Human Physiology

Practical: 30 Hours

- 1) Clinical Examination of Pulse
- 2) Blood Pressure Recording
- 3) Spirometry – Graph interpretation
- 4) Auscultation of Heart Sounds
- 5) Electrocardiogram of a normal person – Description of ECG waves in Lead II

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	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: RESCT08

Theory 30 Hours

Section B : Basics of Biochemistry

1. Specimen collection of blood, urine, cerebrospinal fluid, Pleural Fluid and ascitic Fluid, preservation and preparation of protein free filtrate. Composition of Whole Blood, Serum and Plasma
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. Nutritional Disorders, Diabetic and DASH diets
5. Vitamins- Sources, RDA, functions and deficiency manifestations.
6. Non Protein Nitrogenous compounds-Clinical Significance of Urea, Uric acid, creatinine, acetone and HCL
7. Overview of Metabolism

Carbohydrate Metabolism-Glycolysis, Gluconeogenesis and TCA Cycle

Protein Metabolism- General Reactions of amino acids and Urea cycle

Lipid metabolism- Beta Oxidation of Fatty Acids and Ketone body metabolism

PRACTICAL 2B: RESCT11

Practical : 30 Hours

Basics of Biochemistry II

1. Demonstration to Specimen Collection(Blood and CSF)- Simulation Lab Visit
2. Demonstration to Digital Balance
3. Demonstration to Centrifuge
4. Use of Centrifuge for preparation of Serum and Plasma Samples for further analysis and Preparation of PFF
5. Demonstration of Colorimeter (End point and Kinetic Method) and spectrophotometer
6. Quantitative estimation of Glucose, Urea and Total Protein and Albumin
7. 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
1	Manipal Manual of Clinical Biochemistry	Shivananda Naik	JAYPEE
2.	Textbook of Medical laboratory technology	Prafull Godkar	BHALANI
3.	Textbook of Clinical Biochemistry	Ramnik Sood	CBS Publishers
4.	Text Book of Medical Biochemistry	TEITZ	W.B. Saunders Company Harcourt(India) Private Limited New Delhi-110048.
5.	Test Book of Bio Chemistry for Medical Students	VASUDEVAN(D M), & SREE	Jaypee Brothers, New Delhi.

		KUMARI (S)	
6.	Biochemistry	U. Satyanarayan	Books and Allied (P) Ltd. Kolkata-700009 (India)

PAPER 3: RESCT09

Theory : 30 Hours

Section A - Haematology & Clinical Pathology

Hematology

1. Bone marrow
 - a. Bone marrow Aspiration – Technique, preparation and staining of films
 - b. Bone marrow biopsy – Technique, preparation and staining of films
2. Preparation of buffy coat smears
3. Laboratory test used in investigation of hemolytic anemia's
 - a. Osmotic fragility
 - b. Test for sickling
 - c. Estimation on of Hb-F, Hb-A2
 - d. Plasma haemoglobin and Haptoglobin, demonstration of haemosiderin in urine
 - e. Haemoglobin electrophoresis
 - f. Coomb's test (Direct & Indirect) - Test for auto immune hemolytic Anaemias.

Organisation and quality control in haematology laboratory.

Preparation of glassware and disposal of the waste in the laboratory - Biomedical waste management in haematology laboratory (Other than Radioactive material)

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 · N o.	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: RESCT12

Practical: 30 Hours

Section A: Haematology and Clinical Pathology

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.

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

(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

PAPER 3: RESCT09

Theory 30 Hours

Section B – Microbiology

- Culture media and different methods of cultivation.
 - Immunology
- a) Introduction
 - b) Immunity
 - c) Antigens.
 - d) Antibodies – Structure and function.
 - e) Complement
 - f) 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: RESCT12

Section B - Microbiology

Practicals 30 Hours

- Biomedical waste management
- Collection of various clinical specimens .
- Serological tests
- Un-inoculated culture media and culture techniques.

Practical Exam Pattern

Major :

- Biomedical waste management
- Serological tests/Inoculation techniques

25 marks

10 marks

15 marks

Minor :

- Spotters

15 marks

15 marks

IA

10 marks

Total -50 marks

COMPUTER SKILLS
ELS02

30 Hours

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

NSS-I

UNIT 1: Introduction and Basic Concepts of NSS

- History, philosophy, aims & objectives
- Emblem, flag, motto, song, badge
- Organizational structure, roles & responsibilities of various NSS functionaries

UNIT 2: NSS Programmes and Activities

- Concept of regular activities, special camping, day camps
- Basis of adoption of village/slums, methodology of conducting survey
- Financial pattern of the scheme
- Other young programmes/schemes of GoI
- Coordination with different agencies
- Maintenance of the diary

UNIT 3: Understanding Youth

- Definition, profiles, categories of youth
- Issues, challenges and opportunities of youth
- Youth as an agent of social change

UNIT 4: Health, Hygiene & Sanitation

- Definition, needs and scope of health education
- Food and nutrition
- Safe drinking water, water borne diseases and sanitation (SBA)
- National Health Programme
- Reproductive Health

UNIT 5: Volunteerism and Shramdaan

- Indian Tradition of volunteerism
- Needs & importance of volunteerism
- Motivation and constraints of volunteerism
- Shramdaan as part of volunteerism

NSS II

UNIT 1: Importance and Role of Youth leadership

- Meaning and types of leadership
- Qualities of good leaders; traits of leadership
- Importance and role of youth leadership

UNIT 2: Life Competencies

- Definition and importance of life competencies
- Communication
- Inter Personal
- Problem-solving and decision-making

UNIT 3: Social Harmony and National Integration

- Indian history and culture
- Role of youth in peace-building and conflict resolution
- Role of youth in Nation Building

UNIT 4: Youth Development Programmes in India

- National Youth Policy
- Youth development programmes at the National level, State level and voluntary sector
Youth-focused and Youth-led Organizations

NSS III

UNIT 1: Citizenship

- Basic Features of Constitution of India
- Fundamental Rights and Duties
- Human Rights
- Consumer awareness and legal rights of consumer
- RTI

UNIT 2: Family and Society

- Concept of family, community, (PRIs & other community-based organizations) and society
- Growing up in the family- dynamics and impact
- Human Values
- Gender Justice

UNIT 3: Community Mobilization

- Mapping of community stakeholders
- Designing the message in the context of the problem and culture of community
- Identifying methods of mobilization
- Youth-adult partnership

UNIT 4: Environment Issues

- Environment conservation, enrichment and sustainability
- Climate change
- Waste management
- Natural resource management

UNIT 5: Project Cycle Management

- Project planning
- Project implementation
- Project monitoring
- Project evaluation: impact assessment

UNIT 6: Documentation and Reporting

- Collection and analysis of data
- Preparation of documentation/ reports
- Dissemination of documents/reports

UNIT 7: Additional Life Skills

- Positive Thinking
- Self Confidence and Self Esteem
- Setting Life Goals and working to achieve them
- Management of Stress including Time Management

NSS IV

UNIT 1: Youth Health and Yoga

- Healthy lifestyles (yoga as a tool), substance abuse, HIV, home nursing, first aid
- Yoga: history, concept, misconceptions, traditions, impacts
- Yoga as preventive, promotive and curative method

UNIT 2: Youth and Crime

- Sociological and psychological factors influencing youth crime
- Peer mentoring in preventing crimes
- Awareness about anti-ragging
- Cybercrime and its prevention
- Juvenile Justice

UNIT 3: Civil/ Defense

- Positive Thinking
- Self Confidence and Self esteem
- Setting Life Goals and working to achieve them
- Management of Stress including Time Management

UNIT 4: Entrepreneurship Development

- Definition & Meaning
- Qualities of good entrepreneur
- Steps/ ways in opening an enterprise

THIRD SEMESTER

S.No	Subject code	Name of the Subject	Theory Credits	Practical Credits	Clinical Posting	Total Credits
1	RESCT13	Pharmacology 1	02			02
2	RESCT14	Physical Examination and Health Assessment in Respiratory Diseases	02			02
3	RESCT15	Respiratory Diagnostics	02			02
4	AECC01	AECC: Environmental Sciences	02			02
5	ELS03	Elective Subject (Communication Skills / Basic Statistics)	02			02
6	RESCT16	Pharmacology 1		02	02	04
7	RESCT17	Physical Examination and Health Assessment in Respiratory Diseases		02	02	04
8	RESCT18	Respiratory Diagnostics		02	02	04
Grand Total						22
1-hour lecture =1 credit, 2-hour Practical= 1 credit, 2-hour Clinical Posting – 1 credit						

THIRD SEMESTER

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	RESCT13	Paper 1	Pharmacology 1	60 + 20 + 20	100
2	RESCT14	Paper 2	Physical Examination and Health Assessment in Respiratory Diseases	60 + 20 + 20	100
3	RESCT15	Paper 3	Respiratory Diagnostics	60 + 20 + 20	100
4	AECC01	Paper 4	AECC: Environmental Sciences	80 + 20	100
5	ELS03	Paper 5	Elective Subject : (Communication Skills / Basic Statistics)	80 + 20	100
Grand Total					500

Sr. No.	Subject Code	Practical	Subjects	Practical + IA	Total
5	RESCT16	Practical 1	Pharmacology 1	80 + 20	100
6	RESCT17	Practical 2	Physical Examination and Health Assessment in Respiratory Diseases	80 + 20	100
7	RESCT18	Practical 3	Respiratory Diagnostics	80 + 20	100
Grand Total					300

Semester III

PAPER 1 - RESCT13 PHARMACOLOGY 1:

THEORY -

❖ General Pharmacology

1. Introduction:

- ✓ Definitions of pharmacology and drug
- ✓ Definitions of: Pharmacokinetics, pharmacodynamics, pharmacotherapeutics, clinical pharmacology and toxicology
- ✓ Sources of drug information: Pharmacopei as, nonofficial references, MIMS, medical journals, FDA-product information
- ✓ Drug sources with examples-Animal, plant, mineral and synthetic
- ✓ Drug nomenclature-Chemical, generic, official and trade name

2. Routes of drug administration:

Advantages and disadvantages of the following routes with examples:

- ✓ Enteral route(oral)
- ✓ Parenteral routes – subcutaneous, intramuscular, intravenous, intradermal
- ✓ Topical-skin and mucous membrane
- ✓ Others-transdermal, inhalational, sublingual, rectal

3. Pharmacokinetics:

- ✓ Membrane transport mechanisms
- ✓ Absorption-factors affecting absorption
- ✓ Bioavailability-definition
- ✓ Drug distribution-factors affecting the volume of distribution
- ✓ Biotransformation-definition, organs involved in biotransformation, types of biotransformation
- ✓ Drug elimination-major routes of elimination
- ✓ Definition of half-life, first order and zero order kinetics
- ✓ Definition of first pass metabolism. Examples of drugs with high first pass metabolic

4. Pharmacodynamics:

- ✓ Mechanism of drug action: Different modes of drug action-receptor mediated and non-receptor mediated; types of receptors
- ✓ Definition of: Affinity, intrinsic activity, efficacy, potency, agonist and antagonist-competitive and non-competitive
- ✓ Definition of synergism with examples
- ✓ Factors modifying drug action : Age, genetics, psychological states, pathological states,Other drugs, tolerance – with two examples for each

5. Drug toxicity and safety:

- ✓ Definition of therapeutic index
- ✓ Classification of unwanted effects:
 - Predictable: side effects and toxic effects
 - Unpredictable; Idiosyncrasy and hypersensitivity
- Others; Teratogenicity, Iatrogenic disease, photosensitivity and dependence

❖ **Autonomic nervous system including skeletal muscle relaxants**

Definition, Classification with examples, Indications and contraindications, Mechanism of Action, Uses and Side Effects

- Cholinergic drugs
- Anticholinergic drugs
- Neuromuscular blocking drugs
- Adrenergic drugs
- Adrenergic receptor antagonists

❖ **Central nervous system**

Definition, Classification with examples, Indications and contraindications, Mechanism of Action, Uses and Side Effects.

- General anesthetics (GA):
- Local anesthetics (LA):
- Sedative & hypnotics:
 - Opioids
 - NSAIDs
 - Antiepileptic drugs

❖ **Respiratory system**

- Bronchodilators
- Expectorants
- xanthines
- Steroids
- Antihistaminic
- Mucolytics

PRACTICAL 1 : RESCT16

PHARMACOLOGY 1:

✓ Drugs Spotters

REFERENCES –

- R. S. Satoskar, S.D. Bhandarkar, S. S. Ainapure, Pharmacology and Pharmacotherapeutics, 18th Edition, single Volume, M/S Popular Prakashan, 350, Madan Mohan Marg, Tardeo, Bombay - 400 034.
- K.D. Tripathi, Essentials of Medical Pharmacology, V.Edition, M/s. Jaypee Brothers, Post Box, 7193, G- 16, EMCA House, 23/23, Bansari Road, Daryaganj, New Delhi.
- Laurence and Bennet, Clinical Pharmacology, ELBSEdition, 9th Edition

PAPER 2 - RESCT14

PHYSICAL EXAMINATION AND HEALTH ASSESSMENT IN RESPIRATORY DISEASES:

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
- 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
- Types of respiratory failure - causes and treatment

PRACTICAL 2 : RESCT17

PHYSICAL EXAMINATION AND HEALTH ASSESSMENT IN RESPIRATORY DISEASES:

- ✓ Physical examination and health assessment and its documentation in various respiratory diseases.

REFERENCES -

- ✓ George Mathew.K Medicine Prep manual 1st edition. B.I Churchill Livingstone Pvt Ltd. New delhi 1995
- ✓ Scot Irwin, Jan Stephen tecklin, Cardiopulmonary Physical therapy, a guide to practice, 3rd edition, mosby, USA.
- ✓ Donna Frownfelter, Elizabeth Dean(eds) Principles and practices of cardiopulmonary physical therapy, 3rd Mosby, USA.
- ✓ Craig L, Scanlan, Egan's Fundamentals of Respiratory care, 6th edition Mosby, 1995.
- ✓ Stevansadowsky, H Ellan, A Hillegas, Essential of Cardiopulmonary physical therapy, W.B saunders company USA.
- ✓ John F Murray, Jay A Nadel, Text book of Respiratory Medicine, 2nd edition W.B saunders company USA.
- ✓ Braunwald (edr), Heart disease, A text book or cardiovascular medicine, 4th edition, W.B saunders company, USA 1992.
- ✓ Shoemaker, Ayres, Greenvik, Holbrook, Text book of critical care, 4th edition, W.B saunders company 1984

PAPER 3 - RESCT15

RESPIRATORY DIAGNOSTICS AND MANAGEMENT:

- (a)
- ✓ Airway diseases COPD (Chronic Obstructive Pulmonary Diseases), Asthma, Chronic Bronchitis, Emphysema, Bronchiectasis and their management
 - ✓ Restrictive lung diseases – Interstitial lung disease, chest wall and spine deformities
 - ✓ Acute chest trauma,
 - ✓ Pulmonary fibrosis
 - ✓ Atelectasis and pulmonary collapse
 - ✓ Acute Respiratory distress Syndrome
 - ✓ Ventilator Associated Pneumonia
 - ✓ Community Acquired Pneumonia, Hospital acquired pneumonia (HAP)
 - ✓ Interstitial Lung disease
 - ✓ Neuromuscular disorders (GBS, Myasthenia Gravis) and Management
 - ✓ Pulmonary embolism and management
 - ✓ Pulmonary Tuberculosis and management
 - ✓ Pleural diseases – Pneumothorax, Pleural effusion, Empyema
 - ✓ Lung cancer
 - ✓ Sleep disordered breathing-
Obstructive sleep apnoea (OSA), Obesity hypoventilation syndrome (OHS)
- (b)
- ✓ Indications for Pulmonary Function Testing
 - ✓ Diffusing Capacity Tests
 - ✓ Blood Gases and Related Tests
 - ✓ Cardiopulmonary Exercise Testing
 - ✓ Pulmonary Function Testing Equipment
 - ✓ Quality Assurance in the Pulmonary Function Laboratory
 - ✓ How to look at a chest X-ray
 - ✓ Localizing lesions
 - ✓ The CT/ MRI scan
 - ✓ Pulmonary Artery Catheters
 - ✓ Capnography
 - ✓ Sleep Study
 - ✓ Body Plethysmography
 - ✓ Acid - base balance

PRACTICAL 3 : RESCT18

RESPIRATORY DIAGNOSTICS:

- ✓ Demonstration and interpretation of various respiratory diagnostics

Ability Enhancement Compulsory Course AECC 01

ENVIRONMENTAL STUDIES

Theory : 30 Hours

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:

c) KNOWLEDGE

At the end of the 3rd semester course the student is expected to know:

3. The natural resources like forest, water, mineral, food, energy and land.
4. Functions of the eco system.
5. Bio-diversity and its conservation.
6. Environmental pollution & its prevention.
7. Social issues.

d) SKILLS

At the end of the 3rd semester course the student is expected to:

4. Visit local areas to understand and document environmental assets like river, forest, grassland, hill and mountain.
5. Visit an industrial area or agricultural area to know about local pollutants.
6. Identify common plants, insects and birds in their local areas.
7. Identify rivers, hills and mountains in their local areas.
8. To make use of the knowledge to protect natural resources.

COURSE CONTENTS

1: Multi-disciplinary nature of environmental studies
Definition, scope and importance, need for public awareness.

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

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)

4: Biodiversity and its conservation

- ◆ 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

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

- ◆ 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

- ◆ 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

SCHEME OF EXAMINATION

A. Theory : 80Marks

- ◆ Long Essay 2 X 10 = 20
 - ◆ Short Essay 8 X 5 = 40
 - ◆ Short Answers 5 X 4 = 20
- 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	

Fundamentals of Data Processing and Analysis-Basic Statistics

- Definition of statistics and bio-statistics and its types, scope, limitations
- Uses and application of bio-statistics in public health research and medical sciences.
- Descriptive Statistics: Basic concept of variables, types of variables (discrete and continuous variables), scales of measurement
- Data Collection:
 - Collection and recording of statistical information on public health and its related fields from primary and secondary sources
 - Presentation of statistical data. Classification and Tabulation of data: frequency distribution and different types of tables (one way, two ways).
 - Diagrammatic and graphic presentation: Bar diagram (simple, multiple, subdivided) , pie chart, map diagram, pictogram histogram, frequency polygon, frequency curve, cumulative frequency curve, line chart, scatter diagram.
- Measures of Central Tendency: Mean, Median & Mode and identify the ideal averages, requisites and its merits and demerits.
- Analysis of outliers: different partition values (quartiles, deciles & percentiles) and its uses.
- Measures of dispersion (variability). Range, quartile deviation, mean deviation, standard deviation, variance and coefficient of variation and identify the ideal dispersion, requisites and its merits and demerits. Measures of skewness and kurtosis.

Basic Probability : Concept of probability, its terminology and different types of definition Laws of probability: addition law, multiplication law and conditional probability.

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
Total	: 100 Marks

FOURTH SEMESTER

S.No	Subject code	Name of the Subject	Theory Credits	Practical Credits	Clinical Posting	Total Credits
1	RESCT19	Pharmacology 2	02			02
2	RESCT20	Physical Examination and Health Assessment in Cardiac Diseases	02			02
3	RESCT21	Cardiac Diagnostics	02			02
4	AECC02	AECC: Indian Constitution	02			02
5	ELS04	Elective Subject (Research Methodology & Bioethics / Fundamentals of Health Education & Communication)	02			02
6	RESCT22	Pharmacology 2		02	02	04
7	RESCT23	Physical Examination and Health Assessment in Cardiac Diseases		02	02	04
8	RESCT24	Cardiac Diagnostics		02	02	04
Grand Total						22
1-hour lecture =1 credit, 2-hour Practical= 1 credit, 2-hour Clinical Posting – 1 credit						

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	RESCT19	Paper 1	Pharmacology 2	60 + 20 + 20	100
2	RESCT20	Paper 2	Physical Examination and Health Assessment in Cardiac Diseases	60 + 20 + 20	100
3	RESCT21	Paper 3	Cardiac Diagnostics	60 + 20 + 20	100
4	AECC02	Paper 4	Law- Indian Constitution	80 + 20	100
5	ELS04	Paper 5	Elective Subject (Research Methodology & Bioethics / Fundamentals of Health Education & Communication)	80 + 20	100
Grand Total					500

Sr. No.	Subject Code	Practical	Subjects	Practical + IA	Total
5	RESCT22	Practical 1	Pharmacology 2	80 + 20	100
6	RESCT23	Practical 2	Physical Examination and Health Assessment in Cardiac Diseases	80 + 20	100
7	RESCT24	Practical 3	Cardiac Diagnostics	80+20	100
Grand Total					300

PAPER 1 - RESCT19
PHARMACOLOGY 2:

❖ **Cardiovascular system**

- Drugs used in congestive heart failure(CHF)
- Antihypertensive
- Beta blockers
- Adrenergic agents – Adrenaline, Nor adrenaline, Dopamine, Vasopressin
- Antiplatelet drugs
- Antianginal drugs
- Diuretics

❖ **GIT**

- Peptic ulcer
- Antiemetics
- Laxatives ,antisecretory ,anti-motility

❖ **Blood**

- Haematinics
- Thrombolytics
- Anticoagulants
- Antiplatelet drugs
- Fibrinolytics and antifibrinolytics

❖ **Hormones**

- Corticosteroids:
- Anti-diabetic drugs

❖ **Miscellaneous drugs**

PRACTICAL 1 – RESCT22

PHARMACOLOGY 2:

- ✓ Drugs Spotters

REFERENCES -

- R. S. Satoskar, S.D. Bhandarkar, S. S. Ainapure, Pharmacology and Pharmacotherapeutics, 18th Edition, single Volume, M/S Popular Prakashan, 350, MadanMohanMarg, Tardeo, Bombay - 400 034.
- K.D. Tripathi, Essentials of Medical Pharmacology, V. Edition, M/s. Jaypee Brothers, PostBox, 7193, G- 16, EMCA House, 23/23, Bansari Road, Daryaganj, New Delhi.
- Laurence and Bennet, Clinical Pharmacology, ELBS Edition, 9th Edition.

PAPER 2 – RESCT20

PHYSICAL EXAMINATION AND HEALTH ASSESSMENT IN CARDIOVASCULAR DISEASES:

- Shock Cardiogenic
- Heart Failure

- Systolic Failure
 - Diastolic Failure
 - Right ventricular Failure
- Acute left ventricular failure
- Pulmonary edema
- Pulmonary hypertension
- Pulmonary embolism
- Ischemic heart disease
- Myocardial ischaemia and Infarction
- Valvular Heart Disease
 - Mitral Stenosis
 - Mitral Regurgitation
- Endocarditis
- Myocarditis and Cardiomyopathy
- Pericardial disease Pericarditis, Pericardial effusion and tamponade
- Congenital Heart Diseases
 - TOF
 - Atrial Septal Defect
 - Ventricular Septal Defect
 - Patent Ductus Arteriosus
- Arrhythmias
 - Tachy Arrhythmias
 - Brady Arrhythmia

PRACTICAL 2 – RESCT23

PHYSICAL EXAMINATION AND HEALTH ASSESSMENT IN CARDIOVASCULAR DISEASES:

- ✓ Physical examination and health assessment and its documentation in various cardiovascular diseases-practical aspects.

Reference Books:

- George Mathew.K Medicine Prep manual 1st edition. B.I Churchill Livingstone Pvt Ltd. New delhi 1995
- Scot Irwin, Jan Stephen tecklin, Cardiopulmonary Physical therapy, a guide to practice, 3rd edition, mosby, USA.
- Donna Frownfelter, Elizabeth Dean (eds) Principles and practices of cardiopulmonary physical therapy, 3rd Mosby, USA.
- Craig L, Scanlan, Egan's Fundamentals of Respiratory care, 6th edition Mosby, 1995.
- Stevansadowsky, H Ellan, A Hillegas, Essential of Cardiopulmonary physical therapy, W.B saunders company USA.

- John F Murray, Jay A Nadel, Text book of Respiratory Medicine, 2nd edition W.B saunders company USA.
- Braunwald (edr), Heart disease, A text book or cardiovascular medicine, 4th edition, W.B saunders company, USA 1992.
- Shoemaker, Ayres, Greenvik, Holbrook, Text book of critical care, 4th edition, W.B saunders company 1984

PAPER 3 – RESCT21 CARDIAC DIAGNOSTICS

- ✓ ECG interpretation
- ✓ Echocardiography
- ✓ Treadmill Test/Holter
- ✓ CVP Monitoring
 - Indications
 - Factors affecting measurement
 - Insertion sites
 - Types of catheters
 - Correct technique of pressure measurement.
- ✓ Arterial line
 - Indications
 - Factors affecting measurement
 - Insertion sites
 - Types of catheters
 - Correct technique of pressure measurement
- ✓ Coronary angiogram
- ✓ Pulmonary angiogram

PRACTICAL 3 : RESCT24 CARDIAC DIAGNOSTICS:

- ✓ Demonstration and interpretation of various cardiac diagnostics

Ability Enhancement Compulsory Course AECC02

Theory: 30 Hours

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:

- | | |
|------------------|---|
| 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. |
| 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. |
| Unit III | Fundamental Rights and Duties - Their content and significance |
| Unit IV | Directive Principles of State policies - The need to balance Fundamental Rights with Directive Principles. |
| Unit V | Special rights created in the constitution for Dalits, Backward class, Women and Children, and the Religious and Linguistic Minorities |
| Unit VI | Doctrine of Separation of Powers - Legislative, Executive and Judicial, and their functions 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 Certiorari, Mandamus, Quowarranto and Habeas Corpus. |

Unit X Constitution and Sustainable Development in India.

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 Semester:100 Marks

Reference Books Latest Edition :

Sl. No.	Title	Author	Publisher
1	The Constitution 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

ELS04

Research Methodology & Bioethics

Theory: 30 Hours

Research Methodology:

- Introduction to Research Methodology
- Types of research methods

- Qualitative
- Quantitative
- Introduction to Cross Sectional, Case Control, Cohort, Experimental Design
- Introduction to qualitative methods (Participant Observation, Focus Groups discussion, In-Depth Interviews)
- Comparing Quantitative and Qualitative Research – Mixed method study

Bioethics

- Historical Perspectives
- General Principles on Ethical Considerations Involving Human Participants
- General Ethical Issues
- Ethical Guidelines in Qualitative Research
- ICMR Guidelines for biomedical Research
- Informed Consent process and informed consent form
- Composition & Functions of Institutional Ethical Committee/ Independent Review Boards (IRB)
- Duties & Roles of Principal Investigator/sponsor

ELS04

Theory: 30 Hours

Fundamentals of Health Education & Communication

Introduction to Health Education and health promotion

1. Introduction to Health education(Definition, Changing concepts, aims and objectives, role health care providers)
2. Introduction to Health promotion: Definition, concepts, objectives, principles and strategies)
3. Aims, purposes, principles and scope of health education in relation to health promotion.
4. Role of health Education Specialists.
5. Approaches and models in Health education
6. Distinguishing between education and propaganda.
7. Role of health education/health promotion in primary health care
8. Models of Health behavior change – Health belief model in detail
9. Child to Child approach
 - Meaning, elements and types of communication, principles of effective communication, Mass Communication.

10. Health Education Methods and Media

- **Appraisal of various methods of health education such as:**
 - Individual methods: Counseling and interview.
 - Group methods: Demonstration, group discussion, buzzes session, field trip, workshop, symposium, mini-lecture, brainstorming, role play and dramatization .
 - Mass methods: Exhibition, advertisement, film show, public addressing system, Speeches, radio broadcasting, and television telecast.
- Various types of health education media, its advantages and disadvantages and uses
 - Audio- radio programme, songs, stories
 - Visual – poster, flash cards, flip chart, hand puppets, hand bill, pamphlets, slides show hoardings/ banners, models
 - Audio and visual – film/ video, television
 - E -media
- Preparation of selected health education media in classroom and field setting:
poster, flashcard, flip chart, hand puppets, models, pamphlets, slides song ,video film.
- Preparation of lesson plan, and classroom teaching.

FIFTH SEMESTER

S.No	Subject code	Name of the Subject	Theory Credits	Practical Credits	Clinical Posting	Total Credits
1	RESCT25	Respiratory Care Technology 1- Clinical	02			02
2	RESCT26	Life Support System	02			02
3	RESCT27	Equipment in Respiratory Care	02			02
5	ELS05	Elective Subject (Hospital Administration/ Disaster Management)	02			02
6	RESCT28	Respiratory Care Technology- Clinical		02	02	04
7	RESCT29	Life Support System		02	02	04
8	RESCT30	Equipment in Respiratory Care		02	02	04
Grand Total						20
1-hour lecture =1 credit, 2-hour Practical= 1 credit, 2-hour Clinical Posting – 1 credit						

FIFTH SEMESTER

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viv Voce	Total
1	RESCT25	Paper 1	Respiratory Care Technology 1- Clinical	60 + 20 + 20	100
2	RESCT26	Paper 2	Life Support System	60 + 20 + 20	100
3	RESCT27	Paper 3	Equipment in Respiratory Care	60 + 20 + 20	50
4	ELS05	Paper 4	Elective Subject (Hospital Administration/ Disaster Management)	80 + 20	100
Grand Total					400

Sr. No.	Subject Code	Practical	Subjects	Practical + IA	Total
5	RESCT28	Practical 1	Respiratory Care Technology- Clinical	80 + 20	100
6	RESCT29	Practical 2	Life Support System	80 + 20	100
7	RESCT30	Practical	Equipment in Respiratory Care	80 + 20	100
Grand Total					300

PAPER 1 – RESCT25
RESPIRATORY CARE TECHNOLOGY 1- CLINICAL

- ✓ Mechanical Ventilation- Introduction, Mechanism, Types, Indications, Contraindications, Complications, Instrumentation, Procedure, Uses and Application
- ✓ Initiation of Mechanical ventilation -Establishing the need, selecting the Ventilator Modes and its Settings
- ✓ Monitoring during mechanical ventilation- Ventilator Graphics, Hemodynamic Monitoring
- ✓ Care of patients with mechanical ventilation
- ✓ Troubleshooting during mechanical ventilation
- ✓ Complications during mechanical ventilation
- ✓ Weaning during mechanical ventilation, Weaning criteria
- ✓ PEEP, Auto PEEP
- ✓ Post extubation care
- ✓ Lung recruitment maneuvers
- ✓ Prone Ventilation
- ✓ Non-Invasive mechanical ventilation
- ✓ Special Applications in Ventilatory Support- Airway Pressure release Ventilation, High Frequency Oscillatory Ventilation in the Adults, High Frequency, Helix Therapy and Mechanical Ventilation, Monitoring the Electrical Activity of the Diaphragm and Neurally Adjusted Ventilator, Mismatching of Pulmonary Perfusion and Ventilation, Physiological Dead Space and its Clinical Monitoring, Causes of Hypoxemia.

PRACTICAL 1 – RESCT28
RESPIRATORY CARE TECHNOLOGY 1- CLINICAL

- Demonstration of selection, usage and monitoring of various modes and settings of the ventilator.

REFERENCES –

- ✓ Harrison's Principle of Internal Medicine Edition 19th ISBN –978-0-07-184232-7
- ✓ Andrew D. B OH 's Intensive Care 7th Edition 978-0-7020-4762-6
- ✓ Paul L Marino the ICU Book 4th Edition 9781451121186
- ✓ Rajagopal K Shenoy Manipl Manual of Surgery 4th Edition 978-8123924168
- ✓ Richard S Irwin Intensive Care Medicine 5th 978-1451146813
- ✓ Author(s): J.M. Cario Pilbeam's Mechanical Ventilation: Physiological and Clinical Applications Edition: Fifth Print ISBN: 978-0-323-09617-1 Electronic ISBN: 978-0-323- 29209-2
- ✓ James K. Stoller Wilkins' Clinical Assessment in Respiratory Care ISBN-13: 978- 0323100298 ISBN-10: 0323100295

PAPER 2 – RESCT26
LIFE SUPPORT SYSTEM:

- Basic Life Support
 - Recognition of Cardiac arrest
 - Respiratory arrest
 - AED
 - Lay rescuer Resuscitation
- Advanced Cardiac Life support
 - Tachyarrhythmia
 - Bradyarrhythmia
 - Pulse less arrest
 - Difference between Synchronized Cardio version / Defibrillation
- Advanced Trauma Life support
 - Primary Survey
 - A, B, C, D, E
- Secondary Survey
 - Head to toe evaluation
 - Complete history and physical examination
 - Reassessment of all vital signs
 - Post resuscitation care and monitoring

PRACTICAL 2 – RESCT29
LIFE SUPPORT SYSTEM:

- ✓ Emergency Care
- ✓ Hands on for BLS Skills, AED, Choking Relief Technique, Defibrillator and ventilation in various population.

REFERENCES -

- ✓ American Heart Association (AHA) AHA Handbook on Basic Life Support (BLS)
- ✓ AHA 2015 Guidelines

PAPER 3 – RESCT27

EQUIPMENT IN RESPIRATORY CARE THEORY AND PRACTICE:

- ✓ Basic physics for the Respiratory Therapist
- ✓ Medical Gas Pipelines
- ✓ Heat & Moisture Exchanger Heated Humidifier
- ✓ Defibrillators
- ✓ Pulse Oximetry
- ✓ Cuff Pressure Manometer
- ✓ Peak Expiratory Flow meter
- ✓ AMBU
- ✓ Spirometer
- ✓ Artificial airways – Basic & Advanced
- ✓ ICD System
- ✓ NIV
- ✓ Ventilator
- ✓ Laryngoscope, Bronchoscope
- ✓ Administering medical gasses; Regulators, Flow meter and controlling devices
- ✓ Airway Management devices
- ✓ HME
- ✓ Lung Expansion Therapy devices
- ✓ Sleep Diagnostics

PRACTICAL 3 – RESCT30

EQUIPMENT IN RESPIRATORY CARE THEORY AND PRACTICE:

- ✓ Identification, and Usage of Respiratory Equipment's.

ELS05

Theory: 30 Hours

Disaster & Emergency Management

A. Introduction to Disaster management

- Disaster definition, types of disaster
- Disasters in history
- Disaster trends
- Health problems common to all disasters
- Effects of disasters

B. Public Health aspects of disaster management

C. Modern disaster management – disaster cycle

D. Hazards

- Differences between Hazards and disasters
- Hazards identification and assessment
- Hazard mapping
- Hazard profiles

E. Risk

- Concept and categories of vulnerabilities
- Concept of parameters of risk
- Components of risks
- Risk assessment, analysis and perception

F. Mitigation

- Measures of Mitigation
- Types of mitigation
- Obstacles
- Assessing and selecting mitigation options
- Components of mitigation

Preparedness

- Overview of disaster preparedness
- Government preparedness
- Public preparedness
- Media management in disaster
- Obstacles

Response

- What is response
- Response to emergency
- Water management / food / shelter management
- Media response

Recovery

- Elements in recovery
- Principle's process of recovery

Agencies

- Role of government in disaster management
- Emergency planning

-stages

-Basic elements

ELS05

30 HOURS

BASICS OF HOSPITAL ADMINISTRATION

- Evolution and classification of Hospitals, functions of hospitals
- Introduction, History and growth of management science - Classical, Behavioral and Management sciences
- Functions of management
- Analytical skill and Decision Making models.
- Leadership style and theories
- Employee Centered Management
- Time Management
- Interpersonal skills
- Motivation and Theories of Motivation
- Basic Principles of Communication & Barriers of Communication.
- Principle, policies and procedure for material management
- Inventory Management Techniques & Tools
- Health Insurance – Evolution of Insurance, IRDAI, TPA
- Consumer Protection Act
- Introduction to accounting & financial statement, Budgets & Budgeting
- Health Maintenance Organization (H.M.O)
- Public Private Partnership
- Objective of HMIS/Need and purpose of MIS
- BMW – Biomedical waste management
- Accreditation – NABH & NABL

SIXTH SEMESTER

S.No	Subject code	Name of the Subject	Theory Credits	Practical Credits	Clinical Posting	Total Credits
1	RESCT31	Respiratory Care Technology 2	02			02
2	RESCT32	Cardio- pulmonary Rehabilitation	02			02
3	RESCT33	CSSD Procedures and Medical Ethics	02			02
5	ELS06	Elective Subject : Basic of Biomedcial Engineering // Basics of Electricity and Electronics	02			02
6	RESCT34	Respiratory Care Technology 2		02	02	04
7	RESCT35	Cardio- pulmonary Rehabilitation		02	02	04
8	RESCT36	CSSD Procedures		02	02	04
Grand Total						20
1-hour lecture =1 credit, 2-hour Practical= 1 credit, 2-hour Clinical Posting – 1 credit						

SIXTH SEMESTER

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	RESCT31	Paper 1	Respiratory Care Technology 2	60 + 20 + 20	100
2	RESCT32	Paper 2	Cardio- pulmonary Rehabilitation	60 + 20 + 20	100
3	RESCT33	Paper 3	CSSD Procedures and Medical Ethics	60 + 20 + 20	100
4	ELS06	Paper 4	Elective Subject : Basic of Biomedical Engineering // Basics of Electricity and Electronics	80+20	100
Grand Total					400

Sr. No.	Subject Code	Practical	Subjects	Practical + IA	Total
5	RESCT34	Practical 1	Respiratory Care Technology 2	80 + 20	100
6	RESCT35	Practical 2	Cardio- pulmonary Rehabilitation	80 + 20	100
7	RESCT36	Practical 3	CSSD Procedures	80 + 20	100
Grand Total					300

PAPER 1 – RESCT31

RESPIRATORY CARE TECHNOLOGY 2:

- ✓ Oxygen therapy- Definition, Types, Indications, Contraindications, Complications, Instrumentation, Procedure, Uses and Application
- ✓ Aerosol Therapy- - Definition, Types, Indications, Contraindications, Complications, Instrumentation, Procedure, Uses and Application
- ✓ Humidification - Definition, Types, Indications, Contraindications, Complications, Instrumentation, Procedure, Uses and Application
- ✓ Suctioning (Neonatal and Adult) - Definition, Types, Routes, Indications, Contraindications, Complications, Instrumentation, Procedure, Uses and Application
- ✓ Intercostal drainage - Definition, Types, Indications, Contraindications, Complications, Instrumentation, Procedure, Uses and Application, Monitoring.
- ✓ Intubation - Definition, Types, Routes, Indications, Contraindications, Complications, Instrumentation, Procedure, Uses and Application
- ✓ Transport of Critically ill patients
- ✓ Extra Corporeal Membrane Oxygen (ECMO) Therapy - Definition, Types, Indications, Contraindications, Complications, Instrumentation, Procedure, Uses and Application

PRACTICAL 1 – RESCT34

RESPIRATORY CARE TECHNOLOGY 2:

- ✓ Demonstration, usage of Oxygen therapy, Aerosol Therapy, Humidification Suctioning (Neonatal and Adult), Intercostal drainage, Intubation, Transport of Critically ill patients, ExtraCorporeal Membrane Oxygen (ECMO) Therapy, Hemodynamic Monitoring.

REFERENCES –

- ✓ Harrison's Principle of Internal Medicine Edition 19th ISBN –978-0-07-184232-7
- ✓ Andrew D. B OH's Intensive Care 7th Edition 978-0-7020-4762-6
- ✓ Paul L Marino the ICU Book 4th ISBN 9781451121186
- ✓ Rajagopal K Shenoy Manipal Manual of Surgery 4th Edition 978-8123924168
- ✓ Richard S Irwin Intensive Care Medicine 5th 978-1451146813
- ✓ Brian K. Walsh Neonatal and Paediatric Respiratory Care ISBN:978-145- 575-3192
- ✓ APA AHA ILCOR Neonatal Resuscitation JAYPEE Publishers
- ✓ John P. Cloherty Manual of Neonatal Care Lippincott Williams and Wilkins
- ✓ Meharban Singh Care of the newborn CBS Publishers and Distributors
- ✓ Goldsmith Karotkin Assisted ventilation of the neonate Elsevier Saunders

PAPER 2– RESCT32

CARDIO-PULMONARY REHABILITATION:

- ✓ Pulmonary Rehabilitation- Definition, Structure, Phases, Goals, Team members, Aims, Benefits, Assessment and Selection of patients
- ✓ Dyspnea- Definition, Grading, Assessment, Positioning, Energy conserving techniques
- ✓ Cardiac rehabilitation team - Definition, Structure, Phases, Goals, Team members, Aims, Benefits, Assessment and Selection of patients
- ✓ Rationale for cardio-pulmonary rehabilitation
- ✓ Exercise testing Clinical/Functional - pre-exercise evaluation, health related physical fitness testing and interpretation
- ✓ Breathlessness associated with activities - Modified Medical Research Council scale
- ✓ Assessment of exercise performance – Field tests
- ✓ Self paced – the six minute walk test
- ✓ Externally paced – the incremental shuttle walk test
- ✓ Assessment of exercise performance – Laboratory test
- ✓ Incremental exercise testing – Cardiopulmonary exercise testing
- ✓ Indications and contra indications
- ✓ Exercise Prescription and Testing for Cardiac and Pulmonary Conditions for Paediatric Adult and Geriatrics, Persons with Co-morbidities and patients undergoing Surgical Intervention.
- ✓ Assessment of quality of life
 - Definition
 - Questionnaire measures of health – related quality of life
 - Assessment of anxiety and depression
 - Hospital anxiety and depression questionnaire
- ✓ Bronchial hygiene therapy
- ✓ Broncho – pulmonary segments
- ✓ Surface anatomy of lung
- ✓ Postural drainage
- ✓ Chest percussion
- ✓ Forced expiratory technique
- ✓ Positive airway pressure adjuncts
 - Acapella
 - Flutter
- ✓ Basics of aerobic exercises, exercises and techniques for muscular strength, flexibility.
- ✓ ACCP /AACVPR Evidence-Based Guidelines on Pulmonary Rehabilitation, Pulmonary Rehabilitation and Integrated Care of the Respiratory Patient
- ✓ ACSM and WHO Guidelines
- ✓ ATS Guidelines
- ✓ AACVPR Pulmonary Rehabilitation Certification
- ✓ Disease-Specific Approaches in Pulmonary and Cardiac Rehabilitation

PRACTICAL 2 – RESCT35
CARDIO-PULMONARY REHABILITATION:

- ✓ Demonstration and usage of Techniques and Skills like clinical/functional exercise testing. Airway Clearance Techniques, etc.

REFERENCES –

- ✓ Terry Des Jardins Cardiopulmonary Anatomy and Physiology. Essentials of Respiratory Care 6th Edition.

**PAPER 3– RESCT33
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 ahd 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.

*** 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- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - rentention of medical records - other various aspects

**PRACTICAL 3 – RESCT36
CSSD PROCEDURES**

Practical Examination-Semester VI

Major Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Cleaning, decontaminating, washing used equipment / procedure tray and re-sterilizing process	2	2 x 20	40 Marks

Minor Practical

Topics	No. Of Questions	Number of Question and Marks	Total
Medical Record Keeping and		4 x 10	40 Marks

Documentation of significant events and procedures			
		Practical I A Marks	80 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

ELS06

Theory: 30 Hours

Basics of Biomedical Engineering

Topics

- Insulators and conductors
- Units of measurements
- Electrical power transmission
- Resistors, capacitors and inductors
- Regulated power supply
- Voltage stabilizers
- Uninterrupted power supply systems
- Amplifiers – AC and DC
- Differential amplifiers
- Input impedance
- Output impedance
- Gain and amplification
- Noise
- Common Mode Rejection Ratio (CMRR)
- Filters - Principles
 - High frequency filters
 - Low frequency filters
 - Band Pass filters

- Analog to digital converter (ADC) and Digital Analog converter (DAC)
- Sensitivity & Gain
- Averaging principles

ELS06

Theory: 30 Hours

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

4. There shall be a minimum of two periodical tests preferably one in each term in theory and practical of each subject in an semester, and the average marks of the two tests will be calculated and reduced to 20 or 10 as applicable and the marks are to be communicated to the University at least 15 days before the commencement of the University examination.
5. The marks of the internal assessment must be displayed on the notice boards of the respective departments.
6. If a candidate is absent for anyone of the tests due to genuine and satisfactory reasons, such a candidate may be given a re-test.

Declaration of result

1. Criteria for pass

- a. **Main Subjects:** A candidate is declared to have passed the examination in a subject, if he / she secure 40% of the total marks in Theory and Practical separately. (Theory includes University written examination and Theory Internal marks. Practical includes University Practical examination marks along with Practical Internal assessment marks and Viva Voce marks). Pass will be declared based on the Paper and not on individual subject. Eg: For Pass in Paper No III (Pathology and Microbiology) of 1st year, A candidate must get in minimum of 40% marks together in Pathology and microbiology.
- b. **Subsidiary Subjects:** The minimum marks for a pass in a subsidiary 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 as started para 'a' above).
- d. A candidate shall be declared to have passed the examination if he / she passes in all the main subjects.

Carry over benefit

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.

Declaration of Results (Class):

2. 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.

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
40-49.99	P (Pass)	5	Pass
Less than 40	F	0	Fail
Absent	AB	0	Fail

Conversion of Grades in to Semester Grade Point Average (SGPA):

SGPA= Credits X grade points/ Total Credits

Cumulative Grade Point Average (CGPA) of all six semesters will be calculated as: Total No. of SGPA /No. of Semester

Examiners:

- There should be minimum two examiners, one internal from the same University and one external
- Examiners for the First year subjects shall have Postgraduate degree in the respective subject with 3 years teaching experience or M.Sc. (Medical) with 5 years teaching experience.

***Ordinance Governing
B.Sc. Radiation Therapy
Technology
Syllabus/Curriculum
2023 - 24***

Accredited '**A+**' Grade by **NAAC** (3rd 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)]

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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 SevenStars...

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

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B.Sc. RADIATION THERAPY TECHNOLOGY

PREAMBLE

The B.Sc. Radiation Therapy Technology Course is of 3 years (6 semesters) and 1-year internship duration aimed at training students in the technological aspects of Radiotherapy with a good scientific foundation. These students will be in a position to competently assist the Radiation Oncologist and Medical Physicist especially in high tech radiation treatment. They will be in much demand both within the country and outside as radiotherapy skilled technical personnel. With advanced training in the latest technologies in Radiotherapy Specialty, these graduates will play an important role in determining the quality of health care provided.

OBJECTIVE

The objective is to impart the basic knowledge of Physics, Radiation Physics, Medical Physics & Radiotherapy Techniques including the latest technical skills and its application in the health care delivery system.

I. NAME OF THE COURSE

The course shall be called as Bachelor of Science in –Radiation Therapy Technology (RTT)

II. ELIGIBILITY FOR ADMISSION

Candidates for admission to the Bachelor of Science – Radiation Therapy Technology (RTT) Course shall have passed:

- 1) Pre-University examination conducted by any recognized state board with English, Physics, Chemistry and Biology as optional subjects.
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 approved by the KAHER for the above purpose with Physics, Chemistry and Biology as principal subjects of study.

III. DURATION OF COURSE

The duration of the Course shall be for period of three years including 1-year compulsory internship.

IV. MEDIUM OF INSTRUCTION

The medium of instruction and examination shall be English.

V. 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.

VI. 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.

Course Structure

S. NO	Year	Theory	Marks (Theory + IA + Viva)	Practical	Marks (Practical + IA)
First Year					
1.	1st Semester	Human Anatomy	60 + 20 + 20	Human Anatomy	80 + 20
		Human Physiology	30 + 10 + 10	Human Physiology	40 + 10
		Basics of Biochemistry	30 + 10 + 10	Basics of Biochemistry	40 + 10
		Haematology & Clinical Pathology	30 + 10 + 10	Haematology & Clinical Pathology	40 + 10
		Microbiology	30 + 10 + 10	Microbiology	40 + 10
2.	2nd Semester	Human Anatomy	60 + 20 + 20	Human Anatomy	80 + 20
		Human Physiology	30 + 10 + 10	Human Physiology	40 + 10
		Basics of Biochemistry	30 + 10 + 10	Basics of Biochemistry	40 + 10
		Haematology & Clinical Pathology	30 + 10 + 10	Haematology & Clinical Pathology	40 + 10
		Microbiology	30 + 10 + 10	Microbiology	40 + 10
Second Year					
3.	3rd Semester	Radiation physics	60 + 20 + 20	Radiation physics	80+20
		Radiation Quantities, Units & Measurements	60 + 20 + 20	Radiation Quantities, Units & Measurements	80+20
		Radiation Biology	60 + 20 + 20	Radiation Biology	80+20
4.	4th Semester	Radiation Therapy Equipments	60 + 20 + 20	Radiation Therapy Equipments	80+20
		Radiation Therapy Physics	60 + 20 + 20	Radiation Therapy Physics	80+20
		Oncology Science	60 + 20 + 20	Oncology Science	80+20
Third Year					
5.	5th	Quality Assurance in	60 + 20 + 20	Quality Assurance in	80+20

	Semester	Radiation Therapy		Radiation Therapy	
		Patient Positioning & Simulation	60 + 20 + 20	Patient Positioning & Simulation	80+20
		Radiotherapy Treatment Techniques I	60 + 20 + 20	Radiotherapy Treatment Techniques I	80+20
One Year Compulsory Rotatory Internship					
6.	6th Semester	Radiotherapy Treatment Techniques II	60 + 20 + 20	Radiotherapy Treatment Techniques II	80+20
		Radiation Safety and Standards	60 + 20 + 20	Radiation Safety and Standards	80+20
		Special RT Techniques & Recent Advances	60 + 20 + 20	Special RT Techniques & Recent Advances	80+20

List of Electives

Sl	Semester	Name of the Subject	Marks
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.No			
1	First Semester	Choice Based (Any one Subject)	80+20=100
		1. English	
		2. Kannada	
2	Second Semester	Choice Based (Any one Subject)	80+20=100
		1. Computer Skills	
		2. NSS	
3	Third Semester	Choice Based (Any one Subject)	80+20=100
		1. Communication Skills	
		2. Basic Statistics	
4	Fourth Semester	Choice Based (Any one Subject)	80+20=100
		1. Research Methodology & Bioethics	
		2. Fundamentals of Health Education & Communication	
5	Fifth Semester	Choice Based (Any one Subject)	80+20=100
		1. Basics of Hospital Administration	
		2. Disaster Management	
6	Sixth Semester	Choice Based (Any one Subject)	80+20=100
		1. Basic of Biomedical Engineering	
		2. Biomedical research and Medical Ethics in Radiotherapy	

Ability Enhancement (Compulsory) Subjects

Sl .No	Semester	Name of the Subject	Marks
1.	Third Semester	1. Environmental Studies	80+20=100
2.	Fourth Semester	2. Law - Indian Constitution	80+20=100

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
40-49.99	P (Pass)	5	Pass
Less than 40	F	0	Fail
Absent	AB	0	Fail

Conversion of Grades in to **Semester Grade Point Average (SGPA)**:

$$\text{SGPA} = \frac{\text{Credits} \times \text{grade points}}{\text{Total Credits}}$$

1. Cumulative Grade Point Average (CGPA) of all six semesters will be calculated as: Total No. of SGPA /No. of Semester

FIRST SEMESTER

Sr.No	Subject code	Name of the Subject	Theory Credits	Practical Credits	Total Credits
1	BRTT01	Human Anatomy	02		02
2	BRTT02(A)	Human Physiology	02		02
	BRTT02(B)	Basics of Biochemistry	02		02
3	BRTT03(A)	Pathology	02		02
	BRTT03(B)	Microbiology	02		02
4	ELS01	Elective Subject: English / Spoken Kannada	02		02
5	BRTT04	Human Anatomy		02	02
6	BRTT05(A)	Human Physiology		02	02
	BRTT05(B)	Basics of Biochemistry		02	02
7	BRTT06(A)	Hematology & Clinical Pathology		02	02
	BRTT06(B)	Microbiology		02	02
Grand Total					22
1-hour lecture =1 credit, 2-hour Practical= 1 credit					

FIRST SEMESTER

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA +Viva Voce	Total
1	BRTT01	Paper 1	Human Anatomy	60 + 20 + 20	100
2	BRTT02	Paper 2 Section A	Human Physiology	30 + 10 + 10	50
		Section B	Basics of Biochemistry	30 + 10 + 10	50
3	BRTT03	Paper 3 Section A	Pathology Basic Hematology	30 + 10 + 10	50
		Section B	Microbiology	30 + 10 + 10	50
4	ELS01	Paper 4	<u>Elective Subject:</u> English / Spoken Kannada	80 + 20	100
Grand Total					400

Sr. No.	Subject Code	Practical	Subjects	Practical + IA	Total
5	BRTT04	Practical 1	Human Anatomy	80 + 20	100
6	BRTT05	Practical 2A	Human Physiology	40 + 10	50
		2B	Basics of Biochemistry	40 + 10	50
7	BRTT06	Practical 3A	Hematology & Clinical Pathology	40 + 10	50
		3B	Microbiology	40 + 10	50
Grand Total					300

Human Anatomy

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, names of all the bones and their parts, joints - 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, spinal reflex- arc. Applied Anatomy of spinal cord Applied Anatomy of brain

Anatomy of circulatory system:

Heart: Size, location, coverings, chambers, pericardium and valves, Blood supply and Nerve supply.

External features, Interior of chambers of heart, 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, Venous drainage 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, Bronchopulmonary segments.

Nerve Supply of Respiratory System and Applied aspects of Respiratory System

General Histology:

Epithelial, Types of connective tissue, types & Histology of Cartilage, Microscopic structure of bones, types & Microscopic structure of blood vessels, Histology of Lymphoid Organs, Type & Microscopic structure of muscles, Histology of peripheral nerve.

Type of questions and distribution of marks for Theory examination in each subject in First Semester for Subject Codes: **BRTT01**

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	5X5	25			
3.	Short Answers	5	5	5 x 3	15			

Practical 1: BRTT04

Practical 30 Hours

Human 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 **different parts of Brain & Spinal Cord**

7. Demonstration of different parts of respiratory system and normal X-rays

PRACTICAL ASSESMENT

Scheme of Practical Examination for First Semester for subject code BMLS04:

Sr. no	Practical	Practical	IA	Grand Total
1	Practical - 1	80	20	100

Scheme of Exam for Practicals:

Practicals

Histology

Spotters- 10 X 2marks =20 marks

Gross Anatomy

Discussion- 2 X 20 marks =40 marks

Spotters- 10 X 2marks =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
5. Gray's Anatomy	Susan Standring	Elsevier Churchill Livingstone, Edinburg
6. Text Book of Human Histology	Inderbir Singh	Jaypee Brothers, Medical Publishers, Delhi

SEMESTER I

PAPER 2: BRTT02

Theory: 30 Hours

Section A- Human Physiology

GENERAL PHYSIOLOGY

Structure & Functions of Cell, Cell membrane and Cell Organelles, Intercellular junctions

Classification of Body fluid compartments & composition, Homeostasis

Transport across cell membrane —Active transport, Passive transport & Vesicular transport

NERVE MUSCLE PHYSIOLOGY

Definition of Resting Membrane Potential & Action Potential - Phases & ionic basis

Neuron and Neuroglia

Classification and Properties of Nerve fibers

Classification of Muscles

Structure and Properties of Skeletal Muscle, Molecular mechanism of skeletal muscle contraction

Neuromuscular Junction - Definition, Structure and Mechanism of neuromuscular transmission, Myasthenia gravis.

Excitation-contraction coupling of skeletal muscles.

BLOOD

Composition and functions of blood

Plasma proteins: types & functions

Red Blood Cells: Morphology & functions, Erythropoiesis

Hemoglobin: structure, types, functions & fate of Hb

Definition and Classification of Anaemia & Jaundice

White blood cells: Morphology, functions & variations, Leucopoiesis, Immunity – definition and classification

Platelets and Blood Coagulation: Morphology & functions of platelets, Mechanism of Haemostasis, 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 to Nervous System

Functional organization of CNS, Structure of Spinal Cord

Autonomic Nervous System - Divisions & their Functions

Synapse- Definition, Classification, Structure and Properties of synapse, Mechanism of Synaptic transmission

Receptor- Definition, Types & Properties in brief

Reflex- Definition & Classification, Reflex arc

Sensory system-

Overview of sensory system, Ascending tracts – Anterior Column, Lateral Column and Posterior Column Tract – Course, termination and functions, Referred pain

Motor system-

Overview of motor system, Pyramidal tract– Course, termination and functions, Extra-pyramidal tracts & their functions, Upper & Lower Motor Neuron lesions, Lumbar Puncture.

Cerebrum, Cerebellum, Basal ganglia, Thalamus, Hypothalamus, Limbic system & Vestibular Apparatus- Functions

Temperature Regulation-

Normal temperature of body, Regulation of body temperature & Fever

Sleep- REM & NREM

CSF: composition, formation, circulation & functions

Blood brain barrier

SPECIAL SENSES

Vision

Structure of Eye, Structure & Functions of rods and cones, Visual pathway, Visual acuity
Refractive errors of eye & correction, Color vision, Light reflex, Accommodation

Hearing

Structure and functions of external ear, middle and inner ear, Mechanism of hearing,
Deafness & its types

Taste: Taste buds, pathway and primary taste sensations

Olfaction: olfactory receptors and pathway

Section 2A: Physiology

- Study of Microscope and its use
- Collection of Blood and study of Haemocytometer
- Haemoglobinometry
- White Blood Cell count
- Red Blood Cell count
- Determination of Blood Groups
- Leishman's staining and Differential WBC Count
- Determination of Bleeding Time
- Determination of Clotting
- **Tests for Visual acuity, Colour vision & Hearing**

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: BRTT02

Theory 30 Hours

Section B: Basics of Biochemistry

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 and buffer

5. Introduction to Nutrition and balanced diet

6. Chemistry of Carbohydrates:

a. Definition, Classification and biological importance.

b. Monosaccharides, Oligosaccharides, Disaccharides & Polysaccharides:

7. 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.

8. 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

9. Plasma Proteins: Definitions, Classifications and functions

10. Chemistry of Nucleic acids:

a) Nucleosides, Nucleotides and their functions

b) DNA Structure and function

c) RNA: Types, Structure (only t RNA) and Functions.

11. Minerals-RDA, sources, biochemical functions, deficiency manifestations and toxicity of Calcium, Phosphorus, Iron, copper, zinc, selenium and fluoride

Section B: Biochemistry

1. Introduction to apparatus, Instruments and use of Chemical Balance.
2. Maintenance of Laboratory Glassware and apparatus.
3. Different grades of water
4. Reactions of Carbohydrates (Glucose, fructose, maltose, lactose, sucrose and starch)
5. Reactions Proteins (Albumin and Casein)
6. Colour reactions of Proteins
7. Identification of Unknown Carbohydrates and proteins
8. Introduction to Colorimeter
9. Visit to BSRC and to Hitech laboratory

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
1	Manipal Manual of Clinical Biochemistry	Shivananda Naik	JAYPEE
2.	Textbook of Medical laboratory technology	Prafull Godkar	BHALANI
3.	Textbook of Clinical Biochemistry	Ramnik Sood	CBS Publishers
4.	Text Book of Medical Biochemistry	TEITZ	W.B. Saunders Company Harcourt(India) Private Limited New Delhi-110048.
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)

Semester I

PAPER 3 - BRTT03

Theory 30 Hours

Section A – Haematology and Clinical Pathology

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

Section A – Haematology and Clinical Pathology

Basic Haematology

1. Hb Estimation-Sahli's method & Cyanmethaemoglobin 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

Section B – Microbiology

- **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
- **Classification and Morphology of Bacteria.**
 - **Physiology of Bacteria**
 - **Sterilization:** - Definition -- Types and principle of sterilization methods.
 - (a) 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.
 - (b) 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, Testing efficiency of various disinfectants.
 - **Antibiotics and drug resistance**
 - **Bacterial genetics 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: BRTT06

Practical 30 Hours

Section B – Microbiology

- 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=15Marks

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.

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 &

ELS01

KANNADA

GOAL:

The students should gain knowledge of local language (Kannada) so as to communicate and reciprocate with local people in general and patients in particular to impart proper patient care during the course of their study and future.

OBJECTIVES:

a) KNOWLEDGE

At the end of the 1st semester course the student is expected to know:

1. The basic of Kannada Language.
2. To communicate and interact in Kannada Language with patients and colleagues.

b) SKILLS

At the end of the 1st semester course the student is expected to:

1. Identify and write small words and sentences.
2. Acquire communicative skills.
3. Be compassionate towards patient in treatment delivery.

COURSE CONTENTS

Theory: 100 Hours

- 1) Interaction (Small words & sentences)
- 2) Introducing each other
- 3) Enquiring about the College
- 4) Enquiring about Room
- 5) Vegetable market
- 6) About Medical college
- 7) In a Cloth Shop
- 8) Plan for a Picnic
- 9) Enquiring about one's family
- 10) Conversation between Doctor and Patient
- 11) Enquiring about friend's family
- 12) Conversation between friends
- 13) Routine activities of students
- 14) About children's education
- 15) Halebidu and Belur
- 16) Discussion about examination and future plan
- 17) Karnataka : Lesson for reading
- 18) Lesson for reading

Scheme of Examination

Institutional Theory Examination at the 1st semester B.Sc. Allied

Reference Books:

Sl.No	Title	Author	Yr. of Publ.	Publisher
1.	Kannada Kali	Lingadevaru Halemane	2002	Kannada University

SECOND SEMESTER

Sr.No	Subject code	Name of the Subject	Theory Credits	Practical Credits	Total Credits
1	BRTT07	Anatomy	02		02
2	BRTT08(A)	Physiology	02		02
	BRTT08(B)	Biochemistry	02		02
3	BRTT09(A)	Pathology	02		02
	BRTT09(B)	Microbiology	02		02
4	ELS02	Elective Subject: Computer Skills / NSS	02		02
5	BRTT10	Human Anatomy		02	02
6	BRTT11 (A)	Human Physiology		02	02
	BRTT11(B)	Basics of Biochemistry		02	02
7	BRTT12 (A)	Hematology & Clinical Pathology		02	02
	BRTT12(B)	Microbiology		02	02
Grand Total					22
1-hour lecture =1 credit, 2-hour Practical= 1 credit					

SECOND SEMESTER

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA +Viva Voce	Total
1	BNST07	Paper 1	Human Anatomy	60 + 20 + 20	100
2	BNST08	Paper 2 Section 2A	Human Physiology	30 + 10 + 10	50
		Section 2B	Basics of Biochemistry	30 + 10 + 10	50
3	BNST09	Paper 3 Section 3A	Haematology & Clinical Pathology	30 + 10 + 10	50
		Section 3B	Microbiology	30 + 10 + 10	50
4	ELS02	Paper 4	<u>Elective Subject:</u> Computer Skills / NSS	80 + 20	100
Grand Total					400

Sr. No.	Subject Code	Practical	Subjects	Practical + IA	Total
5	BNST10	Practical 1	Human Anatomy	80 + 20	100
6	BNST11	Practical 2 2A	Human Physiology	40 + 10	50
		2B	Basics of Biochemistry	40 + 10	50
7	BNST12	Practical 3A	Hematology & Clinical Pathology	40 + 10	50
		3B	Microbiology	40 + 10	50
Grand Total					300

Semester II

PAPER 1 - BRTT07

Theory 30 Hours

Human Anatomy

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 with its applied anatomy.

Ureters and urinary bladder-Location, gross features, structure - 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.

Names 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

Systemic Histology

1. G.I.T – oesophagus, stomach, small intestine, large intestine, liver, pancreas and gall bladder.
2. Renal System - Kidney, ureter and urinary bladder.
3. Endocrine glands – Adrenal, Pancreas, Pituitary, Thyroid and Parathyroid
4. Reproductive System Uterus, Ovary, Testis.

Type of questions and distribution of marks for Theory examination in each subject in Second Semester for Subject Codes: BNST08

Sl. 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			

Practical 1: - BRTT10

Practicals-30 Hours.

Human Anatomy

Gross Anatomy 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

Systemic Histology Practical:

G.I.T – oesophagus, stomach, small intestine, large intestine, liver, pancreas and gall bladder.

1. Kidney, ureter and urinary bladder.
2. Endocrine glands – Adrenal, Pancreas, Pituitary, Thyroid and Parathyroid
3. Uterus, Ovary, Testis.

PRACTICAL ASSESMENT

Scheme of Practical Examination for First Semester for subject code BNST11:

Sr. no	Practical	Marks	IA	Grand Total Marks
1	Practicals 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

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

SEMESTER II

PAPER 2 – BRTT08

Theory : 30 Hours

Section A - Physiology

RESPIRATOR SYSTEM

Physiological Anatomy of Respiratory System and Functions

Mechanics of Breathing - Mechanism of Respiration, Lung volume and capacities, Surfactant, Dead Space, Compliance

Transport of Gases - Transport of Oxygen, ODC Curve and forms of CO₂ transport.

Respiratory Centers - Types and functions

Applied Aspects - Hypoxia – definition and types, Cyanosis, Dyspnea, Apnea

CARDIOVASCULAR SYSTEM

Physiological Anatomy of Heart, **Conducting system, Types of blood vessels & blood flow**

Cardiac Cycle – Definition and Phases

Normal Electrocardiogram – Definition and Waves of ECG

Cardiac Output - Definition, Regulation of CO

Blood pressure - Definition, Determinants & Factors affecting blood pressure, Regulation

Coronary Circulation

Applied Aspects - Definition of Hypertension and Hypotension, Myocardial Ischemia and Infarction, **Shock- definition & types**

EXCRETORY SYSTEM

Functional anatomy of kidneys, structure of a nephron & functions of each part, juxtaglomerular apparatus

Mechanism of Urine formation

Glomerular Filtration – glomerular filtration rate, factors affecting GFR

Tubular Reabsorption and **Secretion - Na⁺, Glucose, Water, K⁺ & Urea**

Micturition

Innervation of urinary bladder, Micturition reflex & concept of Artificial Kidney

DIGESTIVE SYSTEM

Functional Anatomy of GIT

Saliva - Composition & Functions

Gastric Juice - Mechanism of Secretion, Composition & Functions

Pancreatic Juice - Composition & Functions

Functions of Liver

Bile Juice - Composition & Functions

Small Intestinal Juice - Composition & Functions

Movements of GI Tract - Deglutition, Movements of Small Intestine

ENDOCRINES

Pituitary Gland: Anterior & Posterior Pituitary Hormones and their actions

Thyroid Gland: Hormones secreted and their actions, Goiter

Adrenal Gland: Hormones secreted by adrenal cortex and medulla and their actions

Endocrine Pancreas: Hormones and their actions, Diabetes Mellitus

Parathyroid Gland - Hormones and their actions

Calcium Regulating Hormones

REPRODUCTIVE SYSTEM

Puberty

Pubertal changes in male and female

Male Reproductive System

Male reproductive organs, Spermatogenesis & factors influencing it, Morphology of a sperm, Semen, Actions of Testosterone

Female Reproductive System

Female reproductive organs, Menstrual cycle with its hormonal basis, Actions of Estrogen & Progesterone, Tests for Ovulation, **Menopause**

Pregnancy & Lactation

Functions of Placenta, Pregnancy tests, Contraceptive methods, Milk Ejection Reflex

PRACTICAL 2A – BRTT11

Practical: 30 Hours

Section A – Human Physiology

- 1) Clinical Examination of Pulse
- 2) Blood Pressure Recording
- 3) Spirometry – Graph interpretation
- 4) Auscultation of Heart Sounds
- 5) Electrocardiogram of a normal person – Description of ECG waves in Lead II

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	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: BRTT08

Theory 30 Hours

Section B : Basics of Biochemistry

1. Specimen collection of blood, urine, cerebrospinal fluid, Pleural Fluid and ascitic Fluid, preservation and preparation of protein free filtrate. Composition of Whole Blood, Serum and Plasma
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. Nutritional Disorders, Diabetic and DASH diets
5. Vitamins- Sources, RDA, functions and deficiency manifestations.
6. Non Protein Nitrogenous compounds-Clinical Significance of Urea, Uric acid, creatinine, acetone and HCL
7. Overview of Metabolism

Carbohydrate Metabolism-Glycolysis, Gluconeogenesis and TCA Cycle

Protein Metabolism- General Reactions of amino acids and Urea cycle

Lipid metabolism- Beta Oxidation of Fatty Acids and Ketone body metabolism

PRACTICAL 2B: BRTT11

Practical : 30 Hours

Basics of Biochemistry II

1. Demonstration to Specimen Collection(Blood and CSF)- Simulation Lab Visit
2. Demonstration to Digital Balance
3. Demonstration to Centrifuge
4. Use of Centrifuge for preparation of Serum and Plasma Samples for further analysis and Preparation of PFF
5. Demonstration of Colorimeter (End point and Kinetic Method) and spectrophotometer
6. Quantitative estimation of Glucose, Urea and Total Protein and Albumin
7. 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
1	Manipal Manual of Clinical Biochemistry	Shivananda Naik	JAYPEE
2.	Textbook of Medical laboratory technology	Prafull Godkar	BHALANI
3.	Textbook of Clinical Biochemistry	Ramnik Sood	CBS Publishers
4.	Text Book of Medical Biochemistry	TEITZ	W.B. Saunders Company Harcourt(India) Private Limited New Delhi-110048.
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)
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PAPER 3: BRTT09

Theory : 30 Hours

Section A - Haematology & Clinical Pathology

Hematology

1. Bone marrow
 - a. Bone marrow Aspiration – Technique, preparation and staining of films
 - b. Bone marrow biopsy – Technique, preparation and staining of films
2. Preparation of buffy coat smears
3. Laboratory test used in investigation of hemolytic anemia's
 - a. Osmotic fragility
 - b. Test for sickling
 - c. Estimation on of Hb-F, Hb-A2
 - d. Plasma haemoglobin and Haptoglobin, demonstration of haemosiderin in urine
 - e. Haemoglobin electrophoresis
 - f. Coomb's test (Direct & Indirect) - Test for auto immune hemolytic Anaemias.

Organisation and quality control in haematology laboratory.

Preparation of glassware and disposal of the waste in the laboratory - Biomedical waste management in haematology laboratory (Other than Radioactive material)

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.

PRACTICAL 3: BRTT12

Practical: 30 Hours

Section A: Haematology and Clinical Pathology

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.

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

(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

PAPER 3: BRTT09

Theory 30 Hours

Section B – Microbiology

- **Culture media and different methods of cultivation.**
- **Immunology**
 - a) Introduction
 - b) Immunity
 - c) Antigens.
 - d) Antibodies – Structure and function.
 - e) Complement
 - f) 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: BRTT12**Section B - Microbiology****Practicals 30 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
- Serological tests/Inoculation techniques

10 marks

15 marks

Minor :**15 marks**

- Spotters

15 marks

IA**10 marks****Total -50 marks**

COMPUTER SKILLS

30 Hours

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

NSS-I II III IV**NSS-I****UNIT 1: Introduction and Basic Concepts of NSS**

- History, philosophy, aims & objectives
- Emblem, flag, motto, song, badge
- Organizational structure, roles & responsibilities of various NSS functionaries

UNIT 2: NSS Programmes and Activities

- Concept of regular activities, special camping, day camps
- Basis of adoption of village/slums, methodology of conducting survey
- Financial pattern of the scheme
- Other young programmes/schemes of GoI
- Coordination with different agencies
- Maintenance of the diary

UNIT 3: Understanding Youth

- Definition, profiles, categories of youth
- Issues, challenges and opportunities of youth
- Youth as an agent of social change

UNIT 4: Health, Hygiene & Sanitation

- Definition, needs and scope of health education
- Food and nutrition
- Safe drinking water, water borne diseases and sanitation (SBA)
- National Health Programme
- Reproductive Health

UNIT 5: Volunteerism and Shramdaan

- Indian Tradition of volunteerism
- Needs & importance of volunteerism
- Motivation and constraints of volunteerism
- Shramdaan as part of volunteerism

NSS II**UNIT 1: Importance and Role of Youth leadership**

- Meaning and types of leadership
- Qualities of good leaders; traits of leadership
- Importance and role of youth leadership

UNIT 2: Life Competencies

- Definition and importance of life competencies
- Communication

- Inter Personal
- Problem-solving and decision-making

UNIT 3: Social Harmony and National Integration

- Indian history and culture
- Role of youth in peace-building and conflict resolution
- Role of youth in Nation Building

UNIT 4: Youth Development Programmes in India

- National Youth Policy
 - Youth development programmes at the National level, State level and voluntary sector
- Youth-focused and Youth-led Organizations

NSS III

UNIT 1: Citizenship

- Basic Features of Constitution of India
- Fundamental Rights and Duties
- Human Rights
- Consumer awareness and legal rights of consumer
- RTI

UNIT 2: Family and Society

- Concept of family, community, (PRIs & other community-based organizations) and society
- Growing up in the family- dynamics and impact
- Human Values
- Gender Justice

UNIT 3: Community Mobilization

- Mapping of community stakeholders
- Designing the message in the context of the problem and culture of community
- Identifying methods of mobilization
- Youth-adult partnership

UNIT 4: Environment Issues

- Environment conservation, enrichment and sustainability
- Climate change
- Waste management
- Natural resource management

UNIT 5: Project Cycle Management

- Project planning
- Project implementation
- Project monitoring
- Project evaluation: impact assessment

UNIT 6: Documentation and Reporting

- Collection and analysis of data
- Preparation of documentation/ reports
- Dissemination of documents/reports

UNIT 7: Additional Life Skills

- Positive Thinking
- Self Confidence and Self Esteem
- Setting Life Goals and working to achieve them
- Management of Stress including Time Management

NSS IV

UNIT 1: Youth Health and Yoga

- Healthy lifestyles (yoga as a tool), substance abuse, HIV, home nursing, first aid
- Yoga: history, concept, misconceptions, traditions, impacts
- Yoga as preventive, promotive and curative method

UNIT 2: Youth and Crime

- Sociological and psychological factors influencing youth crime
- Peer mentoring in preventing crimes
- Awareness about anti-ragging
- Cybercrime and its prevention
- Juvenile Justice

UNIT 3: Civil/ Defense

- Positive Thinking
- Self Confidence and Self esteem
- Setting Life Goals and working to achieve them
- Management of Stress including Time Management

UNIT 4: Entrepreneurship Development

- Definition & Meaning
- Qualities of good entrepreneur
- Steps/ ways in opening an enterprise

THIRD SEMESTER

S.No	Subject code	Name of the Subject	Theory Credits	Practical Credits	Clinical Posting	Total Credits
1	BRTT13	Radiation physics	02			02
2	BRTT14	Radiation Quantities, Units & Measurements	02			02
3	BRTT15	Radiation Biology	02			02
4	AECC01	AECC: Environmental Sciences	02			02
5	ELS03	Elective Subject (Communication Skills / Basic Statistics)	02			02
6	BRTT16	Radiation Physics		02	02	04
7	BRTT17	Radiation Quantities, Units & Measurements		02	02	04
8	BRTT18	Radiation Biology		02	02	04
Grand Total						22
1-hour lecture =1 credit, 2-hour Practical= 1 credit, 2-hour Clinical Posting – 1 credit						

THIRD SEMESTER

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	BRTTS13	Paper 1	Radiation physics	60 + 20 + 20	100
2	BRTTS14	Paper 2	Radiation Quantities, Units & Measurements	60 + 20 + 20	100
3	BRTTS15	Paper 3	Radiation Biology	60 + 20 + 20	100
4	AECC01	Paper 4	AECC: Environmental Sciences	80 + 20	100
5	ELS03	Paper 5	Elective Subject : (Communication Skills / Basic Statistics)	80 + 20	100
Grand Total					500

Sr. No.	Subject Code	Practical	Subjects	Practical + IA	Total
6	BRTTS16	Practical 1	Radiation Physics	80+20	100
7	BRTTS17	Practical 2	Radiation Quantities, Units & Measurements	80+20	100
8	BRTTS18	Practical 3	Radiation Biology	80+20	100
Grand Total					300

THIRD SEMESTER

PAPER -1 –BRTT13 RADIATION PHYSICS

Theory 45 Hours

Unit 1: Basic concepts:

Units and measurements: Force, work, power and Energy, Temperature and heat-SI

Electricity: Electric charges, Coulomb's law- Unit of charge, Electric potential, unit of potential resistance, ohm's law - electric current, unit, electric power, heating effects of current, Joule's law-capacitance and capacitors, series and parallel connection of resistors, capacitors and inductors.

Magnetism: Magnetic induction - magnetic properties – classification of materials, Hysteresis - magnetic effect of current

Electrical instruments: Galvanometer, Voltmeter, Ammeter.

Electromagnetic Induction: Induced electro motive force, Faradays experiments, laws of electromagnetic induction, inductor coil, solenoid coil, Self and mutual induction.

Alternating current: Peak and RMS values, AC circuits with resistance, capacitance and inductance, total resistance in a circuit, Impedance, Choke coil, eddy current. Transformer - theory, design, losses – types of transformers, auto transformer, high voltage transformer, electric power transmission, AC generator, commercial unit of electric energy consumption.

Unit 2: Basic Radiation Physics

Electromagnetic radiation: Quantum nature of radiation-mass energy equivalence-Fluorescence-electromagnetic spectrum, Energy quantization, Relationship between wavelengths, Frequency, Energy

Basic of Atomic Physics: Atomic structure, Atom Model, Constituents of atoms, Nucleus, Atomic No., Mass No., Electron orbit and atomic energy levels, periodic table, Nuclear forces, Nuclear energy levels, Binding energy- electron volt. Isotopes and Isobars, Isotones, Isomers, Ionization and Excitation

Radioactivity: Discovery of radioactivity, natural radioactivity - activity units - Radioactive series, radium, thorium and uranium series- alpha, beta decay and gamma rays - radioactive disintegration exponential decay, half-life period, decay constant. Artificial radioactivity – production of radioisotopes - nuclear reactor, cyclotron – neutron flux, fission and fusion-chain reaction-atom bomb, Particle Radiation.

Unit 3: Production of X-rays

X-rays: History, Discovery of x-rays, properties-production, Continuous x-ray spectrum, bremsstrahlung and characteristic x-rays. x-ray tube; Coolidge tube, tube design, Thermionic Emission, line focus principle, space charge effect, Modern x-ray tubes; stationary anode, rotating anode, grid controlled x-ray tubes, heel effect, off focus radiation, tube insert and housing-Tube rating, Filters, Quality and Quantity of x-rays, factors influencing x-rays-measurement of kV, mA and time.

X-ray generator circuits: Vacuum tube diodes, Rectifiers, Semiconductor diode, diode as rectifier, half and full wave, self-rectification – X-ray generator; Electrical accessories for x-ray tubes, circuits and components, filament circuit- kilo voltage circuit-single phase generator-three phase generator – constant potential generator. Fuses, switches and Interlocks-Exposure switching and timers-HT cables - earthing. Half value layers, determination of HVL. Energy absorbed from x-rays, x-ray scattering, x-ray transmission through the medium, linear and mass attenuation coefficient, HVT and TVT.

Unit 4: Interaction of Radiation

Interaction of Radiation with matter

Radiation transmission through matter, Interaction of electromagnetic radiation with matter, Thomson scattering (coherent scattering), Photoelectric and Compton effects, Pair production & Photo Disintegration, relative importance, Energy absorption from X-rays, X-rays Scattering, X-rays transmission through the medium, attenuation co-efficient - Law of exponential attenuation, linear and mass attenuation Coefficient, HVT and TVT Interaction of particle radiation with matter –neutrons, heavy ions, nuclear reactions – range and Bragg curve.

References

- 1) Walter and Millers, Textbook of Radiotherapy, Radiation Therapy Physics, Therapy and Oncology. C.K. Bomford, 6th Edition, Churchill Living Stone.
- 2) The physics of radiation therapy, Faiz M. Khan, 4th edition (2010), Lippincott Williams
- 3) Principles of Radiological Physics .3rdedition. Donald T. Graham. Churchill Livingstone
- 4) Principles and Practice of Radiation Therapy. Introduction to Radiation Therapy, Charles M Washington & Dennis T Leaver, Mosby
- 5) Basic Medical Radiation Physics – Stanton

Scheme of examination

Type of questions and distribution of marks for Theory examination in each subject in Third Semester:

Theory Total 60 marks

Duration 180 minutes

Sl. No.	Question	Question Asked	Question to attempt	Marks	Max Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	2	2	2 x 10	20	20	20	100
2.	Short Essay Question	5	5	5 x 5	25			
3.	Short Answers	5	5	5 x 3	15			

PRACTICAL 1: BRTT16

Practicals: 50 Hours

1. To find the half-life for different radioactive sources.
2. Physical demonstration of X- Ray tube
3. To find the HVL for given X-ray energies.
4. To demonstrate the production of high energy x-rays in LINAC.
5. To prove Inverse Square Law.
6. Measurement of X and Gamma Rays

Practical Assessment

Scheme of Practical Examination for Third Semester

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical 1	80	20	100

PAPER -2 –BRTT14

Theory 45 Hours

RADIATION QUANTITIES, UNITS & MEASUREMENTS

Unit 1: Radiation Quantities and Units

Radioactivity, Becquerel(Bq), Flux, Fluence, Fluence Rate, Energy Fluence, Kerma, Cema, Exposure, Absorbed Dose, rad, Gray, dose equivalent, rem, Sievert, Equivalent Dose, Weighting Factors, Effective Dose, Natural background Radiation, Occupational Exposure Limits, Dose limits to Public.

Unit 2: Radiation Detection System & instruments

Ionization of gases, Fluorescence and phosphorescence, Effect on photographic emulsion, Ionization chambers, Proportional Counters, G.M. Counters, Scintillation Detectors, Liquid scintillator, Pocket Dosimeters, TL Dosimeters and their use in personnel monitoring badges. Radiation survey meter-zone monitor-contamination monitor, their function use and maintenance. Advantages and disadvantages of various detectors, appropriateness of different types of detectors for different types of radiation measurement.

Unit 3: Radiation Measuring System & instruments

Calculation of absorbed dose from exposure, Absorbed dose to air, Absorbed dose to any medium, Bragg-Gray cavity theory, Spencer Attix cavity theory, Burlin Cavity theory, stopping power (collision and radiative), Interaction Coefficients- linear and mass attenuation coefficients, mass energy transfer coefficients, mass energy absorption coefficient and Transfer of absorbed dose from one medium to another of photons, electrons. Exposure from radioactive sources, exposure rate constant. Free ionization chamber, thimble ion chamber, Parallel Plate Chamber, condenser chamber, victoreen electrometer-secondary standard dosimeter, film dosimeter, chemical dosimeter, thermoluminescent dosimeter

References

- 1) Radiation detection and measurement – G F Knoll
- 2) The physics of radiation therapy, Faiz M. Khan, 4th edition (2010), Lippincott Williams
Radiation Therapy Physics, William Hendee, Mosby

Scheme of examination

Type of questions and distribution of marks for Theory examination in each subject in Third Semester:

Theory Total 60 marks

Duration 180 minutes

Sl. No.	Question	Question Asked	Question to attempt	Marks	Max Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	2	2	2 x 10	20	20	20	100
2.	Short Essay Question	5	5	5 x 5	25			
3.	Short Answers	5	5	5 x 3	15			

PRACTICAL 2: BRTT17

Practicals: 50 Hours

1. Radiation survey using ionization chamber.
2. Radiation Quantity Measurement
3. Radiation Detection Measurement
4. Radiation Contamination Measurement
5. Survey Meter Measurement
6. Film Dosimetry Measurement GM counter Measurement

Practical Assessment

Scheme of Practical Examination for Third Semester

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical 2	80	20	100

**PAPER -3 –BRTT14
RADIATION BIOLOGY**

Theory 45 Hours

Unit 1: Physical Basis of Radiobiology

The Cell, Cell Cycle, cell divisions, Mode of action of ionizing radiation, effect of ionizing radiation on cell, DNA strand breaks, chromosomal aberration, Radiation induced injuries at cellular level, Chemical effects of Radiation, radiolysis of water, production of free radicals, radical's reactions, cell survival curves after irradiation and Dose response relationship for normal tissues

Unit 2: Biological Effects of Radiation

Radiobiology of High LET Radiation, Oxygen effect, RBE, Effect of Ionizing Radiation on different organs & systems of the body. Fractionation. Somatic effects and hereditary effects, stochastic and deterministic effects, Acute exposure and chronic exposure. Effects on Embryo and Fetus, Cataractogenesis, Concept of doubling dose, LD50/60.

Unit 3: Effects of radiation on Normal tissues

Introduction, Pathogenesis of early and late effects, Normal tissues and organs
Effects of radiation on skin, Oral cavity, Oropharynx and salivary glands, Orbit, Lung, GI tract, Hematopoietic tissues, Bone and cartilage, Kidney, testicle, Ovary, Nervous system, Systemic effects of radiation, Carcinogenic effects, Radiation modifiers- Radio sensitizers, Radio protectors, Hyperthermia

Unit 4: Biological Models

- i Treatment fractionation
- ii NSD (Nominal Standard Dose)
- iii CRE (Cumulative Radiation Effect)
- iv TDF (Time Dose Fractionation)
- v LQM (linear Quadratic Models) and their practical Application.

References

- 1) Basic Clinical Radiobiology for Radiation Oncologist, G. Gordon Steel, Edward Arnold, A Member of the Hodder Headline Group, London Boston Melbourne Auckland.
- 2) Textbook of Radiobiology, Eric J Hall.

Scheme of examination

Type of questions and distribution of marks for Theory examination in each subject in Third Semester:

Theory Total 60 marks

Duration 180 minutes

Sl. No.	Question	Question asked	Question to attempt	Marks	Max Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	2	2	2 x 10	20	20	20	100
2.	Short Essay Question	5	5	5 x 5	25			
3.	Short Answers	5	5	5 x 3	15			

PRACTICAL 3: BRTT18

Practicals: 50 Hours

1. Make list of different types of carcinomas
2. Explain the radiation sensitivity of cell cycle.
3. Explain the linear quadratic model.
4. To make the list of various sensitizers and protectors used in radiotherapy.

Practical Assessment

Scheme of Practical Examination for Third Semester

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical 1	80	20	100

Ability Enhancement Compulsory Course AECC 01

ENVIRONMENTAL STUDIES

Theory : 30 Hours

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:

c) KNOWLEDGE

At the end of the 3rd semester course the student is expected to know:

3. The natural resources like forest, water, mineral, food, energy and land.
4. Functions of the eco system.
5. Bio-diversity and its conservation.
6. Environmental pollution & its prevention.
7. Social issues.

d) SKILLS

At the end of the 3rd semester course the student is expected to:

4. Visit local areas to understand and document environmental assets like river, forest, grassland, hill and mountain.
5. Visit an industrial area or agricultural area to know about local pollutants.
6. Identify common plants, insects and birds in their local areas.
7. Identify rivers, hills and mountains in their local areas.
8. To make use of the knowledge to protect natural resources.

COURSE CONTENTS

- 1: Multi-disciplinary nature of environmental studies
Definition, scope and importance, need for public awareness.
- 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

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)

4: Biodiversity and its conservation

- ◆ 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

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

- ◆ 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

- ◆ 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

SCHEME OF EXAMINATION

A. Theory : 80Marks

- ◆ Long Essay 2 X 10 = 20
- ◆ Short Essay 8 X 5 = 40
- ◆ Short Answers 5 X 4 = 20

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	

Fundamentals of Data Processing and Analysis-Basic Statistics

- Definition of statistics and bio-statistics and its types, scope, limitations
- Uses and application of bio-statistics in public health research and medical sciences.
- Descriptive Statistics: Basic concept of variables, types of variables (discrete and continuous variables), scales of measurement
- Data Collection:
 - Collection and recording of statistical information on public health and its related fields from primary and secondary sources
 - Presentation of statistical data. Classification and Tabulation of data: frequency distribution and different types of tables (one way, two ways).
 - Diagrammatic and graphic presentation: Bar diagram (simple, multiple, subdivided) , pie chart, map diagram, pictogram histogram, frequency polygon, frequency curve, cumulative frequency curve, line chart, scatter diagram.
- Measures of Central Tendency: Mean, Median & Mode and identify the ideal averages, requisites and its merits and demerits.
- Analysis of outliers: different partition values (quartiles, deciles & percentiles) and its uses.
- Measures of dispersion (variability). Range, quartile deviation, mean deviation, standard deviation, variance and coefficient of variation and identify the ideal dispersion, requisites and its merits and demerits. Measures of skewness and kurtosis.

Basic Probability : Concept of probability, its terminology and different types of definition Laws of probability: addition law, multiplication law and conditional probability.

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
Total	: 100 Marks

FOURTH SEMESTER

S.No	Subject code	Name of the Subject	Theory Credits	Practical Credits	Clinical Posting	Total Credits
1	BRTT19	Radiation Therapy Equipments	02			02
2	BRTT20	Radiation Therapy Physics	02			02
3	BRTT21	Oncology Science	02			02
4	AECC02	AECC: Indian Constitution	02			02
5	ELS04	Elective Subject (Research Methodology & Bioethics / Fundamentals of Health Education & Communication)	02			02
6	BRTT22	Radiation Therapy Equipments		02	02	04
7	BRTT23	Radiation Therapy Physics		02	02	04
8	BRTT24	Oncology Science		02	02	04
Grand Total						22
1-hour lecture =1 credit, 2-hour Practical= 1 credit, 2-hour Clinical Posting – 1 credit						

FOURTH SEMESTER

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	BRTT19	Paper 1	Radiation Therapy Equipments	60 + 20 + 20	100
2	BRTT20	Paper 2	Radiation Therapy Physics	60 + 20 + 20	100
3	BRTT21	Paper 3	Oncology Science	60 + 20 + 20	100
4	AECC02	Paper 4	Law and Indian Constitution	80 + 20	100
5	ELS04	Paper 5	Elective Subject (Research Methodology & Bioethics / Fundamentals of Health Education & Communication)	80 + 20	100
Grand Total					500

Sr. No.	Subject Code	Practical	Practical	IA	Total
6	BRTT22	Practical 1	Radiation Therapy Equipments	80+20	100
7	BRTT23	Practical 2	Radiation Therapy Physics	80+20	100
8	BRTT24	Practical 3	Oncology Science	80+20	100
Grand Total					300

FOURTH SEMESTER

PAPER -1 BRTT19

Theory – 45 hours

RADIATION THERAPY EQUIPMENTS

Unit-1: Kilovoltage units

Historical developments in Radiotherapy, Grenz-ray, contact, superficial and orthovoltage or deep therapy units, construction of therapy tube, Supervoltage therapy units. Megavoltage therapy units: Vande-Graaff Generator, Betatron, Microtron, Cyclotron.

Unit-2: Tele-gamma Units

Sources and their properties, preparation of tele-gamma sources Co-60 units: source housing, source movement mechanisms. Fixed Gantry units, iso-centric units, Beam collimation and penumbra. Head leakage in on/off position, collimator leakage in on position.

Unit-3: Linear accelerator

Block diagram of LINAC, power supply, modulator, electron gun, magnetron/klystron, wave guide system, accelerator tube (traveling wave and standing wave type), bending magnet, exit window, target, flattening filter, scattering foil, monitoring system. Collimator system, gantry couch. Heavy charged particle (Proton & negative pions) beam generators. Neutron generators: D-T generator, cyclotron.

Unit-4: CT Simulator

Design and working principles of conventional simulator, CT-Simulator. Basic principles of CT scanner and its image processing along with interconnectivity with treatment planning system. Brief overview of different generations of CT-scanners.

Unit-5: Brachytherapy Units

Overview of brachytherapy manual sources and applicators. Manual source preparation station, L-bench, lead blocks. Transport container, main safe, procedure to prepare manual brachy sources. Concept of low dose rate brachytherapy units – sources used in low dose rate brachytherapy applications and working mechanism of LDR brachytherapy units. Principles of remote controlled after loading brachytherapy units. Concept of high-dose rate and pulse dose rate remote controlled brachytherapy units. Sources of high dose rate brachytherapy units and their properties. Co-60 HDR units and Ir-192 HDR units, working mechanism and its applicators. Advantage and disadvantage of remote controlled brachytherapy units over manual after loading brachytherapy units.

References

- 1) Principles and practice of Radiation Oncology. Perez & Brady
- 2) Radiation Therapy; Murphy and Walter:
- 3) Radiation therapy in the management of cancers; Fletcher, Gilbert

Scheme of examination

Type of questions and distribution of marks for Theory examination in each subject in fourth Semester:

Theory Total 60 marks

Duration 180 minutes

Sl. No.	Question	Question asked	Question to attempt	Marks	Max Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	2	2	2 x 10	20	20	20	100
2.	Short Essay Question	5	5	5 x 5	25			
3.	Short Answers	5	5	5 x 3	15			

PRACTICAL 1: BRTT22

Practicals: 50 Hours

1. Cobalt-60 machine: Various parts, its working, its accessories, beam direction devices and control console.
2. Linear Accelerator: Various parts, it's working, its accessories, beam direction devices and control console.
3. Brachytherapy: Various parts, it's working, its accessories and control console
4. CT Simulator: Various parts, it's working, its accessories and control console

Practical Assessment

Scheme of Practical Examination for fourth Semester

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical 1	80	20	100

PAPER 2 – BRTT20

Theory: 45 hours

RADIATION THERAPY PHYSICS

Unit 1: Dose distribution and scattering in medium

Properties of phantom materials and various types of phantoms, depth dose distribution, dose build-up, percentage depth dose and its influencing factors. Back scatter factor, tissue-air-ratio and influencing factors. Relation between TAR and PDD. Scatter-air-ratio. Introduction of Clarkson 's method.

Unit 2: Basics of Dosimetric calculations:

Dose calculation parameters, collimator scatter factor (S_c), phantom scatter factor (S_p), Tissue phantom ratio (TPR), tissue maximum ratio (TMR), and their influencing factors. Relationship between TMR and **PDD**. Scatter maximum ratio (SMR). Monitor Unit Calculation of SAD, SSD and Arc techniques for Tele cobalt and Linear Accelerator.

Unit 3: Isodose distribution of photon beam

Isodose charts, measurement of Isodose curves, parameters of Isodose curves: beam quality, source size, SSD and SDD — penumbra effect, collimation and flattening filter, field size, Wedge filters: wedge angle, wedge transmission factor, wedge systems, effect of beam quality, design of wedge filters. Bolus, tissue compensators, shielding blocks- block thickness, block divergence, Field shaping: custom blocking, independent jaws, multileaf collimators, skin dose, electron contamination of photon beams, dose distribution in build-up region, skin sparing effect of absorber skin distance effect of field size.

Unit 4: Electron beam therapy

Electron interactions, rate of energy loss, collisional losses (ionization and excitation) radiation losses (bremsstrahlung), polarization, stopping power, absorbed dose, electron scattering, most probable energy, mean energy, energy at depth. Introduction of absorbed dose, output calibration, phantom, reference depth and field size, depth dose distribution, central axis depth dose curves, isodose curves for different electron energies. Basic of Field flatness and symmetry, beam collimation, field size dependence, electron source, x-ray contamination.

References

- 1) The Physics of Brachytherapy C A Joslin, A Flynn Erica Hall
- 2) Walter and Millers, Text Book of Radiotherapy, Radiation Therapy Physics, Therapy and Oncology. C.K. Bomford, 6th Edition, Churchill Living Stone.
- 3) The physics of radiation therapy, Faiz M. Khan, 4th edition (2010), Lippincott Williams

Scheme of examination

Type of questions and distribution of marks for Theory examination in each subject in Fourth Semester:

Theory Total 60 marks

Duration 180 minutes

Sl. No.	Question	Question asked	Question to attempt	Marks	Max Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	2	2	2 x 10	20	20	20	100
2.	Short Essay Question	5	5	5 x 5	25			
3.	Short Answers	5	5	5 x 3	15			

PRACTICAL 2: BRTT23

Practicals: 50 Hours

1. Measurement of TAR, SF, PDD, TPR, TMR
2. Basics of Dosimetric calculations
3. Isodose distribution of photon beam
4. Electron and Photon Beam characteristic
5. Different types of Ionisation chambers used for dosimetry of photons & electrons
6. Beam Modifying devices demonstration

Practical Assessment

Scheme of Practical Examination for Fourth Semester

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical 2	80	20	100

PAPER 3 – BRTT21

Theory:45 Hours

ONCOLOGY SCIENCE

Unit 1: Basics of Oncology

Epidemiology, etiology, pathology, route of spread (local, regional lymphatic & distant hematogenous), performance status, signs and symptoms, clinical examination, diagnosis (FNAC, biopsy, laboratory tests, imaging methods).

Unit 2: Staging and treatment overview

Staging and grading (TNM staging system, other commonly used systems), prognosis, stage wise overall treatment flowchart (neo-adjuvant, radical, adjuvant, palliative) of different site wise malignancies & non-malignant diseases.

Unit 3: Primary management of malignancy

Surgery, Radiation Oncology and chemotherapy with special focus to indications of Radiation Oncology. Radiation Oncology treatment technique, planning (2D conventional, 3D conformal), dose prescription & OAR constraints in radiation treatment for cancer of different anatomic sites Skin, lip, oral cavity, Para nasal sinus, nasopharynx, oropharynx, hypopharynx, larynx, thyroid, postcricoid, Oesophagus, mediastinum, lungs, pancreas, liver, breast, cervix, body of the uterus, vagina, vulva, kidney, ureter, bladder, rectum, prostate, penis, testis, scrotum, bone marrow, CNS, eye, orbit, soft tissue & bone, paediatric tumor - retinoblastoma, Wilms tumor, rhabdomyosarcoma.

Unit 4: Imaging in Oncology

2D (radiography, fluoroscopic, USG), 3D (CT, MRI) and functional (PET/SPECT) imaging and their application in radiotherapy planning

Unit 5: Tumor Delineation

Understand Gross Tumour Volume (GTV), Clinical Target Volume (CTV), Internal Target Volume (ITV), Planning Target Volume (PTV), Organs at Risk (OAR) delineation

Unit 6: Basics of Palliative & supportive care

Care of Terminally ill cancer patients. Specialized oncology care pertaining to the needs of cancer patients – Palliation Pain Management Patient's and relatives counseling on end stage management.

References

- 1) Principles and Practice of Radiation Oncology, Carlos A Perez,
- 2) Principles and Practice of Radiation Therapy, G.K. Rath & B.K .Mohanthi.ILBS
- 3) Clinical Oncology for Medical Students and Physicians. Philip Rubin. American Cancer Society.
- 4) Radiation therapy in the management of cancers; Fletcher, Gilbert

Scheme of examination

Type of questions and distribution of marks for Theory examination in each subject in fourth Semester:

Theory Total 60 marks

Duration 180 minutes

Sl. No.	Question	Question asked	Question to attempt	Marks	Max Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	2	2	2 x 10	20	20	20	100
2.	Short Essay Question	5	5	5 x 5	25			
3.	Short Answers	5	5	5 x 3	15			

PRACTICAL 3: BRTT24

Practicals: 50 Hours

- 1) Differentiation of normal and cancer cells.
- 2) Orientation towards clinical examination of head and neck cancers.
- 3) Demonstration of pre-cancerous lesions.
- 4) Various instruments used in clinical examination
- 5) Procedure of clinical examination.
- 6) Pathological, diagnostic tests for various cancers.
- 7) Different methodology adopted for confirmation of diagnosis.
- 8) Importance of self-examination.

Practical Assessment

Scheme of Practical Examination for Fourth Semester

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical 3	80	20	100

Ability Enhancement Compulsory Course AECC02

Theory: 30 Hours

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:

- 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.

- 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.
- Unit III** Fundamental Rights and Duties - Their content and significance
- Unit IV** Directive Principles of State policies - The need to balance Fundamental Rights with
Directive Principles.
- Unit V** Special rights created in the constitution for Dalits, Backward class, Women and Children,
and the Religious and Linguistic Minorities
- Unit VI** Doctrine of Separation of Powers - Legislative, Executive and Judicial, and their functions 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 Certiorari, Mandamus, Quowarranto and Habeas Corpus.
- Unit X** Constitution and Sustainable Development in India.

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 Semester: 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

ELS04
Research Methodology & Bioethics

Theory: 30 Hours

Research Methodology:

- Introduction to Research Methodology
- Types of research methods
 - Qualitative
 - Quantitative
- Introduction to Cross Sectional, Case Control, Cohort, Experimental Design
- Introduction to qualitative methods (Participant Observation, Focus Groups discussion, In-Depth Interviews)
- Comparing Quantitative and Qualitative Research – Mixed method study

Bioethics

- Historical Perspectives
- General Principles on Ethical Considerations Involving Human Participants
- General Ethical Issues
- Ethical Guidelines in Qualitative Research
- ICMR Guidelines for biomedical Research
- Informed Consent process and informed consent form
- Composition & Functions of Institutional Ethical Committee/ Independent Review Boards (IRB)
- Duties & Roles of Principal Investigator/sponsor

Fundamentals of Health Education & Communication**Introduction to Health Education and health promotion**

1. Introduction to Health education(Definition, Changing concepts, aims and objectives, role health care providers)
2. Introduction to Health promotion: Definition, concepts, objectives, principles and strategies)
3. Aims, purposes, principles and scope of health education in relation to health promotion.
4. Role of health Education Specialists.
5. Approaches and models in Health education
6. Distinguishing between education and propaganda.
7. Role of health education/health promotion in primary health care
8. Models of Health behavior change – Health belief model in detail
9. Child to Child approach
 - Meaning, elements and types of communication, principles of effective communication, Mass Communication.

10. Health Education Methods and Media

- **Appraisal of various methods of health education such as:**
 - Individual methods: Counseling and interview.
 - Group methods: Demonstration, group discussion, buzzes session, field trip, workshop, symposium, mini-lecture, brainstorming, role play and dramatization .
 - Mass methods: Exhibition, advertisement, film show, public addressing system, Speeches, radio broadcasting, and television telecast.
- Various types of health education media, its advantages and disadvantages and uses
 - Audio- radio programme, songs, stories
 - Visual – poster, flash cards, flip chart, hand puppets, hand bill, pamphlets, slides show hoardings/ banners, models
 - Audio and visual – film/ video, television
 - E -media
- Preparation of selected health education media in classroom and field setting:
poster, flashcard, flip chart, hand puppets, models, pamphlets, slides song ,video film.

Preparation of lesson plan, and classroom teaching.

FIFTH SEMESTER

S.No	Subject code	Name of the Subject	Theory Credits	Practical Credits	Clinical Posting	Total Credits
1	BRTT25	Quality Assurance in Radiation Therapy	02			02
2	BRTT26	Patient Positioning & Simulation	02			02
3	BRTT27	Radiotherapy Treatment Techniques I	02			02
5	ELS05	Elective Subject (Hospital Administration/ Disaster Management)	02			02
6	BRTT28	Quality Assurance Radiation Therapy		02	02	04
7	BRTT29	Patient Positioning & Simulation		02	02	04
8	BRTT30	Radiotherapy Treatment Technique I		02	02	04
Grand Total						20
1-hour lecture =1 credit, 2-hour Practical= 1 credit, 2-hour Clinical Posting – 1 credit						

FIFTH SEMESTER

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	BRTT25	Paper 1	Quality Assurance in Radiation Therapy	60 + 20 + 20	100
2	BRTT26	Paper 2	Patient Positioning & Simulation	60 + 20 + 20	100
3	BRTT27	Paper 3	Radiotherapy Treatment Techniques I	60 + 20 + 20	100
4	ELS05	Paper 4	Elective Subject (Hospital Administration/ Disaster Management)	80 + 20	100
Grand Total					400

Sr. No.	Subject Code	Practical	Subjects	Practical +IA	Total
5	BRTT28	Practical 1	Quality Assurance Radiation Therapy	80+20	100
6	BRTT29	Practical 2	Patient Positioning & Simulation	80+20	100
7	BRTT30	Practical 3	Radiotherapy Treatment Technique I	80+20	100
Grand Total					300

FIFTH SEMESTER

PAPER 1 – BRTT25

Theory: 45 Hours

QUALITY ASSURANCE IN RADIATION THERAPY

Unit 1: Quality Assurance equipments

Aim of Quality assurance, staffing requirements, qualification, roles and responsibility, Equipments required, dosimeter, survey meter, densitometer, clinical dosimeter – viz. diode dosimeters, Thermoluminescent dosimeter etc.

Unit 2: QA of Tele gamma Machine

Acceptance testing & commissioning of teletherapy machines, tele cobalt, beam congruence test, iso-center check, laser alignments, timer error, shutter error, periodic output calculations – Daily Checks, monthly checks - quarterly checks - annual checks

Unit 3: QA of Linear accelerator

Acceptance testing & Commissioning, isocentre accuracy -gantry, collimator and couch, beam congruence test, accuracy of mechanical or digital readout for gantry, couch, collimator rotation. Beam symmetry, jaw symmetry, uniformity checks, field flatness, wedges - wedge angle checking mechanical safety - collision devices check, Equipment - Radiation field analyzer - film densitometry

Unit 4: QA of Simulator/CT Simulator

Mechanical movements, isocentre - gantry - collimator couch check, beam congruence of field delineators and collimators. Mechanical safety devices - installation of collision devices - auto centering of image intensifier camera

Unit 5: Brachytherapy:

Aim - manual after loading - intracavitary sources - leak tests - uniformity of activity checks - auto radiograph swipe test - source identity - activity calibration - applicators - quality control of applicators - Interstitial sources - source uniformity - auto radiograph - activity calibration - source identity Remote after loading - source calibration - commissioning and acceptance of remote after loading equipments - source movements - pneumatic system air pressure check -

Unit 6: Treatment planning system:

Quality assurance - accuracy of data - percentage depth dose - tissue maximum ratio - scattered factors - collimator factors - etc - accuracy of interpolation techniques - accuracy of input and output devices such as digitizer, printer, plotter.

References

- 1) Medical Physics Handbook ,Fundamentals of Radiation Dosimetry ,JR Greening, Adam Hilgerltd, Bristol.
- 2) Radiotherapy :Principles and Practice, A Manual for quality in Treatment delivery, Sue E.Griffith, Churchill Livingstone.
- 3) Radiation Protection and Dosimetry, by Michael Stabin

Scheme of examination

Type of questions and distribution of marks for Theory examination in each subject in Fifth Semester:

Theory Total 60 marks

Duration 180 minutes

Sl. No.	Question	Question asked	Question to attempt	Marks	Max Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	2	2	2 x 10	20	20	20	100
2.	Short Essay Question	5	5	5 x 5	25			
3.	Short Answers	5	5	5 x 3	15			

PRACTICAL 1: BRTT28

Practical: 50 Hours

1. QA of Linear Accelerator
2. QA of CT Simulator
3. QA of Brachytherapy Unit
4. QA of TPS Unit
5. Demonstration of Brachytherapy Applicators

Practical Assessment

Scheme of Practical Examination for Third Semester

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical 1	80	20	100

PATIENT POSITIONING & SIMULATION

Unit 1: Principles of positioning and immobilization

- a) Positioning Aids-Breast boards, Lung boards, Belly boards, Head-and-neck fixation devices, Vacuum packs, Stereotactic systems, Patient Positioning and Knowledge of fixation techniques
- b) Internal organ motion control- Bite blocks, Gating systems, Active breathing control, Diaphragm compression, Prostate immobilization, Tracking systems, Laser/ positioning systems, Marking systems, Iso-center determination, Reference points, Treatment couch

Unit 2: Mould Room Techniques

- a) Immobilization Devices & techniques for patients and their preparation
- b) Beam shaping devices (block, compensators etc.) and their preparation
- c) Bolus material and their preparation
- d) Moulds for Brachytherapy
- e) Materials used for individual shielding including electron cutouts

Unit 3: Simulation techniques

- a) Image acquisition for planning (and/or verification)
- b) Modalities for image acquisition for planning
- c) Simulation- Conventional Simulation, CT Simulation, Virtual Simulation
- d) Image processing and archiving
- e) Documentation and Information management.

References

- 1) Practical Radiation Technical manual. Mould room Techniques for Teletherapy published by IAEA
- 2) Radiation Oncology: Rational technique and results .8thedition .James D & K. KhanAng.

Scheme of examination

Type of questions and distribution of marks for Theory examination in each subject in Fifth Semester:

Theory Total 60 marks

Duration 180 minutes

Sl. No.	Question	Question Asked	Question to attempt	Marks	Max Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	2	2	2 x 10	20	20	20	100
2.	Short Essay Question	5	5	5 x 5	25			
3.	Short Answers	5	5	5 x 3	15			

PRACTICAL 2: BRTT29

Practical: 50 Hours

1. Preparation of
 - a. Plaster of Paris cast , Perspex cast
 - b. Orfit/Aquaplast immobilization cast, Vaclocs
 - c. Shield (use of Styro foam Cutter)
 - d. Tissue Compensators
 - e. Electron Lead Cutout
 - f. Mouth Bite
2. AP/PA portals for pelvis in cancer cervix with SSD Techniques.
3. Simulation of four fields of pelvis in cancer cervix with SAD Technique.
4. Simulation of oblique fields for cancer esophagus with SAD Techniques.
5. Simulation of tangential field of a case of Ca. Breast
6. Simulation of whole Brain Irradiation

7. Abdomen, Extremities & Patient Positioning and decubitus.
8. Explain simulation process on CT Simulator for different sites

Practical Assessment

Scheme of Practical Examination for Third Semester

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical 1	80	20	100

RADIOTHERAPY TREATMENT TECHNIQUES -I

Unit 1: Conventional Treatment Techniques

Principles and working of asymmetric jaws in radiotherapy. Techniques in which asymmetric jaws are used. Use of asymmetric jaw movement to get virtual wedge, central shielding, matching of adjacent beams in breast, medulloblastoma etc.

Unit 2: Conformal Radiotherapy with Multi Leaf Collimator

Introduction to 3DCRT with MLC-Modern developments in MLC - Different categories of MLC commercially available MLC systems - Universal wedge – Enhanced Dynamic wedge for Linac-clinical application.

Unit 3: Intensity Modulated Radiotherapy

Introduction to IMRT - Understand Gross Tumour Volume (GTV), Clinical Target Volume (CTV), Internal Target Volume (ITV), Planning Target Volume (PTV), Organs at Risk (OAR) delineation Target and critical structure. Definitions for IMRT - Static MLC IMRT, Dynamic MLC IMRT, compensator based IMRT - comparison of IMRT delivery systems, Introduction to serial Tomotherapy and Helical Tomotherapy. VMAT-Arc Therapy

Unit 4: Image Guided Radiation Therapy

Concept of IGRT, uses of imaging modalities, intrafraction and interfraction variations, dedicated imaging systems for radiotherapy, in- room CT scanners, MV and KV imaging, techniques for guidance in radiation therapy settings- clinical procedures in employing X-ray imaging technologies.

Unit 5: Brachytherapy

Dosimetry systems for Intracavitary and interstitial brachytherapy, Applicators, tools, catheter, and other necessary items required for ICBT, ISBT, ILBT and Surface mould.

References

- 1) Technical basics of Radiation Therapy Levitt S H, Purdy J A
- 2) Radiation Oncology –Rationale, technique, & results – Moss
- 3) Short text book of radiotherapy; Walter and Miller

Scheme of examination

Type of questions and distribution of marks for Theory examination in each subject in fifth Semester :

Theory Total 60 marks

Duration 180 minutes

Sl. No.	Question	Question asked	Question to attempt	Marks	Max Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	2	2	2 x 10	20	20	20	100
2.	Short Essay Question	5	5	5 x 5	25			
3.	Short Answers	5	5	5 x 3	15			

PRACTICAL 3: BRTT29

Practicals: 50 Hours

1. Conventional treatment technique – Comparison between two field and four field technique for Ca. Cervix
2. Draw Isodose curves for Ca Rectum/Esophagus
3. 3DCRT/IMRT/IGRT treatment delivery
4. Explain applicators used and steps involved in Intracavitary brachytherapy
5. Explain applicators used and steps involved in Interstitial brachytherapy

Practical Assessment

Scheme of Practical Examination for fifth Semester

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical 3	80	20	100

ELS05

Theory: 30 Hours

Disaster & Emergency Management

A. Introduction to Disaster management

- Disaster definition, types of disaster
- Disasters in history
- Disaster trends
- Health problems common to all disasters
- Effects of disasters

B. Public Health aspects of disaster management

C. Modern disaster management – disaster cycle

D. Hazards

- Differences between Hazards and disasters
- Hazards identification and assessment
- Hazard mapping
- Hazard profiles

E. Risk

- Concept and categories of vulnerabilities
- Concept of parameters of risk
- Components of risks
- Risk assessment, analysis and perception

F. Mitigation

- Measures of Mitigation
- Types of mitigation
- Obstacles
- Assessing and selecting mitigation options
- Components of mitigation

Preparedness

- Overview of disaster preparedness
- Government preparedness
- Public preparedness
- Media management in disaster
- Obstacles

Response

- What is response
- Response to emergency
- Water management / food / shelter management
- Media response

Recovery

- Elements in recovery
- Principle's process of recovery

Agencies

- Role of government in disaster management
- Emergency planning

-stages

-Basic elements

BASICS OF HOSPITAL ADMINISTRATION

- Evolution and classification of Hospitals, functions of hospitals
- Introduction, History and growth of management science - Classical, Behavioral and Management sciences
- Functions of management
- Analytical skill and Decision Making models.
- Leadership style and theories
- Employee Centered Management
- Time Management
- Interpersonal skills
- Motivation and Theories of Motivation
- Basic Principles of Communication & Barriers of Communication.
- Principle, policies and procedure for material management
- Inventory Management Techniques & Tools
- Health Insurance – Evolution of Insurance, IRDAI, TPA
- Consumer Protection Act
- Introduction to accounting & financial statement, Budgets & Budgeting
- Health Maintenance Organization (H.M.O)
- Public Private Partnership
- Objective of HMIS/Need and purpose of MIS
- BMW – Biomedical waste management
- Accreditation – NABH & NABL

SIXTH SEMESTER

S.No	Subject code	Name of the Subject	Theory Credits	Practical Credits	Clinical Posting	Total Credits
1	BRTT31	Radiotherapy Treatment Techniques II	02			02
2	BRTT32	Radiation Safety and Standards	02			02
3	BRTT33	Special RT Techniques & Recent Advances	02			02
5	ELS06	Elective Subject : Biomedical research and Medical Ethics in Radiotherapy // Basics of Biomedical Engineering	02			02
6	BRTT34	Radiotherapy Treatment Techniques II		02	02	04
7	BRTT35	Radiation Safety and Standards		02	02	04
8	BRTT36	Special RT Techniques & Recent Advances		02	02	04
Grand Total						20
1-hour lecture =1 credit, 2-hour Practical= 1 credit, 2-hour Clinical Posting – 1 credit						

SIXTH SEMESTER

Scheme of Examination:

Sr. No.	Subject Code	Theory	Subjects	Theory + IA + Viva Voce	Total
1	BRTT31	Paper 1	Radiotherapy Treatment Techniques II	60 + 20 + 20	100
2	BRTT32	Paper 2	Radiation Safety and Standards	60 + 20 + 20	100
3	BRTT33	Paper 3	Special RT Techniques & Recent Advances	60 + 20 + 20	100
4	ELS06	Paper 4	Elective Subject : Biomedical research and Medical Ethics in Radiotherapy // Basics of Electricity and Electronics	80 + 20	100
Grand Total					400

Sr. No.	Subject Code	Practical	Subjects	Practical + IA	Total
5	BRTT35	Practical 1	Radiotherapy Treatment Techniques II	(Major 50 + Minor 30) + 20	100
6	BRTT36	Practical 2	Radiation Safety and Standards	(Major 50 + Minor 30) + 20	100
7	BRTT37	Practical 3	Special RT Techniques & Recent Advances	(Major 50 + Minor 30) + 20	100
Grand Total					300

SIXTH SEMESTER

PAPER 1: BRTT31

Theory: 45 Hours

Radiotherapy Treatment Techniques II

Unit 1 Treatment Execution

- a) Ensuring the Target volume, Organs at risk, Tumor Dose- Mean, Maximum, Minimum dose, Number of Fractions, Normal Tissue Tolerance, Dose Prescription in patient Treatment Charts
- b) Patient Positioning, Immobilization and Reproducibility, setup procedures, manual computer assisted, data verification, Registration or recording, dose monitoring, verification, documentation of all the above in patient charts

Unit 2: On Board Imaging Techniques

- a) MV Imaging – 2D Radiograph, 2D-MV/MV imaging & 2D/3D MV imaging, MVCBCT
- b) KV Imaging – 2D Radiograph, 2D-KV/KV imaging & 2D/3D KV imaging, 2D KV/MV imaging, 3D/3D KVCBCT
- c) Triggered Imaging
- d) 4D CBCT Imaging
- e) 4D Gated CBCT Imaging
- f) Short Arc CBCT Imaging
- g) Iterative CBCT Imaging
- h) Extended CBCT Imaging

Unit 3: Treatment Verification

- a) Imaging protocols - Development and implementation
- b) Online and offline correction Protocols
- c) Matching or Co registration procedures – Bony and soft tissue matching,
- d) Geometric uncertainties
- e) Documentation
- f) Information Management.

Unit 4: Brachytherapy

- a) Knowledge of use of radionuclides and after loading equipment (low, medium, high and pulsed dose rate)
- b) Preparation of the source holders (applicators, catheters)
- c) Preparation of the patient including radiographs for dosimetry and preparation of the Moulds.

- d) Monitoring of the patient before, during and after treatment
- e) Accurate and complete recording of documentation of all the parameters relevant to the treatment
- f) After care of the used radioactive sources with emphasis on safety

References

- 1) Radiation Therapy Planning – Gunilia C Bentel
- 2) Short text book of radiotherapy; Walter and Miller
- 3) Principles and practice of Radiation Oncology= Perez & Brady

Scheme of examination

Type of questions and distribution of marks for Theory examination in each subject in sixth Semester :

Theory Total 60 marks

Duration 180 minutes

Sl. No.	Question	Question asked	Question to attempt	Marks	Max Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	2	2	2 x 10	20	20	20	100
2.	Short Essay Question	5	5	5 x 5	25			
3.	Short Answers	5	5	5 x 3	15			

PRACTICAL 1: BRTT35**Practicals: 50 Hours**

- 1) Explain different steps in radiotherapy treatment planning.
- 2) Patient Positioning during treatment for LINAC & Brachytherapy
- 3) Record and verification system in External Radiotherapy
- 4) To explain the various steps in verification Image acquisition and matching
 - a) Port Film
 - b) 2D Radiograph Image Matching
 - c) 3D Image Matching
- 5) Online verification of patient set-up by EPID (Head & Neck/Thorax/Pelvis)
- 6) Online verification of patient set-up by 3D matching (Head & Neck/Thorax/Pelvis)

Practical Assessment**Scheme of Practical Examination for Sixth Semester**

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical 1	80	20	100

RADIATION SAFETY AND STANDARDS

Unit 1: Radiation protection quantities:

Equivalent Dose, effective dose, committed equivalent dose, committed effective dose, radiation weighting factor, Tissue weighting factor, Concepts of collective dose, Annual Limit Intake (ALI), Derived Air Concentration (DAC). Operational quantities and their need: Dose equivalent-Ambient and directional dose equivalents, personnel dose equivalent ICRU conversion coefficients from air kerma to operational quantities. Radiation dose to individuals from natural radioactivity in the environment and man-made sources.

Unit 2 Radiation Protection Standards:

Basic concepts of radiation protection standards, Historical background, International Commission on Radiological Protection and its recommendations, The system of Radiological protection – Justification of Practice, Optimization of Protection and dose limitation. Potential exposures, dose and dose constraints – System of protection for intervention – Categories of exposures – Occupational, Public and Medical Exposures - Permissible levels for neutron flux Factors governing internal exposure - Radionuclide concentrations in air and water contamination levels.

Unit 3: Regulatory requirements

National Regulatory Body, Responsibilities, organization, Safety Standards, Codes and Guides, Responsibilities of licensees, registrants and employers and Enforcement of Regulatory requirements

Unit 4: Radiation Hazard evaluation and control

Philosophy of radiation protection, Effect of Time, Distance and Shielding, Calculation of workload, Calculation of Weekly dose to the radiation worker and general public, good work practices in diagnostic radiology and/or radiotherapy practices (including teletherapy and Brachytherapy), Planning consideration for radiology and/or radiotherapy installation including work load, use factor & occupancy factors, effect of different shielding material.

Unit 5: Radiation Emergency Preparedness

Safety and security of radiation sources, case histories of emergency situations and preparedness, equipments and tools including role of Gamma Zone Monitor, Regulatory requirements and prevention of emergency, Preventive maintenance and Safety Culture, Role of RTT in handling radiation emergencies.

References

- 1) Fundamental safety principles , IAEA Safety Standards for protecting people and the environment
- 2) Applying Radiation Safety Standards in Radiotherapy Safety Reports Series38 IAEA.
- 3) Quality and Safety in Radiotherapy Todd Pawlicki, Peter Dunscombe et al
- 4) Principles of Imaging Science and Protection, Michael A. Thompson, Janice D. Hall, Marian P. Hattaway, Steven B. Dowd
- 5) Physics for Radiation Protection. James E Martin A Wiley – Interscience Publication
- 6) AERB Safety Code “ Teletherapy Installations”
- 7) AERB Safety Code “ Brachytherapy sources; Equipment and Installations
- 8) AERB Safety Code “ Medical Diagnostic X ray; Equipment and Installations

Scheme of examination

Type of questions and distribution of marks for Theory examination in each subject in Sixth Semester :

Theory Total 60 marks

Duration 180 minutes

Sl. No.	Question	Question asked	Question to attempt	Marks	Max Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	2	2	2 x 10	20	20	20	100
2.	Short Essay Question	5	5	5 x 5	25			
3.	Short Answers	5	5	5 x 3	15			

PRACTICAL 2: BRTT36**Practical: 50 Hours**

- 1) Radiological Protection Survey of LINAC, Brachytherapy and CT Simulator Installations
- 2) Personal dosimetry devices: Film badges, TLD badges, pocket ion chambers
- 3) Explain handling of emergency in LINAC
- 4) To explain handling of emergency in BRACHYTHERAPY
- 5) Security plans for LINAC, Brachytherapy
- 6) Workload and Shielding calculation in radiotherapy

Practical Assessment**Scheme of Practical Examination for Sixth Semester**

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical 2	80	20	100

SPECIAL RT TECHNIQUES AND RECENT ADVANCES

Unit 1: Introduction to special techniques

- a) Introduction to various latest techniques like VMAT, IGRT, SRS, SRT, SBRT, Tomotherapy, and Cyberknife.
- b) Stereo tactic irradiation methods - Physics, principles, Merits and demerits of Stereotactic Radio surgery (SRS) and Stereotactic Radiotherapy (SRT), Stereotactic Body Radiotherapy (SBRT)
- c) PET in radiotherapy treatment planning
- d) O-Gantry treatment techniques (Halcyon & Ethos)
- e) MR Linac Treatment techniques

Unit 2: Motion Management Techniques

- a) Challenges with moving targets
- b) Breath hold, motion reduction Techniques, 4DCT, Fluoroscopy based tracking, Real time tumor tracking
- c) Advantages of motion reduction
- d) Adaptive radiotherapy.

Unit 3: Advancement in Brachytherapy

- a) Intra-operative radiotherapy
- b) Image guided brachytherapy

Unit 4: Special teletherapy techniques

- a) Total body irradiation (TBI),
- b) Hemi Body Irradiation(HBI),
- c) Total Marrow and Lymphoid Irradiation (TMLI)
- d) Total Skin Election Therapy (TSET)
- e) Electron Arc Therapy (EAT)
- f) Cranio-Spinal Irradiation (CSI)
- g) Pediatrics Treatment

Unit 5: Patient Specific Quality Assurance

- a) Pre-treatment patient specific Quality assurance of precision and Special Techniques
- b) In vivo dosimetry for Special Techniques
- c) Quality Assurance for Special Techniques

References

- 1) Principles and Practice of Radiation Oncology, Carlos A Perez,
- 2) New Technologies in Radiation Oncology – L. W. Brady.

3) IMRT, IGRT, SBRT –Advances in treatment planning Meyer JL

Scheme of examination

Type of questions and distribution of marks for Theory examination in each subject in Sixth Semester:

Theory Total 60 marks

Duration 180 minutes

Sl. No.	Question	Question asked	Question to attempt	Marks	Max Marks	Internal Assessment	Viva	Total Marks
1.	Long Essay Question	2	2	2 x 10	20	20	20	100
2.	Short Essay Question	5	5	5 x 5	25			
3.	Short Answers	5	5	5 x 3	15			

PRACTICAL 3: BRTT37

Practicals: 50 Hours

1. Explain different steps in stereotactic radiotherapy treatment planning.
2. Explain steps involved for 4D treatment planning.
3. Explain various steps for treatment for Total Body Irradiation.
4. Explain steps involved for treatment of medulloblastoma.
5. Explain recent advancement in RT Techniques.

Practical Assessment

Scheme of Practical Examination for Sixth Semester

Sr. No.	Practical	Practical	IA	Grand Total
1	Practical 3	80	20	100

PAPER 4: ELS06

BIOMEDICAL RESEARCH & MEDICAL ETHICS IN RADIO THERAPY

Biomedical Research Methodology

Research Methodology

Unit 1: Introduction to research methodology

Types of research; Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, Some Other Types of Research

Unit 2: Study Designs-Observational Studies

Epidemiological study designs; Observational studies, Descriptive studies; Case reports, Case series, Analytical studies; Case control studies, Cohort studies, Cross sectional Unit III

Unit 3: Experimental Studies

Experimental studies (Interventional studies); Randomized control trials (Clinical trials), Field trials, Community trials, Nm - Randomized trials

Unit 4

Uses of Epidemiology

Unit 5

Application of study Designs in Medical Research

Unit 6: Introduction to Biostatistics

Meaning, Branches of statistics, uses of statistics in medicine, Basic concepts & scales of measurement, collection of data and presentation of data.

References

1. K.R.Sundaram, S.N.Dwivedi and V Sreenivas (2010), Medical statistics, Principles and Methods, BI Publications Pvt Ltd, New Delhi
2. NSN Rao and NS Murthy (2008), Applied Statistics in Health Sciences, Second Edition, Jaypee Brothers Medical Publishers (P) Ltd.
3. J.V.Dixit and L.B.Suryavanshi (1996), Principles and practice of biostatistics, First Edition, M/S Banarsidas Bhanot Publishers.
4. GetuDegu and Fasil Tessema (2005), Biostatistics, Ethiopia Public Health Training Initiative.

5. Essentials of Community Medicine for Allied Health Sciences, JSS University Publications, 20.
6. Park K. Park's Textbook of Preventive and Social Medicine. 23rd ed. Jabalpur: Banarsidas Bhanot Publishers, 2015. p.135-141.
7. Suryakantha. Textbook of Community medicine with recent advances. 4th edition.
8. Bhalwar R. Textbook of Public Health and Community Medicine. 2nd Edition. Pune, Department of Community Medicine AFMC, 2012.
9. Leon Gordis. Epidemiology Fourth Edition - Elsevier Saunders Publication.

Medical Ethics in Radiotherapy

Theory 45

Hours

Patient Care:

General Care of the patients, Lifting and moving techniques for patients and staff safety. Basic nursing procedure for patient care and emergency situations first aid to include CPR

Procedure in Radiotherapy department

Room preparation, equipment, treatment review and documentation necessary and importance of follow-up assistance with procedures or examinations. Instructions to patients

Care of cancer patients- Patient privacy, nutrition, skin care, universal precautions, dietary advice, lab investigations

Care under specific circumstances – catheter, stroma, wound care, unconscious patient, physically disabled, mentally disturbed, deaf, blind, diabetes.

Patient management on treatment

Side effects related to RT, Acute and Late management of side effects and documentation.

Legal aspects, confidentiality, informed consents and data protection

References

- 1) A Nurse's guide to cancer care , Brenda M. Nevidjon, Lippincott
- 2) Practical nursing and first aid. Ross and Wilson. Livingstone.
- 3) Basic Medical techniques and patient care for radiology technologists, second edition

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. Internal Assessment : 20 Marks

ELS06

Theory: 30 Hours

Basics of Biomedical Engineering

Topics

- Insulators and conductors
- Units of measurements
- Electrical power transmission
- Resistors, capacitors and inductors
- Regulated power supply
- Voltage stabilizers
- Uninterrupted power supply systems
- Amplifiers – AC and DC
- Differential amplifiers
- Input impedance
- Output impedance
- Gain and amplification
- Noise
- Common Mode Rejection Ratio (CMRR)
- Filters - Principles
 - High frequency filters
 - Low frequency filters
 - Band Pass filters
- Analog to digital converter (ADC) and Digital Analog converter (DAC)

- Sensitivity & Gain
- Averaging principles

Internal Assessment

1. There shall be a minimum of two periodical tests preferably one in each term in theory and practical of each subject in an semester, and the average marks of the two tests will be calculated and reduced to 20 or 10 as applicable and the marks are to be communicated to the University at least 15 days before the commencement of the University examination.
2. The marks of the internal assessment must be displayed on the notice boards of the respective departments.
3. If a candidate is absent for anyone of the tests due to genuine and satisfactory reasons, such a candidate may be given a re-test.

Declaration of result

1. Criteria for pass

- a. Main Subjects:** A candidate is declared to have passed the examination in a subject, if he / she secure 40% of the total marks in Theory and Practical separately. (Theory includes University written examination and Theory Internal marks. Practical includes University Practical examination marks along with Practical Internal assessment marks and Viva Voce marks). Pass will be declared based on the Paper and not on individual subject. Eg: For Pass in Paper No III (Pathology and Microbiology) of 1st year, A candidate must get in minimum of 40% marks together in Pathology and microbiology.
- b. Subsidiary Subjects:** The minimum marks for a pass in a subsidiary 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 as started para ‘a’ above).
- d.** A candidate shall be declared to have passed the examination if he / she passes in al the main subjects.

Carry over benefit

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.

Declaration of Results (Class):

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.

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
40-49.99	P (Pass)	5	Pass
Less than 40	F	0	Fail
Absent	AB	0	Fail

Conversion of Grades in to **Semester Grade Point Average (SGPA)**:

$$\text{SGPA} = \frac{\text{Credits} \times \text{grade points}}{\text{Total Credits}}$$

Cumulative Grade Point Average (CGPA) of all six semesters will be calculated as: Total No. of SGPA / No. of Semester

Examiners:

- There should be minimum two examiners, one internal from the same University and one external
- Examiners for the First year subjects shall have Postgraduate degree in the respective subject with 3 years teaching experience or M.Sc. (Medical) with 5 years teaching experience.

BACHELOR IN HOSPITAL ADMINISTRATION (B.H.A)

Syllabus / Curriculum

2023-24



Accredited 'A' + Grade by NAAC (3rd Cycle)

Placed in Category 'A' by MHRD (GoI)

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH

J N Medical College, Nehru Nagar, Belagavi - Karnataka, India

Phone: +91 0831-2472777, 2493779, FAX: +91 0831 - 249377

E-mail: info@kledeemeduniversity.edu.in Website: kledeemeduniversity.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 health 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 program 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 pillar, a symbol of the "KAHER of Excellence "built on strong values & principles.

The Palm and the Seven Stars...

The Palmist he 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 andintensedesirefor"DnyanaDasoha"laidthefoundationforcreatingtheknowledgecalledKLE 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 withitsstrength,maturityandwisdomforeverstrivetoempowerthestudentcommunitytobecome globallycompetentprofessionals.Ithasbeenaguidingforceformanystudentgenerationsinthe past, and will continue to inspire many forthcoming generations.

Section I

Preamble:

Hospital Management is one of the most recent concepts in the field of management courses. It is the most important lucrative career in the health sector. In the early days, senior specialists used to perform the role of a hospital manager. At present, the things are changed & the services of these professionals are required for the smooth functioning of hospitals. Also the amount of money being invested in hospital and healthcare industry is so huge that it requires specialized /qualified administrators to manage it. The term which applies to those professionals who organize, coordinate, direct and supervise the delivery of medical services is "*medical and health services manager*".

The aim of the course is to impart a comprehensive knowledge and skills in the field of Administration and management of the hospital. With the corporatization of the hospitals and the increasing investment in the health industry it has been the need of the day to have professional hands to run it. The accreditation process, quality control measures, implementation of the modern techniques etc. requires trained administrators. The course aims to impart this knowledge and skills.

Section II

Vision: The program's vision is to create a bunch of post graduates to provide leadership and to cater the need of the healthcare industry for the present and future.

Mission: The programme is carefully designed to develop a cadre of professional managers for the rapidly growing hospital sector. As the healthcare industry has become increasingly complex technical environment, engaging people with widely divergent skills. Hence there is a need to manage them efficiently and effectively.

Objectives:

- To train students in the field of Hospital Administration and Management.
- To provide scientific approach and optimal tools to improve managerial skills.
- To develop strategic thinking and critical awareness of their management style and constantly weigh its appropriateness to deal with various professional groups, skilled and unskilled staff, patient and their families and members of the community.

Section III

Regulations Governing BHA

3.1 Eligibility for Admission:

To be eligible for admission a candidate shall have obtained: A two year Pre University examination or its equivalent as recognized by Rajiv Gandhi University of Health Sciences with any principle subjects of study OR Pre degree course from a recognized University / Board (two years after ten years of schooling) with any principle subject of study.

3.2 Duration: It is a 4-years (8-semester) full time degree course.

3.3 COURSE OF STUDY:

1. The course shall have 6 semesters in First year and 2 semesters in the Second year & Third year

2. Theory: Four hours of theory class work for five week days adds up to twenty (20) hours of theory class work per week which includes didactic lectures, interactive sessions, seminars and tutorials. Course instruction is in English only.
3. Practical Training: The students shall spend 2 hours per day i.e. 10 hours per week for practical training. The duration of the training shall be 2 weeks (20 Hours) for Major departments and 1 week (10 hours) for Minor departments. They will prepare a brief report on department visit and present to the faculty. In each semester, students will be assigned to 6 departments; a total of 24 departments shall be covered.
4. Note: Daily three hours of theory classes and Four hours of practical training at the departments for five week days, every week for twenty weeks will ensure Six hundred (585) hours of available training period during each semester. (Refer Table of Teaching Hours

3.4 Proposed Intake of candidates: 30

3.5 Medium of Instruction & Examination: English

3.6 Training, Teaching and Learning Activities:

A candidate pursuing course shall work/study in the department as a full time candidate. No candidate shall be permitted to run a clinic/laboratory/nursing home etc. while studying.

3.7 Monitoring Progress of Studies:

Log Book: Every candidate shall maintain a log dairy and record his/her participation in department posting, ward postings, seminar, journal club etc. The work diary shall be scrutinized & certified by the HOD.

3.8 EVALUATION SCHEME:

Eligibility for appearing at the University Examination:

Requirement of attendance shall be 80%. If a student is short of attendance in any of the subjects, the candidate shall not be permitted to appear for the entire examination. Every student should complete & submit Synopsis in Second Semester and dissertation in fourth semester to get eligibility for examinations.

Internal Assessment:

Theory:

Twenty marks will be assigned for internal assessment of which 10 shall be for presentations in Area Presentations (practical), Seminars and Journal clubs, and 10 for sessional tests, attending conference, class attendance in each subject. A minimum of one sessional tests and one preliminary test shall be conducted in each subject and average of any two best marks obtained in the tests shall be taken into consideration for calculation of internal assessment.

3.10 Practical training: Assessment is done for each department posting, as area presentation. A logbook in the prescribed format need to be maintained by each student.

To be eligible to appear for the university examination the student should get minimum 50% marks in internal assessment in both theory and practical assessments.

3.11 UNIVERSITY EXAMINATIONS:

There shall be four examinations one each at the end of each semester. Only those candidates who have requisite attendance and satisfactory progress, duly certified by the Head of the Department and also the Head of the Institution will be permitted to appear for the examination. The University shall notify the semester examination accordingly.

3.12 CRITERIA FOR PASSING:

In first, second, third & forth semester, for a pass, a candidate shall secure a minimum of 40% marks in the University theory examination in each subject and an aggregate of 50% of the total marks for the subject, which includes marks obtained in theory, internal assessment (theory) and separately 50% in the viva-voce examination (practical, viva-voce & internal assessment together).

Carry over:

A candidate can carry over only two subjects from any of the semester at a time. It is to be noted that He/She shall clear all subjects of first to Seventh semester to become eligible to appear for the final semester examination.

3.13 Scheme of Examinations for all Theory Subjects in all 4 Semesters:

Sr.no	Semester	Subjects	IA + THEORY	Grand Total
1	Semester 1 to Semester6	All Papers(including subsidiary)	20 + 80	2500
2	Semester 6	Project Work/ Practical & Comprehensive Viva	20 + 80	100

DISTRIBUTION OF TYPE OF QUESTIONS AND MARKS FOR VARIOUS SUBJECTS

TYPE OF QUESTIONS	NUMBER OF QUESTIONS	NO. OF QUESTIONS TO BE ANSWERED	MARKS FOR EACH QUESTION	TOTAL
Long Essay	3	2	10	20
Short Essay	10	8	5	40
Short Notes	12	10	2	20
Internal assessment				20

MANAGEMENT OF HOSPITAL SERVICES: (Practical of Fifteen Days)

Objective: To make students familiar and conversant with planning, organization staffing, work scheduling, control of quality and cost of various service departments of hospital. The course emphasizes on workflow analysis of records and statistics analysis of utilization of facilities and staff and need for development and growth

<u>S.No</u>	<u>Department</u>	<u>S.No</u>	<u>Department</u>
1	Dietary Services	14	Nursing Service
2	Biomedical Waste Management	15	Critical Care areas
3	Medical Records Department	16	Operation Theatre
4	Pharmacy	17	Radiology Services
5	Stores and Material Management	18	Laboratory Services
6	Central Sterile Supply Department	19	Public Relations
7	Laundry & Linen	20	Family Welfare Services
8	House keeping	21	Administration and Personnel Management Services
9	Security	22	Accounting and Billing Services
10	Emergency Services	23	Biomedical Engineering
11	Mortuary	24	Civil Engineering & Maintenance
12	Out Patient Services	25	Information Technology Department
13	In Patient Services	26	Logistic Services
		27.	NABH & NABL

SECTION IV

Table - I Distribution of Teaching Hours in Subjects

Main Subjects:

SEMESTER		MAIN SUBJECTS	Marks	CREDIT HOURS
I Semester	1	Principles of Management	100	4
	2	Medical Terminology	100	3
	3	Fundamentals of Accounting	100	4
	4	Kannada - Subsidiary Subject	50	2
	5	English -- Subsidiary Subject	50	3
	6	Ward Posting/Dept. Postings		11
			Total	27
II Semester	1	Hospital & Health System(History & Evolution)	100	4
	2	Organizational Behavior	100	4
	3	Bio Statistics	100	4
	4	Constitution of India - Subsidiary Subject	100	4
	5	Ward Posting/Dept. Postings		11
			Total	27
III Semester	1	Health Economics	100	4
	2	Epidemiology & Public Health Administration	100	4
	3	Hospital Operations Management –I (Clinical Services)	100	4
	4	Research Methodology & Operations Research	100	4
		Ward Posting/Dept. Postings		11
			Total	27
IV Semester	1	Hospital Medical Records Management	100	4
	2	Project Management	100	4
	3	Hospital Operations Management –II (Non -Clinical Services)	100	4
	4	Computer Fundamentals	100	4
		Ward Posting/Dept. Postings		11
				Total
V Semester	1	Management Information System	100	4
	2	Strategic Management	100	4
	3	Cost Accounting in Healthcare	100	4

	4	Hospital Hazards & Disaster Management	100	4
		Ward Posting/Dept. Postings		11
			Total	27
VI Semester	1	Quality in Health Care	100	4
	2	Human Resource Management	100	4
	3	Material planning & Management	100	4
	4	Financial Management in Healthcare	100	4
	5	Ward Posting/Dept. Postings		11
			Total	27
VII Semester	1	Marketing Management in Healthcare	100	4
	2	Management Accounting in Healthcare	100	3
	3	Hospital Related Law	100	4
	4	NABH	100	5
	5	Ward Posting/Dept. Postings		11
			Total	27
VIII Semester	1	Project Work	100	4
	2	Internship	100	13
	3	Viva-Voce	200	
	4	Ward Posting/Dept. Postings		10
			Total	27

COURSE CONTENT

	MAIN SUBJECTS	WRITTEN PAPER		IA	MARKS TOTAL
		Duration	Marks	MARKS	
FIRST SEMESTER					
1	Principles of Management	3 Hours	80	20	100
2	Medical Terminology	3 Hours	80	20	100
3	Fundamentals of Accounting	3 Hours	80	20	100
4	Hospital & Health System(History & Evolution)	3 Hours	80	20	100
SECOND SEMESTER					
1	Organizational Behavior	3 Hours	80	20	100
2	Bio Statistics	3 Hours	80	20	100
3	Health Economics	3 Hours	80	20	100
4	Epidemiology & Public Health Administration	3 Hours	80	20	100
THIRD SEMESTER					
1	Hospital Operations Management –I (Clinical Services)	3 Hours	80	20	100
2	Research Methodology & Operations Research	3 Hours	80	20	100
3	Hospital Medical Records Management	3 Hours	80	20	100
4	Project Management	3 Hours	80	20	100
FOURTH SEMESTER					
1	Hospital Operations Management –II (Non - Clinical Services)	3 Hours	80	20	100
2	Management Information System	3 Hours	80	20	100
3	Strategic Management	3 Hours	80	20	100
4	Cost Accounting in Healthcare	3 Hours	80	20	100
FIFTH SEMESTER					
1	Quality in Health Care	3 Hours	80	20	100
2	Human Resource Management & IR	3 Hours	80	20	100
3	Hospital Hazards & Disaster Management	3 Hours	80	20	100
4	Financial Management in Healthcare	3 Hours	80	20	100
SIXTH SEMESTER					
1	Material planning & Management	3 Hours	80	20	100
2	Marketing Management in Healthcare	3 Hours	80	20	100
3	Management Accounting in Healthcare	3 Hours	80	20	100
4	Hospital Related Law	3 Hours	80	20	100
5	N A B H	3 Hours	80	20	100
6	Project Work				100

Subsidiary Subjects:

Semester	Subject	No of Hours Theory	Total
I Semester	English	30	180 hours
I Semester	Kannada	30	
II Semester	Constitution of India	30	
II Semester	Sociology	30	
III Semester	Computer Fundamentals	30	
III Semester	Health Care	30	
IV Semester	Environment Science & Health	30	

FIRST SEMESTER

HA I 01 PRINCIPLES OF MANAGEMENT

UNIT -1: - 10 hours

Introduction to management - the evolution of management, definition and importance of management. Different schools of management thought- classical school, management sciences school, behavioral school, human relation school, operational approach, system approach and contingency approach to management.

UNIT- 2: - 10 hours

Management - Meaning, nature and characteristics of Management, Scope and functional areas of management, Management as a science art or profession, Management & Administration, Principles of management.

UNIT- 3:- 15 hours

Planning- Meaning, Nature, importance and purpose of planning, Objectives, Planning process, Planning Premises & Types of plans. Decision making - importance & steps

Unit – 4: - 15 hours

Organizing - Meaning and importance, Nature and purpose of organization, Principles of organization, Types of organization, Organization structure / chart, Responsibility and Authority, Span of control,

Delegation of authority, Centralization & Decentralization, Line and staff relationships, Types of organizations, formal and informal groups in organizations, Matrix organization, Departmentalization, Committees. UNIT – 5 - 10 hours Nature and importance of Staffing - Process of Selection & Recruitment (in brief) staffing function, Manpower needs & Manpower position, Training & development, Performance appraisal, Human resource audit. 20

UNIT – 6: - 10 hours

Directing -Meaning and nature of directing. Leadership - Nature, Styles, attitudes, Motivation, Theories & Models. Coordination- meaning, importance & Techniques of Co-ordination.

UNIT- 7: - 10 hours

Control- Meaning and steps in controlling, Concept of Managerial Control, Importance, Process, Essentials of a sound control system, Methods of establishing Control.

UNIT -8:- 10 hours

Communication- Meaning & Role of Communication, importance, Communication process, levels of Communication, forms, models and media of Communications, Verbal and non-verbal Communication- functions and types. Barriers to effective Communication

UNIT – 8 - 10 hours

Social Responsibility of Management - Professional Management as compared to traditional system of owner Management, Impact of political system, government Policy, national economic planning on managerial policy, CSR.

BOOKS FOR REFERENCE:

1. Stoner, Freeman & Gilbert Jr – Management- Prentice Hall of India Pvt Ltd New Delhi.
2. Heinz Weinrich & Harold Koontz- Management- A global perspective- Tata mcgraw Hill, New Delhi.
3. Terry Francicin - Principles of Management, AITBS Publishers and Distributors, New Delhi
4. Rao V S P & Krishna Hari V (2006) – Management- Text & Cases, Excel Books.
5. Prasad L M – Principles and Practice of Management – Sultan Chand & Sons.
6. Tripathi P C & Reddy P N – Principles of Management.
7. C B Gupta - Principles of Management.
8. Appaniah & Reddy - Essentials of Management
9. Srinivasan & Chunawalla - Management Principles and Practice
10. J.S. Chandan - Management Concepts and Strategies

UNIT - 1 - 20 hours

Introduction to medical terminology - Word formation & syntax - Greek alphabet - Greek & Latin prepositional & adverbial prefixes - Singular & plural endings

UNIT - 2 - 30 hours

Human Anatomy and Physiology – Structure & functions of following systems: a. Digestive System b. Respiratory system c. Circulatory system d. Central Nervous system

UNIT - 3 - 30 hours

Human Anatomy and Physiology – Structure & functions of following systems: a. Muscular Skeletal system b. Reproductive system c. Excretory system d. Endocrine Glands

UNIT - 4 - 20 hours

Commonly used prefixes in medical terminology - Commonly used suffixes in medical terminology - Commonly used root words in medical terminology. Common Latin term used in prescription writing - Study of standard abbreviations- Commonly used medical terms to define different parts of the body

UNIT - 5 - 25 hours

Medical terminology used by Cardiologist - Medical terminology used by Neurologist Medical terminology used by Nephrologist - Medical terminology used by Gastroenterologist - Medical terminology used by ENT surgeon - Medical terminology used by Dentist - Medical terminology used by Orthopedician - Medical terminology used by Gynecologist - Medical terminology used by Oncologist - Medical terminology used by Dermatologist - Medical terminology used by Endocrinologist

BOOKS FOR REFERENCE

1. Ross & Wilson Anatomy and Physiology in Health and Illness - Textbook by Allison Grant, Anne Waugh, and Kathleen J. W. Wilson.
2. Fundamentals of Anatomy and Physiology- Textbook by Frederic H. Martini
3. Principles of Anatomy and Physiology - Book by Bryan H. Derrickson and Gerard J. Tortora

HA I 03 FUNDAMENTALS OF ACCOUNTING**UNIT – 1: - 15 hours**

Introduction to Accounting - Meaning, Need for accounting, Internal and External uses of Accounting information, Accounting concepts and conventions, Accounting practices, Generally Accepted Accounting Principles (Concept only of GAAP)

UNIT – 2: - 25 hours

Accounting systems & process - Nature of accounting, Systems of accounting (Single entry and double entry), Process of accounting, transactions, journal entries and posting to ledger. UNIT – 3: - 25 hours
Subsidiary books - all subsidiary books (Sales book, sales return book, purchases book, purchase returns

book, bills receivable book, bills payable book, cash book (Single column, double column, and three columnar cash book), petty cash book and journal proper. Bank reconciliation statement - Need for reconciliation and preparation of bank reconciliation statement.

UNIT – 4: - 10 hours

Rectification of errors and Trial balance - Types of accounting errors and methods of rectification of errors, Preparation of Trial balance.

UNIT – 5: - 15 hours

Final Accounts - Preparation of Trading and Profit and Loss account and balance sheet (including adjustments for Sole Proprietor concern)

UNIT – 6: - 10 hours

Single Entry system of bookkeeping - Preparation of Opening & Closing statement of Affairs and Computation of profit.

BOOKS FOR REFERENCE:

1. V.A.Patil and J.S.Korlahalli - Principles and Practice of Accountancy
2. Grewal T.E - Double Entry book keeping
3. Shukla and Grewal - Advanced Accountancy
4. Gupta and Radhaswamy - Advanced Accountancy Vol I & II
5. Hrishikesh Chakraborty - Advanced Accounts
6. Jain SP and Narang KL - Basic Financial Accounting – I
7. S.N. Maheshwari - Fundamental of Accounting

HA I 04 HOSPITAL & HEALTH SYSTEM (HISTORY & EVOLUTION)

UNIT – 1 - 15 hours

Definition and meaning of Health - Concept of Health ,Holistic approach to health, Determinants to health Responsibility for Health, Health & Development, Indicators of Health, Concept of Disease, Concept of Causation, Natural History of Disease, Spectrum of disease, Concepts of Control, Modes of Intervention

UNIT – 2 - 15 hours

Definition and meaning of hospital - historical development of hospitals globally, Systems of medicine, Modern medicine, changing concept of hospitals, present status of hospitals (public & private) in India, Classification of Hospitals

UNIT – 3 - 25 hours

Healthcare – Concepts, changing concepts, levels, healthcare delivery system in India, public, private sector, Indigenous system of medicine, Importance of Voluntary health agencies and health programs in delivering healthcare in India.

UNIT – 4 - 15 hours

Hospital as a system - Peculiarities of hospital system, Roles & Responsibilities of Hospitals, Administration of rural hospitals, staffing pattern & Job description.

UNIT – 5 - 10 hours

The reforms of Healthcare System- the healthcare system in US/UK, Canada, China, Singapore. Canadian lessons in Healthcare reforms & Future of Healthcare System.

UNIT – 6 - 20 hours

Recent trends in healthcare system: Medical Tourism –Introduction, Ethics, Challenges, Standards and Future. Telemedicine - History, Definition & concepts, Types, Advantages & Disadvantages, Challenges, telemedicine in India.

BOOKS TO BE REFERRED:

1. The Evolution of International Health System, Cumper G.E, OUP New York, 1991
2. Management of Hospital (4 Vols), S.L Goel & R. Kumar, Deep & Deep Publications Pvt. Ltd.
3. Preventive and Social Medicine, K Park, Banarsidas Bhanot Publishers.

ENGLISH LANGUAGE & COMMUNICATION:

UNIT 1:

Introduction – Study Techniques – Organization of Effective Note taking and logical processes of analysis and synthesis –Use of Dictionary – Enlargement of vocabulary – effective diction

UNIT 2

Applied Grammar – Correct Usage – Structure of sentences - Structure of paragraphs – enlargement of vocabulary – Verbs –Tenses - Voice

UNIT – 3

Written Composition – precise writing and Summarizing - Report Writing – Writing of Bibliography – Enlargement of Vocabulary

UNIT -4

Reading and Comprehension – Review of selected material and expressing oneself in words - Vocabulary, Synonyms & Antonyms

UNIT – 5

Forms of Writing: The Essay, The Precis, The Report, The Proposal, The C.V. and Job Application letter - The Presentation.

UNIT – 6

Meaning of Communication; Role of Communication in Business; Basic elements of the Communication process, level of Communication, forms, models and media of Communications, Verbal and non-verbal Communication-functions and types, Barriers to effective Communication.

BOOKS TO BE REFERRED:

1. English Grammar, Collins, Birmingham University, International Language Data Base, Rupa & Co 1993.
2. Wren & Martin – Grammar and Composition, 1989, Chand and Co, Delhi
3. Letters for all Occasions – A S Meyers, Harper Perennial
4. Spoken English - V Shashikumar and P V Dhanija, Tata Mcgraw Hill, New Delhi
5. Rajendra Paland J.S. Korlahalli-Essentials of Business Communication (Sultan Chand & Sons.)
6. C.S. Rayed-Communication (Mumbai: Himalaya Publishing House).
7. C.B. Gupta-Business Communication & Customer Relations (Sultan Chand & Sons.)
8. Parag Diwan-Communication Management (Deep & Deep Publication Pvt. Ltd.)

II SEMESTER

HA II 05 ORGANISATIONAL BEHAVIOUR

UNIT – 1 - 10 hours

Organization - Meaning and significance, Definition, Scope and Application in Management, need to study organizational behavior, Organisational structure, Emerging Organisations, challenges & opportunities for Organizational behavior.

UNIT – 2 - 10 hours

Perception – Meaning, Need, Perceptual Process, Perceptual Mechanism, Factors influencing perception & Interpersonal perception.

UNIT – 3 - 10 hours

Motivation – Meaning, Nature, Motivation process, Theories of Motivation (Maslow's Need Hierarchy theory - Herzberg's Two Factor Theory - mcgregor Theory X & Theory Y. Financial and Non Financial Incentives, Job enrichment.

UNIT – 4 - 10 hours

Attitudes – Meaning, Characteristics of Attitudes, Components of Attitude, Attitude and Behavior, Attitude formation and Measurement of Attitudes

UNIT – 5 - 10 hours

Learning and behavior modification - Principles of learning & Reinforcement, observational & Cognitive Learning. Organizational Behavior Modification - Steps in Organizational Behavior, Modification Process & Organizational Reward Systems

UNIT – 6 - 10 hours

Personality - Determinants of Personality, factors influencing personality - Biological, Cultural, Family, Social, Situational factors. Concept of Conflict – nature, process, types & resolution of conflict.

UNIT – 7 - 10 hours

Group Dynamics - Meaning, Types of Groups, Functions of small groups, Group Size Status, Managerial Implications. Group Behavior, Group Norms, Cohesiveness, Group Think

UNIT – 8 - 10 hours

Leadership - Formal and Informal Leadership, Characteristics, Leadership Styles, theories of leadership.

UNIT – 9 - 10 hours

Organizational Change – Meaning, Nature of work change, Pressure for change, Change process, Types of change, Factors influencing change, resistance to change, overcoming resistance. Organizational Development.

UNIT 10- 10 hours

Managerial skills - Analytical & Decision making skills, Decision making models, Problem solving skills, types of problem solving techniques, delegation, Assertiveness, Time management, Interpersonal skills.

BOOKS FOR REFERENCE:

1. Organizational Behavior - Stephen Robbins
2. Organizational Behavior - John W. Newstrom & Kieth Davis
3. Organizational Behavior - Fred Luthans

4. Organizational Behavior - K. Aswathappa
5. Organizational Behavior - M. Gangadhar. V.S.P.Rao and P.S.Narayan,
6. Organizational Behavior - N.S. Gupta
7. Organizational Behavior - Jit. S. Chandan 8. Organizational Behavior - M.N. Mishra,
9. Management and Behavior Process - Sharma R.K & Gupta S.K,
10. Management and Behavioral Process - Appanniah & Reddy,

HA II 06 BIO STATISTICS

UNIT – 1: - 8 hours

Statistics - Introduction, Background, Basic Concepts, Definition, Functions, Scope, and Limitations.

UNIT – 2: - 15 hours

Diagrammatic and Graphic Representation – Introduction, Significance, Difference between Diagrams and Graphs & Types of Diagrams.

UNIT – 3: - 20 hours

Measures of Central Tendency – Introduction, Types of Averages, Arithmetic Mean (Simple and Weighted), Median, Mode.

UNIT – 4: - 20 hours

Measures of Dispersion – Range, Quartile Deviation, The Mean deviation and the Standard deviation, Coefficient of Variation.

UNIT – 5: - 15 hours

Correlation and Regression Analysis – Meaning, types, probable error, rank correlation (excluding bivariate and multi correlation)

UNIT – 6: - 12 hours

Time Series - Meaning and components, (Problems on moving average and least square method)

UNIT – 7: - 10 hours

Index Numbers – Classification, Construction of Index numbers, Methods of constructing index numbers, Simple Aggregative Method, Simple Average of Price Relative Method , Weighted Index Method, Laspear’s method, Paasche’s method, Fischer’s method.

BOOKS FOR REFERENCE:

1. Statistical Methods - S.P. Gupta
2. Fundamentals of Statistics - Elhance D.N
3. Business Statistics - Dr. B.G. Sathyaprasad & Prof. Chikkodi
4. Fundamentals of Statistics - Gupta. S.C
5. Business Statistics - S. Saha
6. Business Statistics - Dr. J.S. Chandra, Prof. Jagjit Singh & K.K. Khanna,
7. Fundamentals of Statistics - D.N. Ellahance, Veena Ellahance, B.M. Agarwal 29
8. Business Mathematics and Statistics - Aggarwal S.L.

HA II 07 HEALTH ECONOMICS

UNIT – 1: - 10 hours

Business Economics - Nature & scope of Business Economics , Micro and Macro economics, Need , Objectives and importance of Business Economics. Goals of business – Economics Goals, social Goals, Below Poverty Line, Strategic Goals. Profit maximization Vs Optimization of profits.

UNIT – 2: - 15 hours

Consumer Behavior - The Law of Diminishing Marginal Utility, The law of equi-marginal utility, the indifference curve techniques, properties of indifference curve.

UNIT – 3: - 15 hours

Demand and Revenue Concepts - Meaning of demand, Determinants of demands, Demand Schedule, The Demand curve, The Law of Demand, Exceptions to the law of demand, Demand Distinction (types of demand), Elasticity of Demand. Price elasticity – Types, Measurement of Price elasticity, factors influencing elasticity of demand. Income elasticity of demand – Types, Cross elasticity of demand. Demand Forecasting – Types, Techniques. Revenue concepts – Total revenue, Average revenue, Marginal revenue.

UNIT – 4: - 15 hours

Production – Introduction, Production Functions, and Law of Variable Proportions, Production functions with two variable inputs (isoquants & iso costs). Equilibrium through Iso quants and Iso cost curves.

UNIT – 5: - 15 hours

Analysis of Market situations and Pricing - Kinds of competitive situation, features of perfect competition, monopoly, duopoly, oligopoly and monopolistic competition. Pricing - Meaning, Types of pricing, Pricing under different market situation, Perfect competition, Price determination under monopoly price discrimination and Price determination. 30

UNIT – 6: - 15 hours

National Income- Meaning, Methods & difficulties of Measuring National income, uses, Meaning of GNP, GDP, NNP, PI, DPI. Business cycles - Meaning, Features & Phases of a trade cycle, adjusting business plans to cyclical situations.

UNIT – 7: - 15 hours

Methods & Techniques of Economic Evaluation of Health Programmes, Cost benefit & cost effective methods, output & input analysis. Insurance programs – Advantages and disadvantages, Health insurance schemes in India, Public Private Partnerships in health sector

BOOKS FOR REFERENCE:

1. Business Economics - Reddy P.N and Appanniah H.R
2. Managerial Economics - Srivayya, Gangadhara Rao, Rao V.S.P.
3. Managerial Economics - Gupta G.S.
4. Managerial Economics - Dr. D.M. Mithani
5. Business Economics - Sharma N.K.
6. Business Economics - Wali and Kalkundikar
7. Managerial Economics - D.N. Dwivedi
8. Business Economics - Lekhi. R.K and Aggarwal S.L

HA II 08 EPIDEMIOLOGY & PUBLIC HEALTH ADMINISTRATION

Unit – 1 - 10 hours

Demography Trends - World population trends, Indian Population trends & Health implications, vital statistics.

Unit – 2 - 25 hours

National health policy - meaning, need and priorities, National health programmes, Health committees and their recommendations, Health services through Five Year Plans, Health for All by 2000 AD, and National Rural Health Mission, International Classification of Disease.

Unit – 3 - 20 hours

Health planning and management: health system in India- central, state and local. Nutritional problems in India & Geriatric care. Health Education – principles, methods & materials.

Unit – 4 - 20 hours

Organizations for Health: Voluntary health agencies in India – Indian Red Cross Society , Hind Kusht Nivaran Sang, Bharat Sevak Samaj, Central Social Welfare Board, Kasturba Memorial Fund, All India Women’s Conference, FPAI, Indian Council for Child Welfare, Tuberculosis Association of India, The All India Blind Relief Society-Professional Bodies. International Health Organizations – WHO, UNICEF, UNDP, UNFPA, FAO, ILO, Rockefeller Foundation, CARE, International Red Cross Society

Unit – 5 - 25 hours

National Health Programmes related to Communicable diseases- Malaria, Filariasis, Tuberculosis, Leprosy, AIDS. National Health Programmes related to Non Communicable diseases – Cancer, Blindness, Diabetes, and Mental Health, Reproductive and child health programme. Health related national programme, Integrated Child development scheme, water supply and sanitation, minimum need programme.

BOOKS FOR REFERENCE:

1. Park K, Text Book on Hygiene and Preventive Medicine, Banarsidas, Bhanoy.
2. Francis CM & Mario Ode Souza, Hospital Administration, Jaypee Bros, New Delhi.
3. Study material on Hospital Administration – Vol.II, Health Care Systems in India.
4. Study Material – Vol.III, Health and Family Welfare Management

CONSTITUTION OF INDIA

Unit-I:

Meaning of the term ‘Constitution’ making of the Indian Constitution 1946-1949.

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 FOR REFERENCE

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, Allahabad, Central Law Agency, 1998.
3. Granville Austin: The Indian Constitution – Corner Stone of a Nation-Oxford, New Delhi, 2000. 33

S P 4 SOCIOLOGY

Unit 1:

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

Unit 2:

Social factors in health and disease: meaning of social factors - role of social factors in health and disease

Unit 3:

Socialization: meaning and nature of socialization- primary, secondary and anticipatory socialization - agencies of socialization

Unit 4:

Social groups: concepts of social groups influence of formal and informal groups on health and sickness. Roles of primary groups and secondary groups in the hospital and rehabilitation setups.

Unit 5: 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

Unit 6: 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.

Unit 7: Culture and health: concept of health, concept of culture, culture and health, culture and health disorders 34

Unit 8: 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

Unit 9: 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

Unit 10:

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

III SEMESTER

HA III 09 HOSPITAL OPERATIONS MANAGEMENT-I (CLINICAL SERVICES)

UNIT I - 25 hours

Promoting and Building a new hospital – Planning the Hospital, Guiding principles in planning hospital facilities & services, Stages in planning, Preliminary Survey, Financial Planning, Equipment Planning (Equipment Leasing, Turnkey Projects), Need assessment survey of community, factors determining site, legal requirements, design considerations.

UNIT II- 15 hours

Organization of the Hospital – Organization Structure, Management structure, Types of hospitals, Governing body, Hospital committee and hospital functionaries, Roles and responsibilities of Hospital Administrators.

Unit III- 10 hours

Principles and methods of organizing Clinical services for hospitals, Role of clinical services/departments in the hospital management.

UNIT IV-25 hours

Planning, Designing, Functions & Management Of General & Specialty departments – Out Patient Services, Emergency, OT, Anesthesia, Labour Room & Delivery Suit. Ward Design of Medical & Surgical Intensive care units, General & Specialized Wards.

UNIT V – 25 hours

Planning, Designing, Functions & Management Of Super Specialty Departments – Cardiology, Orthopedics, Plastic Surgery, Obstetrics & Gynecology, neonatology, Pediatrics, Oncology, Nephrology & Dialysis, Urology, Neurology, Dermatology, Burns, Nuclear Medicine, Transplantation Units.

BOOKS TO BE REFERRED:

1. Principles of Hospital Administration & Planning- B.M.Sakharkar
2. Management of Hospitals - S.L.Goel, R.Kumar
3. Hospital & Health Services administration-Principles & practices, Tabish, OUP
4. Hospitals- facilities planning and management – G D Kunders
5. Hospital Planning and Administration - Llewellyn and Davis Macaulay
6. The Hospital Administrator – George, Jaypee Brothers, N. Delhi, 2003
7. Hospital Services and Planning - Sakharkar.B M.

HA III 10 RESEARCH METHODOLOGY & OPERATIONS RESEARCH

UNIT – 1 - 15 hours

Introduction – Meaning, Objectives, Types of Research, and Research Approaches, Research methods Vs Research Methodology, Steps in Research - Defining the Research Problem, Meaning, Selecting the Problem & Techniques involved in defining the problem.

UNIT – 2 - 15 hours

Research Design – Meaning, Need, Features, Concepts, Types and basic Principles of Experimental Designs.

UNIT – 3 - 20 hours

Sampling – Meaning, Need, Census & Sample Survey Sampling Designs, Probability Sampling (Simple Random - Systematic - Stratified - Cluster – Area Multistage - Sequential Sampling Methods), Data Collection and Processing Collection of Primary data, Collection of data through Questionnaire & Schedules, Secondary data, Qualitative techniques of data collection, Interview, Observation & Tabulation of Data.

UNIT – 4 – 15 hours

Analysis and Interpretation of Data and Research reporting - Meaning of Interpretation, Technique of Interpretation, Significance of Report writing, Steps, Layout of the Research Report, Types of Reports, Precautions while writing Research Reports. 37

UNIT – 5 – 15 hours

Quantitative Techniques- Introduction, Statistical and operations Research techniques, Scope and application of quantitative techniques, scientific approach in decision making, Limitations. Probability and probability, distributions - Laws of probability, Baye's theorem, Mathematical Expectation, Binomial, Poisson and normal probability distribution

UNIT – 6 - 20 hours

Decision Theory: Decision making under certainty, uncertainty and Risk, Decision tree analysis. Linear Programming: Graphical and Simplex Solutions of LPP, Primal and its dual, Transport and Assignment Problems. Network Analysis : Programme Evaluation and Review Technique (PERT) and critical path Method (CPM), Cost Analysis and Crashing the Network, Theory of Games and Queuing Models : Two persons Zero sum games, pure and mixed strategy, Queuing mode Single channel queuing theory Application of queuing theory in business decision making. Simulation: Advantages, Limitations, Monte Casio Method.

BOOKS FOR REFERENCE:

1. Research Methodology - O.R. Krishna Swamy
2. Research Methodology - CR. Kothari
3. Methodology and Techniques of Social Research - Wilkinson & Bhandarkar
4. Research Methodology in social science - Sadhu Singh
5. Research Methodology in Management - V.P. Michael
6. Operations Research -Kapoor, V.K.
7. Quantitative Techniques – Sultan Chand & Sons.

HA II 11 HOSPITAL MEDICAL RECORDS MANAGEMENT

Unit I – 20 hours

Records Management- Introduction, meaning and importance, definition of registers, records & forms, principles of record keeping, merits and limitations, recent trends in record maintenance, electronic forms of records. 38

Unit – 2 - 20 hours

Hospital Records - Meaning, Functions, Importance of medical records to Patients, Doctors, Hospitals, Public health, Press, Insurance, Police , Court of Law, Education and Research.

Unit – 3-20 hours

Hospital Records – Types - Out Patient record, Causality Emergency, Surgery, Obstetrics and Gynecology, Pediatrics, investigation and diagnosis. Hospital Statistics - Evaluation of Medical Care (Medical, Nursing, Pharmacy etc Audits).

Unit – 4 -20 hours

Records organization and Management - Classification of records, Bases for classification, Indexing and Filling of records, Problems associated with medical records, International classification of Diseases (ICD) and Diagnostic Related Groups (DRG

Unit – 5 -10 hours

Medical Registers - Meaning, Principles, Types, Purposes, Advantages of designing registers, Registers in various departments & common problems faced

Unit – 6-10 hours

Medical forms and Reports - Meaning, Types and significance, Principles of designing of forms & reports, Statutory registers and reports to be maintained.

BOOKS TO BE REFERRED:

1. Rajendra Pal Korlahalli JS, Essentials of Business Communication, Sultan Chand and Sons, New Delhi, 1999
2. Prasantha Ghosh K. Office Management, Sultan Chand and Sons, New Delhi, 1995.
3. Francis CM & Mario C de Souza, Hospital Administration, 3rd Ed., Jaypee Brothers, N. Delhi.
4. George, MA, Hospital Administrator, Jaypee Brothers, N.Delhi, 2003
5. Mogli. J D., Medical Records-Organisation & Management, JAYPEE Brothers.

A III 12 PROJECT MANAGEMENT

UNIT – 1 - 20 hours

Project Management - Introduction, Meaning & Definition of project. Defining - Project Managers, Functional Managers & Executive's role. Project Manager as a planning agent, Project Driven Vs Non Project Driven organization, marketing in the Project Driven Organization, Programs and Projects,

Product Vs Project Management, Project Life Cycles, program evaluation, project analysis & management.

UNIT – 2 - 15 hours

Project Planning- Identifying strategic project variables, Project planning, Statement of work, Project specifications, Milestone schedule, Work breakdown structure, Planning cycle, Management Control, categories of project.

UNIT – 3- 20 hours

Project Feasibility - technical feasibility, marketing feasibility, socio-economic feasibility, managerial feasibility, financial feasibility and potential feasibility.

UNIT – 4 - 15 hours

Project Evaluation and Review techniques - Estimating activity time, Estimating total program time, PERT/CPM planning, Crash time, project sustainability, operations research.

UNIT – 5 - 15 hours

Project Management Functions - Controlling, Directing, Project authority, Team building, Leadership, communications, Project review meetings, Management policies and procedures, proposal writing.

UNIT – 6 - 15 hours

Pricing Estimating & Cost Control - Types of estimates & Pricing process, Labor distributions, Overhead rates, Material/Support costs, Pricing review, Budgeting for projects variance & earned value, Status reporting, project accounting.

BOOKS FOR REFERENCE:

1. Project Management - Choudary S
2. Project management - Joseph J Moder and Philips C.R.
3. Total Project management - Joy P.K.
4. Project Management - Harold Kerzer
5. Project Management - Josh S
6. Project Management - Saprthe R.K
7. Project Management and Control - Narendra Singh
8. Project Management and Entrepreneurship - Vasanth Desai S P 5

COMPUTER FUNDAMENTALS

Unit – 1:

General features of a computer - generation of computers - personal computer – workstation - mainframe computer and super computers. Computer applications – data processing, information processing, commercial, office automation, industry and engineering, healthcare, Education, graphics and multimedia

Unit – 2:

Computer organization, Central processing unit, Computer memory primary memory and secondary memory. Secondary storage devices – magnetic and optical media. Input and output units. OMR, OCR, MICR, scanner, mouse, Modem.

Unit – 3:

Computer hardware and software, Machine language and high level language, Application software. Computer program, Operating system, Computer virus, antivirus and computer security. Elements of ms dos and windows os, Computer arithmetic, Binary, octal and hexadecimal number systems, Algorithm and flowcharts - Illustrations. Elements of database and its applications.

Unit – 4:

Word processing and electronic spread sheet, An overview of ms word, ms excel and ms PowerPoint, Elements of basic programming - Simple illustrations.

Unit – 5:

Network of computers- Types of networks, LAN, intranet and internet. Internet applications, World Wide Web, E-mail, browsing and searching. Search engines. Multimedia applications.

List of practical assignments: (12 sessions of 2 hours each)

1. System use, keyboard, mouse operations. Word pad and paint brush. Creating a folder and saving a document – 2 sessions.
2. Simple MS. Dos commands – 1 session
3. Windows operating system – icons, menus and submenus, my computer – 2 sessions
4. Desktop publishing – preparation of a document using ms.word – 2 sessions
5. Installation of software, virus scanning – illustrations – 1 session.
6. Spreadsheet calculations using ms.excel – 1 session.
7. Basic programming – illustrations – 1 session.
8. Internet use. Surfing, browsing, search engines, e-mail. – 2 sessions.

BOOKS FOR REFERENCE:

1. Alexis leon and mathews leon (1999): fundamentals of information technology, leon techworld pub.

2. Jain, s.k. (1999): information technology “o” level made simple, bpb pub.
3. Jain, v.k. (2000): “o” level personal computer software, bpb pub.
4. Rajaraman, v. (1999): fundamentals of computers, prentice hall india.
5. Hamacher, computer organisation, mc graw.

S P 6 HEALTHCARE

UNIT 1:

Introduction to Health- Definition of Health, Determinants of Health, Health Indicators of India, Health Team Concept, National Health Policy, National Health Programmes (Briefly Objectives and scope), Population of India and Family welfare programme in India

UNIT 2:

Introduction to Nursing - What is nursing? Nursing principles. Inter-Personnel relationships. Bandaging - Basic turns, Bandaging extremities, Triangular Bandages and their application. 42

UNIT 3:

Nursing Position, Bed making, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, Aids and rest and sleep. - Lifting and Transporting Patients: Lifting patients up in the bed, transferring from bed to wheel chair, transferring from bed to stretcher.

UNIT 4:

Bed Side Management: Giving and taking Bed pan, Urinal: Observation of stools, urine. Observation of sputum, Understand, use and care of catheters, enema giving.

UNIT 5:

Methods of Giving Nourishment: Feeding, Tube feeding, drips, transfusion - Care Of Rubber Goods - Recording of body temperature, respiration and pulse, - Simple aseptic technique, sterilization and disinfection - Surgical Dressing: Observation of dressing procedures

UNIT 6:

First Aid: Syllabus as for Certificate Course of Red Cross Society of St. John's Ambulance Brigade.

IV SEMESTER

HA IV 13 HOSPITAL OPERATIONS MANAGEMENT-II (NON CLINICAL SERVICES)

Unit I - 10 hours

Principles and methods of organizing - Administrative & support services for Hospitals, Importance & Role of supportive services / departments in the hospital management.

Unit II - 25 hours

Planning, Designing, functions & management of Non-Clinical Services - Pharmacy, Physiotherapy, Clinical laboratory & Blood bank, Radiology & Imaging, Nuclear medicine, Radio therapy, Medical Records department, CSSD.

Unit III - 20 hours

Nursing Services - Objective, Nursing administration, Duty of nursing officers, nursing and support staff in the ward, nursing by-laws, rules, policies and procedures, nursing audit – determining nursing complement in hospital.

Unit IV – 20 hours

Planning, Designing, functions & management of Support Services: Enquiry, Reception and Admission, Dietary and catering, Linen & Laundry, Housekeeping, Security, General & Medical Stores, Ambulance & Transport service.

UNIT V - 10 hours

Planning, Designing, Functions & Management of- Administrative Services, Hospital Administration Unit, Financial Management Unit, Hospital Information System, Human Resource Management, Marketing & Public Relations Unit.

UNIT - 6 - 15 hours

Planning and Designing Systems – Engineering Department, Maintenance Department Biomedical Engineering, Electricity & water supply system, Air Conditioning System, Centralized Medical Gas System, Communications System, Environmental Control.

BOOKS TO BE REFERRED:

1. Principles of Hospital Administration & Planning: B.M.Sakharkar
2. Management of Hospitals: S.L.Goel, R.Kumar
3. Hospital & Health Services administration-Principles & practices, Tabish, OUP
4. Hospitals- facilities planning and management – G D Kunders
5. Hospital Planning and Administration- Llewlyn and Davis Macaulay
6. George, The Hospital Administrator - Jaypee Brothers, N. Delhi, 2003
7. Hospital Medical International Pvt. Ltd., Hospital Administration,
8. Kusum Samant, Hospital Ward Management, Vora Medical Publications, Mumbai. HA IV 14

MANAGEMENT INFORMATION SYSTEMS

UNIT – 1: - 10 hours

Introduction to MIS – Concept, roles & objectives of MIS, emergence of MIS, MIS and computers, Impact of MIS, systems approach to MIS, Advantages and disadvantages of computer 44 based MIS, Importance of information in decision making and strategy building, information systems and subsystems.

UNIT – 2: - 15 hours

Information - Classification of information, Levels of information, Methods of data and Information collection value of Information. Conceptual foundations - The decision making process, systems approach to problem solving, support systems for planning. Role of MIS in surveillance for healthcare.

UNIT – 3: - 20 hours Technical foundations of Information System - Introduction to computer concepts, hardware and software concepts applied to Information System, Database and file management, determining the information requirements. Development of MIS - factors responsible for development of MIS, Implementation of MIS & evaluation of MIS

UNIT– 4: - 20 hours System Analysis and Design - Introduction, System Analysis for existing system, system analysis for new requirements, MIS and system /system analysis, cost benefit analysis, Subsystems of MIS (Transaction processing systems, DSS and GDSS, ES). Decision making and MIS - decision making concepts, organizational decision-making, MIS as technique for programme decisions, Decision support system, MIS and role of DSS

UNIT – 5: - 15 hours Information Subsystems and Organization- Introduction to ERP, BPR, AI, EIS, KMS and ECRM. Data base Management systems- Data base concepts, data base models data base design, RDEMS MIS and RDEMS, Introduction to oracle & Data Access Management systems. Network - Introduction, topology, LAN and WAN & Data communication.

UNIT – 6: - 20 hours MIS in operations, MIS for Finance, MIS for Marketing, MIS for production, MIS for Human resource Management, MIS for marketing & MIS for Diagnostics. Network Usage, MIS and client server, Data Processing/Transaction processing.

BOOKS FOR REFERENCE:

1. Javedkar, W.S.-Management Information Systems (Tata McGraw-Hill Publishing Company Ltd., New Delhi)
2. Mardic R.G., Ross J.E.& clagget J.R. - Information System for Modern Management (Prentice Hall of India)
3. James A.O. Brien Management Information Systems, (Galgota Publications)
4. Locus, Analysis, Design and Implementation of Information System (McGraw-Hill Book Co.)
5. Anderson, Lavid L. Post, Gerald V., Management Information System (Tata-McGraw Hill Publishing Co.) HA IV 15

STRATEGIC MANAGEMENT

UNIT – 1 – 10 hours

Business Policy- Introduction, Definition and Importance, Purpose & objectives of business policy

UNIT – 2 - 20 hours

Utility and application of strategic management- Meaning and definition of strategy, Need & process of strategic management, Strategic decision-making. Reasons for failure of strategic management, Strategists and their role in strategic management.

UNIT – 3 - 12 hours

Environment appraisal- The concept of environment, The Company and its environment, scanning the environment, relating opportunities and resources based on appraisal of the environment (situation analysis - opportunities and threats analysis)

UNIT – 4 - 20 hours

Strategic planning - Process, strategic plan. Corporate level strategies [Stability strategy, expansion strategy, merger strategy, retrenchment strategy, restructures strategy]. Business level strategy - SBU (strategic business units, cost leadership, decentralization)

UNIT – 5 - 20 hours

Implementation of strategies: Activating strategy - interrelationship between formulation and implementation, aspects of strategy implementation, project implementation, and procedural implementation, Structural implementation, structural considerations & structures for strategies. Organizational Design and change, Organizational systems, Behavioral implementation, Leadership implementation, corporate culture, corporate politics and use of power. Functional and operational implementation - Functional strategies, Functional Plans and policies, Financial, marketing, operational and personnel dimensions of functional plans and policies, Integration of functional plans and policies.

UNIT – 6 – 10 hours

Strategy evaluation - Strategic evaluation and control, operational control, overview of management control, focus on KRA (Key Result Areas).

UNIT – 7 - 8 hours

Social responsibilities - The Company and its social responsibilities, social responsibility for economic growth, Social audit

BOOKS FOR REFERENCE:

1. R. Nanjundaiah & Dr. S. Ramesh, Strategic planning and business policy.

2. Azhar Kazmi, Business policy and strategic management.
3. Michael, Business policy and Environment. 4. Verma, Business policy. 5. Ghosh P.K, Business policy and strategic Planning & management.
6. Lawrence, Business policy and strategic management.
7. Sukul Lomesh, P.K. Mishra, Business Policy and Strategic Management.
8. Sharma & Gupta, Strategic Management. HA IV

16 COST ACCOUNTING

UNIT-1: 18 Hours

Cost accounting – Introduction, Meaning and Definition of Cost, Costing and Cost Accounting Objectives of Costing- Comparison between Financial Accounting and Cost accounting- Scope and Uses of Cost Accounting- Classification of Costs- Cost Unit- Cost Center- Elements of Cost Preparation of Cost Sheet- Tenders and Quotations.

UNIT-2 :18 Hours

Material cost control – Meaning, Types- Direct Material- Indirect Material- Purchasing Procedure- Material Control- Techniques of Inventory Control- Setting of Stock Levels- EOQ ABC Analysis- VED Analysis- Perpetual Inventory System- Methods of Pricing Material Issues: FIFO, LIFO, Simple Average Price Method, Weighted Average Price Method..

UNIT-3:18 Hours

Labour cost control – Meaning, Types, Direct Labour, and Indirect Labour. Time Keeping, Time Booking, Idle Time, Over Time, Labour Turn Over- Time Rate System- Piece Rate System Incentive Systems- Halsey Plan- Rowan Plan- Taylors Differential Piece rate System and Merricks Differential Piece rate System- Employee welfare Cost and Fringe Benefits.

UNIT-4: 20 Hours Overhead cost control- Meaning and Definition, Classification of Overheads, Procedure for Accounting and Control of Overheads, Allocation of Overheads, Apportionment of Overheads Primary Overhead Distribution Summary, Secondary Overhead Distribution Summary: Repeated Distribution Method and Simultaneous Equations Method, Absorption of Overheads, Methods of Absorption: Machine Hour Rate.

UNIT-5: 16 Hours

Reconciliation of cost and financial accounts - Need for Reconciliation, Reasons for Difference in Profit or Loss shown by Cost Accounts and Financial Accounts, Preparation of Reconciliation Statement

UNIT-6: 12 Hours

Methods and techniques of costing- Costing Methods: Output Costing, Contract Costing, Service Costing, and Process Costing (only theory) Cost Control Techniques: Budgetary Control, Standard Costing and Marginal Costing (only theory)

BOOKS TO BE REFERRED:

1. M.N.Arora: Cost Accounting
2. S.P.Jain and K.L.Narang: Cost Accounting
3. S.P.Iyengar: Cost Accounting 4. S.N.Maheshwari Cost Accounting
5. M.L.Agarwal: Cost Accounting

S P 7 ENVIRONMENT & ECOLOGY

Unit – 1

General meaning of environment, relevance of the subject environment, ecology for hospital administrators.

Unit – 2

Brief outline of the environment (protection) act 1986 & its importance for hospital administration, Legislation vs. Social obligation of hospitals, Role of ngo's like green peace in environmental protection.

Unit – 3

Ecology - brief outline on elements of ecology; brief discussion on ecological balance and consequences of change, principles of environmental impact assessment. Environmental impact assessment report (eia).

Unit – 4

Air pollution and control - factors responsible for causing air pollution in hospitals, sources & effects of air pollutants in the hospital context. Primary & secondary pollutants, green house effect, depletion of ozone layer. Brief discussion on the air (prevention & control of pollution) Act 1989.

Unit – 5

Water pollution and control - brief discussion on hydrosphere, natural water, pollutants: their origin and effects, river/lake/ground water pollution, the financial implication of water pollution control and steps required to be taken e.g. Sewerage treatment plant, water treatment plant. 49 Standards and control in Relation to the effect of legislation by central and state boards for prevention and control of water pollution.

Unit – 6

Land pollution- Brief understanding of lithosphere, pollutants, municipal, industrial, commercial, agricultural, hospital, hazardous solid waste); their original effects, collection and disposal of solid waste, recovery & conversion methods in relation to an hospital enterprise with discussion about the financial implication.

Unit – 7

Noise pollution - Sources, effects, standards & control

BOOKS FOR REFERENCE

1. Environmental science, cunningham,tmh
2. Environmental studies, a.k.de & a.k.de, new age international
3. Environmental pollution control engineering, c.s.rao, new age international
4. Environmental management, n.k. obero, excel books
5. Ecosystem principles & sustainable agriculture, sithampanathan, scitech
6. Text book of environmental studies for under graduate courses by erach bharucha reprinted in 2006, orient longman private limited /universities press india pvt. Ltd

V SEMESTER HA V

QUALITY IN HEALTHCARE

UNIT – 1 - 10 hours Fundamentals of Quality Management: Introduction, Objectives, Historical Background, Concept of Quality Management, contributions by Quality Management Gurus (Kaoru Ishikawa, Juran's trilogy, Kaizen, Philip Crosby's principles, Deming, Pareto

UNIT – 2

- 10 hours Quality control tools & techniques - Brain storming, Bench marking, Business process reengineering (BPR), statistical process control, fish bone diagram, six sigma concept, poka yoke, Quality Assurance, Continuous quality improvement (CQI), quality circles.

UNIT – 3 - 20 hours

Techniques of Quality Management - Improving Hospital Performance, Patient Participation, Quality Health Care through Patient Satisfaction, conceptual model for assessing quality in health care.

UNIT – 4 - 20 hours Organization wide Quality Improvement in Health Care – Introduction, organizing for Quality Assessment, Quality Improvement fundamentals, A Quality Improvement model of daily Patient Care

UNIT – 5 - 20 hours

Assessing Quality Health Care - Attributes of Quality in Health Care, Attributes of a Good Patient Practitioners Relationship, Patient Satisfaction Survey, and The measurement of Quality in health care.

UNIT – 6- 8 hours

Total quality management - The implementation of Total Quality, Planning Quality, organizing Quality, Evaluating Quality, Transforming organizations to a Total Quality Philosophy and Culture. Outcome Management and Total Quality - Background of Quality outcome, what is quality outcome and what is outcome Management?

UNIT – 7 - 12 hours

Concepts of Accreditation in Hospitals: NABH, NABL, JCI - ISO 9000 Quality Management, Effects and Benefits of ISO 9000 management System & clauses. Audits for quality assessment & management- Antibiotic audit, Infection control Review & Tissue Committee review.

BOOKS TO BE REFERRED

1. Raandi Schmidt J. Trumbo and R. Jonson, Quality in Health Care Sector – ASQC Quality Press.
2. Quality Improvement in Health Care, 2nd Ed, Nelson Thrones
3. Total Quality Management, S.K.Joshy HA V

18 HUMAN RESOURCE MANAGEMENT

UNIT – 1 - 10 hours

Human Resource Management - Meaning of HRM, Importance of HRM, Objectives and Functions, process of HRM, Systems and Techniques, Role of human resource manager, duties and responsibilities of human resource Manager, typical organization set up of human resource department.

UNIT – 2 - 20 hours

Human resource planning, Recruitment, Selection and Placement in hospitals- Meaning and importance of human resource planning, benefits of human resource planning, Meaning of recruitment, selection, placement and training, Methods of Recruitment and Selection, Uses of tests in selection, Problems involved in placement.

UNIT – 3 - 10 hours

Training and Induction in hospitals - Meaning of Training and Induction, Objective and purpose of induction, Need for training, benefits of training, Identification of training needs, methods of training, executive development

UNIT – 4 - 10 hours

Performance Appraisal – Meaning, objectives, methods of performance appraisal and limitations, productivity analysis. Reference checking- concept, definition, process, benefits and challenges.

UNIT – 5 – 20 hours

Principles and techniques of wage fixation - meaning & objectives of compensation. Promotion & Transfers in Hospitals – Purpose & basis of promotion, Meaning, reasons & types of transfer, right sizing of work force. Need for right sizing, Developing Policies for Compensation, Incentive, promotion & Welfare Programmes.

UNIT – 6 - 20 hours

Work Environment - Meaning of work environment, Quality of work life, Fatigue, Implications of fatigue, causes and symptoms of fatigue. Monotony and boredom - factors contributing to monotony and boredom. Industrial accidents, Employee safety & Morale, Grievance & Grievances handling, Personnel records & Personnel Audits.

UNIT – 7 - 10 hours

HRD - Meaning of HRD, Role of training in HRD, Knowledge management, Knowledge resources, Impact of globalization on human resource management, problems in relation to Hospitals.

BOOKS FOR REFERENCE

1. C.B.Mammoria - Personnel management
2. Edwin Flippo - Personnel management
3. Aswathappa - Human Resource Management
4. Subba Rao - Human Resources management
5. Michael Porter - HRM and human Relations
6. Biswanath Ghosh - Human Resource Development and Management.

7. Reddy & Appanniah - Personnel Management.

8. Sahni - Personnel Management.

HA V 19 HOSPITAL HAZARDS & DISASTER MANAGEMENT

Unit 1- 10 hours

Hospital hazards – meaning, types (physical, biological, mechanical & psychological), its impact on employees, preventive measures. Hospital hazards management- meaning, need, principles, purpose

Unit 2 – 15 hours

Control of hospital acquired infection- types of infection, Common Nosocomial infections and their causative agents, prevention of hospital acquired infection, role of central sterile supply department, infection control committee, monitoring and control of cross infection, staff health, and patient safety.

Unit 3 – 15 hours

Biomedical waste management – meaning & categories of biomedical Wastes, disposal of biomedical waste products, incineration and its importance. Government rules and schedules, standards for waste autoclaving, micro waving and deep burial, segregation, packaging, transportation & storage.

Unit 4 – 12 hours

Human waste disposal and sewage disposal- diseases carried from excreta, sanitation barrier, methods of excreta disposal. Sewage wastes – meaning, composition, aims of sewage disposal, decomposition of organic matter, modern sewage treatment, drawbacks of improper disposal of wastes – solid and liquid – effluent treatment plan.

Unit 5 – 15 hours

Medical insurance: national insurance companies, paramount health care services, third party insurance, payment terms and conditions & limitations of liability and indemnity

Unit 6 –15 hours

Disaster – meaning, types, manmade, natural, need for disaster Management. Management of natural disasters - flood, earth quake, drought, cyclone, tsunami etc. Epidemics - cholera, plague, typhoid, jaundice & management of epidemics.

Unit 7 – 10 hours

Management of man-made disasters - nuclear, biological & chemical disasters, Accidents - road, train & fire. Management of food poisoning, alcoholic and drug addiction, organization of medical camps

Unit 8 - 8 hours Management of disaster – prevention, method precautions, ambulance management. Role of hospitals, community, voluntary agencies and government in disaster management

BOOKS TO BE REFERRED:

1. Shahunth and panekar v. - first aid, vora publication

2. First aid manual - accident and emergency, vora medical publ.
3. Park k. - Preventive and social medicine
4. Park k - Text book on hygiene and preventive medicine, banarsidas bhanot. HA V

20 FINANCIAL MANAGEMENT

Unit- - 10 hours

Introduction- meaning and definition of finance, finance function, aims of finance, functions, organization structure of finance. Financial management- goals of financial management, financial decisions & role of a financial manager. Financial planning- steps in financial planning, Principles of a sound financial planning.

Unit-2 : - 10 hours

Time value of money- Introduction, meaning, definition, need, future value (single-uneven flow and annuity, present value (single-uneven flow and annuity), doubling period. 55

Unit-3 – 10 hours

Financing decisions - Introduction to capitalization and capital structure, sources and instruments of funds (long term, medium term and short term sources). Capital market - primary and secondary, money market.

Unit-4 - 15 hours

Cost of capital - Meaning, computation of cost of capital - cost of equity, preference, debentures and retained earnings. Weighted average cost of capital & marginal cost of capital.

Unit-5 - 15 hours Capital structure- Meaning, optimum capital structure, factors influencing capital structure, ebit eps analysis & problems. Leverages- operating leverage, financial leverage, combined leverage & problems.

Unit-6 - 20 hours

Investment decision- Introduction, meaning and definition of capital budgeting, features, significance, process, techniques of capital budgeting, payback period, accounting rate of return, net present value, internal rate of return & problems.

Unit-7 –10 hours

Working capital management- Introduction, concept of working capital, significance of adequate working capital, evils of excess or inadequate working capital, determinants of working capital, cash management, receivables management, inventory management & simple problems on working capital requirements.

Unit-8- 10 hours

Dividend decision – Introduction, meaning and definition, determinants of dividend policy, types of dividend policy & forms of dividends.

BOOKS TO BE REFERRED:

1. Khan and Jain: financial management
2. Prasanna chandra- financial management
3. I.m.pandey: financial management
4. Sharma and shashi.k.gupta: financial management
- . S.n.maheshwari: financial management

3. VI SEMESTER HA VI**4.****5. 21 MATERIALS PLANNING & MANAGEMENT****UNIT- 1 - 10 hours**

Materials management – meaning, concept, objectives & importance. Material planning – objectives, integrated approach to materials planning and control, relevance of materials management to hospitals.

UNIT – 2 - 20 hours

Purchasing – types, significance of purchasing policy, principles of scientific purchasing, factors affecting purchasing, essence of sound purchasing policy, purchasing methods, purchasing procedure, imports of equipments and medicines for hospitals. LC payments, common foreign currencies, documents & procedures.

UNIT – 3 - 20 hours

Stores management – objectives, functions, stores location, store accounting and records, stock verification, principles of storage & stores accounting, types of storage care & preservation of materials, equipments in inventory control, role of computers in stores management, need of research for stores management.

UNIT – 4 - 20 hours

Inventory control and purchase management - meaning and significance, concept, importance, techniques. Purchasing & procurement - principles of sourcing, purchase methods & procedures, legal aspects of purchasing. Reference to contract act, sale of goods act, drug control act in respect to purchase activities, Import substitution.

UNIT – 5 - 20 hours

Quality control & quality management - principles & methods, distribution management (logistics management), distribution of materials to various departments & auxiliary services. Exceptional 57 management needs in healthcare units – management of blood bank, donated organs, morgues, dispensaries.

UNIT -6 - 10 hours

Contract administration- administration of services obtained through contract principles. Model contract for laundry, dietary, dispensary, security & ambulance services.

BOOKS FOR REFERENCE:

1. Jha s.m, hospital management 2001, hph, mumbai. 2. Ammer s, purchasing and materials management for health care institutions; north eastern university. 3. Jha s.m, services marketing 4. Chap 12 hospital marketing 2000, hph, mumbai.

HA VI 22 MARKETING MANAGEMENT & PUBLIC RELATIONS IN HEALTHCARE

UNIT— 1 :- 15 hours

Introduction to marketing- definition, nature, scope and importance of marketing, approaches to the study of marketing and economic development, traditional and modern concept of marketing, functions of marketing.

UNIT – 2 :-10 hours

Marketing environment- analyzing needs & trends in the micro & macro- environment. Marketing mix- the elements of marketing mix. Market segmentation - bases for market segmentation, requisites of sound marketing segmentation. Market targeting strategies – positioning, undifferentiated marketing, concentrated marketing & Services marketing.

UNIT— 3:-10hours

Analyzing consumer markets and buying behavior – factors influencing buying behavior (cultural, social, personal, psychological), the buying decision process & stages of the buying decision process

UNIT— 4:-10hours

Product – classification of products, product mix decision, product line, product addition & deletion. Product lifecycle, product planning, diversification, product positioning. New product development process and strategies, concepts of branding, packaging & labeling

UNIT— 5:-05 hours

Pricing – pricing objectives, policies, factors influencing pricing policy, method of pricing policies and strategies.

UNIT— 6:-10 hours

Channels of distribution – definition, need, channel, design decision, channel management decision, factors affecting channels & types of marketing channels.

UNIT— 7:-10 hours Promotion – nature and importance of promotion, promotional methods – advertising decisions, differences between sales promotion & public relations , direct selling, advertising copy, evaluation of advertising, differences between personal selling and sales promotion.

UNIT— 8:-10 hours Marketing research – marketing information system, components, marketing intelligence system, marketing research, process, types and techniques of organizing marketing research.

UNIT— 9:-10 hours Recent trends in hospital marketing – e- business, tele-marketing, m-business, and relationship marketing, Retailing, concept marketing & virtual marketing. Application of social media in hospital marketing & Concepts of digital marketing.

UNIT-10:- 10 hours

Public relations (PR) – theory and concept, branches of public relations, roles of public relations staff in hospitals, functions of public relations department, differences between HRM & PR, liaison with government agencies.

BOOKS FOR REFERENCE:

1. Philip Kotler - marketing management
2. Wiliam j.Stanton - marketing management
3. Sherleker S. A - marketing management
4. J. C Gandhi - marketing management
5. Davar - modern marketing management.
6. Joelr. Evans and Barry berman - marketing in the 21st century, biztantra pub.
7. P K .Gupta.eph - Marketing management & Research.
8. M.v.kulkarni .eph - Marketing research.

HA V 23 MANAGEMENT ACCOUNTING

Unit-1: 10 hours

Introduction to management accounting- Meaning, objectives, nature and scope of management accounting, role of management accountant, relationship between financial accounting, cost accounting and management accounting.

Unit-2: 18 hours Financial statement analysis- Meaning, types, types of financial analysis, methods of financial statement analysis, comparative statements, common size statements, trend analysis.

Unit-3: 25 hours Ratio analysis - Meaning, importance, utility of ratios, classification, calculation & limitations of ratios.

Unit-4: 25 hours Fund flow and cash flow analysis- Meaning, concept of funds flow statement, uses and significance of funds flow statement, procedure for preparing funds flow statement, schedule of changes in working capital, funds from operations, statement of sources and application of funds. Cash flow analysis- meaning and concept, comparison between cash flow and funds flow statements, uses and significance of cash flow statement, cash flow from operating, investment and financing activities.

Unit-5: 22 hours

Marginal costing - Marginal costing, meaning, features and assumptions, CVP analysis, calculation of breakeven point. Budgetary control - meaning and definition of budget and budgetary control, objectives of budgetary control, classification of budget, preparation of flexible budget & cash budget.

BOOKS FOR REFERENCE:

1. M.n.arora: management accounting
2. Sharma and gupta: management accounting
3. S.n.maheshwari management accounting 4. Jawaharlal: essentials of managerial accounting
5. B.s.raman: management accounting

HA VI 24 HOSPITALS RELATED LAW

UNIT – 1 - 15 hours Introduction to Indian constitution- content and significance of fundamental rights and duties, sources of law, interpretation of law, important provisions under Indian contract act, insurance act, trust act, societies registration act.

UNIT – 2 - 15 hours Laws governing the qualification or practice and conduct of professionals: transplantation of human organs act 1994, pre-natal diagnostic techniques (regulation and prevention of misuse) act 1994, central births and deaths registration act 1969, medical termination of pregnancy act 1971, mental health act, patient consent.

UNIT – 3 - 20 hours Law governing sale, storage of drugs and safe medication: drugs and cosmetics act 1948, narcotics and psychotropic substances act, pharmacy act 1948, poison act 1919, sales of goods act, drugs and magic remedies (objectionable advertisement) act 1954, dying declaration.

UNIT – 4 - 20 hours

Law governing employment and management of manpower: employees provident fund act 1952, payment of gratuity act 1972, minimum wages act 1948, payment of wages act 1916, maternity benefit act 1961, workmen compensation act 1923, industrial employment (standing order) act, trade union act, industrial disputes act.

UNIT – 5 - 15 hours

Laws governing medico-legal aspects: consumer protection act 1986, application of c.p act in hospital, recent judgment of supreme court, implication for health professionals, medical negligence act, bio-

medical waste management rules, fire safety rules and act, medical establishment (registration and regulation) act, Indian evidence act, .law of torts, income tax act.

UNIT – 6 - 15 hours

Ethics in health care: introduction to ethics; nature, scope and purpose- values, norms, beliefs and standards , ethical guidelines for bio-medical research, Indian medical council (professional conduct, etiquette and ethical regulation).

BOOKS FOR REFERENCE:

1. Hospital Law Manual – Walters Kluwer
2. Hospital Law Manual- Aspen Health law
3. Hospital & Law - Brig. M A George.

NABH Chapters a

Patient Centered Standards

1. Access, Assessment and Continuity of Care (AAC).
2. Care of Patients (COP).
3. Management of Medication (MOM).
4. Patient Rights and Education (PRE).
5. Hospital Infection Control (HIC).

Organisation Centered Standards

6. Continuous Quality Improvement (CQI).
7. Responsibility of Management (ROM)
8. Facility Management and Safety (FMS).
9. Human Resource Management (HRM).
10. Information Management System (IMS).

Checklist - IV: MODEL CHECK LIST FOR PROJECT WORK PRESENTATIONS

Name of the student:

Date:

Name of the faculty/ Observer:

SL NO.	POINTS TO BE CONSIDERED	POOR 0	BELOW AVERAGE 1	AVERAGE 2	GOOD 3	EXCELLENT 4
1	Topic selection					
2	Appropriate review					
3	Discussion with guide and other faculty					
4	Quality of protocol					
5	Preparation of Performance					
	Total score					

**Checklist - V: CONTINUOUS EVALUATION OF PROJECT WORK BY GUIDE/
CO-GUIDE**

Name of the student:

Date:

Name of the faculty/ Observer:

SL NO	CONTENT FOR OBSERVATION	POOR 0	BELOW AVERAGE 1	AVERAGE 2	GOOD 3	EXCELLENT 4
1	Periodic consultation with guide/ co-guide					
2	Depth of Analysis/ Discussion					
3	Department presentation of findings					
4	Quality of final output					
5	Others					
	Total score					

Checklist - IV: MODEL CHECK LIST FOR PROJECT WORK PRESENTATIONS Name of the student: Date:
Name of the faculty/ Observer: SL NO. POINTS TO BE CONSIDERED POOR 0 BELOW AVERAG E 1 AVERAG
E 2 GOOD 3 EXCELLENT 4 1 Topic selection 2 Appropriate review 3 Discussion with guide and other
faculty 4 Quality of protocol 5 Preparation of Performa Total score 68 Checklist - V: CONTINUOUS
EVALUATION OF PROJECT WORK BY GUIDE/ CO-GUIDE Name of the student: Date: Name of the faculty/
Observer: SL NO . CONTENT FOR OBSERVATION POO R 0 BELOW AVERAG E1 AVERAGE 2 GOOD 3
EXCELLENT 4 1 Periodic consultation with guide/ co-guide 2 Depth of Analysis/ Discussion 3 Department
presentation of findings 4 Quality of final output 5 Others Total score 69 OVERALL ASSESSMENT SHEET

COURSE OUTCOMES

At the end of this course, graduates will be able to –

1. To develop comprehensive professional skills that are required for a business administration graduate and to develop language abilities of students to inculcate writing skills and business correspondence
2. To apply the knowledge of accounting fundamentals, and financial management to the solution of complex accounting & management problems
3. To develop self-employment competencies of young entrepreneurs and to create corporate professionals
4. To create awareness of laws and legislations related to healthcare and business and practical orientation in the area of hospitals and healthcare
5. Problem solving through the application of appropriate theories, principles and data
6. Recognize the need to adapt business practices to the opportunities and challenges of an evolving global environment.
7. Demonstrate ability to recognize and identify ethical conflicts, apply ethical reasoning and assess response options relative to the needs and interests of relevant stakeholders to address issues in a business context.
8. Identify, evaluate, analyze, interpret and apply information to address problems and make reasoned decisions in a business context.
9. Communicate in a business context in a clear, concise, coherent and professional manner.
10. Demonstrate the understanding and ability to apply professional standards, theory and research to address business problems within specific concentrations

Bachelor in Hospital Administration (B.H.A.) Career Options and Job Prospects
Career Options and Job Prospects There are many options available after the completion of Bachelor in Hospital Administration (B.H.A.) program. Students may either pursue a master degree program or any short term diploma/ certificate program. Besides this, candidates who are wishing to work may find a suitable profile to start their career. Some of the employment areas available after BHA are listed below.

Nursing Homes

International and National Healthcare Organizations

Healthcare Portal

Mental Health Facilities

Hospital Consulting Firms

Pharmaceuticals and Hospital Supply Firms

Health Insurance Companies

Medical Software Companies

Public Health Department

Rehabilitation Centre

Hospitals

Candidates may apply for any job profile listed below.

Hospital Administrator
Floor Manager - Hospital
Centre Manager
Teacher or Instructor - College and Universities
Sales Manager - Hospital Management
Associate Professor - Hospital Management Healthcare
Administrative Officer
Facility Manager - Healthcare/Hospital

Semester 1

Medical Terminology
Principles of Management
Fundamentals of Accounting
Hospital & Health System(History & Evolution)

Semester 2

Hospital Operation Management
Business Statistics
Health Economics
Project Management

Semester 3

Hospital Hazards & Disaster Management
Bio-Statistics (Operation Research & Research Methodology)
Materials Planning and Management
Hospital Medical Records Management

Semester 4

Epidemiology & Public Health Administration

Hospital Core Services

Management Information System Strategic Management

Semester 5

Quality in Health Care

Human Resource Management

Financial Management

Hospital Support & Utility Services

Semester 6

Cost & Management Accounting

Organizational Behavior

Hospital Related Laws

Marketing Management

REGULATIONS COURSE TITLE & SUMMARY:

The course shall be called the **“BHA - Bachelors in Hospital Administration”**.

The prescribed course will be an intensive full time program, which will include classroom lectures and practical training in various departments in a Hospital or any healthcare organization.

The programme will be conducted at a College/ Institution recognized by the Rajiv Gandhi University of Health Sciences, Karnataka. Candidates shall abide by the stipulated timings, discipline, rules and regulations of the University.

1. ELIGIBILITY: To be eligible for admission a candidate shall have obtained:

A two year Pre University examination or its equivalent as recognized by Rajiv Gandhi University of Health Sciences with any principle subjects of study

OR

Pre degree course from a recognized University / Board (two years after ten years of schooling) with any principle subject of study

2. MEDIUM OF INSTRUCTION: English shall be the medium of instruction for the subjects of study as well as for the examination

3. DURATION OF THE COURSE: The Course shall extend over a period of three years. The duration of the course shall be on full time basis for a period of three years consisting of six semesters from the commencement of the academic term. Each semester would be of minimum twenty weeks.

4. SCHEME OF EXAMINATION: There shall be six examinations one each at the end of each semester. The Examination will be of 2400 marks divided into 6 parts as per details given below:

i. BHA Sem I Aggregate marks 400

i. BHA Sem II Aggregate marks 400

iii. BHA Sem III Aggregate marks 400

iv. BHA Sem

IV Aggregate marks 400 v. BHA Sem

V Aggregate marks 400

vi. BHA Sem

VI Aggregate marks 400

5.

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/she can appear for semester II and pending subjects of semester I simultaneously.
- Appearing for semester III, he should have cleared semester I, and can appear for paper pending semester II along with semester III subjects.

- Appearing for semester IV, he/she should have cleared semester I & II completely, and can appear for pending paper of semester III and semester IV simultaneously.
- Appearing for semester V, he/she should have cleared semester I, II & III completely, and can appear for pending paper of semester V and semester IV simultaneously.
- Appearing for semester VI, he/she should have cleared semester I, II, III & IV completely, and can appear for pending paper of semester VI and semester V simultaneously.

POST GRADUATE DIPLOMA IN PUBLIC RELATIONS (HOSPITAL)

Preamble:

In order to fulfill commitment "HEALTH FOR ALL" our country requires well organized health care delivery system. The success of such a system is overly dependent on **availability** of well-trained health care professionals. Public Relations in hospital are emerging as force to strengthen the link between people/patients to hospital administration.

To develop graduates with good conceptual knowledge, Managerial skills and practical training in various functional areas in a Hospital

Objective

- To develop better systems for effective delivery of healthcare in hospitals
- To train the candidate in developing better leadership skills
- To provide the necessary skills and knowledge for practical orientation and implementation of strategies with relation to modern hospitals
- To train the candidate in understanding the concepts of public relations and the related activities of public affairs, Ethical Marketing, Media Relations of multi-specialty hospital

Duration of the Course

The duration of the Course is One Year with two semesters (approx 5 months each) & examination will be conducted at the end of each semester.

Place of Study

The Course will be conducted at KLES Dr. Prabhakar Kore Hospital & Medical Research Centre, Nehru Nagar, Belgaum.

Regulations :

1) Eligibility for Admission

Candidates who have passed any degree course from a recognized University are eligible for admission. The candidates with working experience in Hospitals will be given preference.

2) Course of Study

The period of study for the PG Diploma in PR (Hospital) is a full time course and its duration is of One Year (two semesters). The course includes theory, practical & oral examination at the end of each semester. The priority is given to practical aspects of the syllabus.

3) Evaluation Systems and Question Papers

Evaluation methods includes following steps

- Internal Assessment by the concerned teaching staff.
- Practical examination by internals.
- The Theory examination will be conducted by the University at the end of the each semester for the mentioned subjects.
- Project evaluation is a part of IInd semester syllabus. It consists of Viva & report of field visit.

SUBJECTS

1st Semester - Scheme of Examination

Sub Code	Subject	Theory	Practical	Internal Assessment	TOTAL MARKS
PR/01	Public Relation practices	60	20	20	100
PR/02	Business communication & Basic knowledge of Medical jargons	60	20	20	100
PR/03	Human Resource Management	60	20	20	100
PR/04	Basics of Computers & Hospital Information System	60	20	20	100
PR/05	Hospital Finance & Accounting	60	20	20	100

2nd Semester - Scheme of Examination

Sub Code	Subject	Theory	Practical	Internal Assessment	TOTAL MARKS
PR/06	Hospital Operations & Support services	60	20	20	100
PR/07	Marketing Management	60	20	20	100
PR/08	Media Relations & Event Management	60	20	20	100
PR/09	Quality Management & Hospital ethics	60	20	20	100
PR/10	Project work, Power point presentation, including field visit #Evaluation by external	--	--	--	100

4) Practical Exposure

Major thrust is to provide maximum practical exposure to students in order to make him / her employable immediately after the course. The focus is on hands on training, the candidates will work with staff of various departments leading to understanding of the Public Relations functioning, Hospital, patient care areas, support service departments and other departments and their functioning.

5) Field Visit

Students shall visit KLES Satellite Hospitals at Ankola, Hubli, Gokak, Jamakhandi, Bagalkot, Poly Clinic (Belgaum), Primary Health Centers (Kineya, Vantmuri & Handignur), Diagnostic centers, KLE Health Care Services, Old age homes, in their 2nd year field work and produce a report which will be accounted along with project work (2nd Sem.). The expenses of the field visit will have to be borne by the students.

6) Requirement to appear for the Examination

A candidate shall be permitted to appear for the examination if he/she secure not less than 80% of attendance in the number of instructional days, failing which he/she should redo the course of study.

7) Medium of instruction and Examination

The medium of instruction throughout the course and the examinations shall be conducted in **English** only.

8) Passing Marks

A Candidate shall be declared to have passed the examination in a subject if he/she secured not less than 50% in the examination. The candidate scoring 65% above will be declared as 1st class and 75% above will be declared as Distinction.

9) Conferment of Degree

Candidates shall be eligible for conferment of the degree, if he/she has undergone the prescribed course of the study for a period of one year and also has passed the examinations as have been prescribed. A candidate, who has passed all the examinations as prescribed, shall be eligible to receive the degree of "PG Diploma in PR (Hospital)" from KLE University.

10) Revision of Regulations and Syllabus

The syllabus and regulations of the course are subject to modification every three years but however it may be modified earlier if needed by the university as and when required.

TIME TABLE

PRACTICAL POSTINGS

(Every day 10 am to 1 pm)

The candidates will be posted in the following Departments as per the stipulated time table. He/She is required to understand the functioning of the Department along with gap analysis & suggest remedial actions for improvement of the services. Log book will have to be maintained by each candidate with appropriate observations/recordings.

SEMESTER - I	SEMESTER - II
<ul style="list-style-type: none"> • Central Registration • OPDs, Enquiry counter • Admission counter • Lab, Investigations (OPD & IPD Labs) • Radio Imaging Diagnostics Radiology Dept, CT/MRI Dept, USG, Colour Doppler • In-patient Department • Wards (General, Semi Pvt., Deluxe) • Nursing Dept • Nursing Responsibilities • Admission & Discharge Procedures • CSSD • Corporate Cell • MD & CEO Secretariat • Dental College 	<p>Accident Emergency & Critical care</p> <ul style="list-style-type: none"> • TC/EMS • All ICUs • Mortuary, Post Mortem & Liaison with Police • OT Services ➤ Supportive Services • Dietary • House Keeping • Laundry • Civil Maintenance • Electrical Maintenance • MRD • Accounts & Credit Cell • Administration & HR • IT & Telemedicine • Pharmacy • General Stores • Security, Ambulance Services • JNMC/KLE Univ.

Time table for 1st Semester - Theory

Time / Day	8 am to 9 am	4 pm to 5 pm	5 pm to 6 pm	10 am to 1 pm
Mon	Business communication & Medical Jargons	Public Relations Practices	Human Resource Management	Practical Posting
Tue	Hospital Finance & Accounting systems	Computer Application & HIS	Business communication	-Do-
Wed	Public Relations Practices	Human Recourse Management	Hospital Finance & Accounting system	-Do-
Thu	Computer Application & HIS	Business communication	Public Relations Practices	-Do-
Fri	Human Recourse Management	Hospital Finance & Accounting System	Computer Application & HIS	-Do-
Sat (10 am to 1pm)	Personality Development	Group Discussion	Seminar / Assignment	--

Time table for 2nd Semester - Theory

Time / Day	8 am to 9 am	4 pm to 5 pm	5 pm to 6 pm	10 am to 1 pm
Mon	Hospital Operations & support services	Marketing Management	Media Relations & Event Mgmt	Posting
Tue	Quality Mgmt & Hospital Ethics	Hospital Operations & support services	Marketing Mgmt	-Do-
Wed	Media Relations & Event Mgmt	Quality Mgmt & Hospital Ethics	Hospital Operations & support services	-Do-
Thu	Marketing Mgmt	Media Relations & Event Mgmt	Quality Mgmt & Hospital Ethics	-Do-
Fri	Hospital Operations & support services	Marketing Mgmt	Media Relations & Event Mgmt	-Do-
Sat (10 am to 1pm)	Gap Analysis in OPDs/IPDs	Case Studies	Seminar / Assignment	--

SUB : PR / 01 - PUBLIC RELATIONS PRACTICES (SEM - I)

Total Hours - 40

Unit : 1

Introduction - Public Relations in Health Care Industry, Definition of Public Relations in respect to Health Care Industry, Role of PR in Hospital, the importance of PR in Health Care Industry.

Unit : 2

Functions of PR - Front Office Management, Social Work, Counseling, Grievances handling, Grief counseling, Marketing of Health care services, Organizing Camps, CME's / Medical Workshops, Awareness programs, Exhibitions, Corporate Tie-ups, Patient feed back survey, advertisement, Press meets, editorial write-ups & image building exercises.

Unit : 3

P R as image builders - Crisis management, reputation management, Change management, Information - Over phone / e-mail / letter / fax / across the table, Dispatch reports for outstation patient Reaching out to stakeholders, NGOs, Corporate Social Responsibility (CSR), Publications of Annual Reports: corporate reporting, Financial and investor relations, Brand building, Promoting medical services and business to business services, Managing sponsorship, Managing relationship with Medical fraternity & patients / attendees & event management.

Unit : 4

Health Insurance - Illness and Accident Insurance - New Insurance Products - Concept of Social Security, Corporate tie-ups/Memorandum of Understanding (MOU), corporate sales & recovery, long term associations. GOI & State Govt. Policy in implementation of Health insurance, Hospitals / TPA / Insurance Company / Relationship and Problems. Case studies on KLES Dr. Prabhakar Kore Hospital Corporate cell.

Unit : 5

Medical Tourism - Business Opportunities - Challenges - Quality assurance in Health Care. Promotional method in service sector - Advertising Media - Press, Radio, Television, Films, Hoardings, etc - Media Relations. Role of Telemedicine. MCI guidelines on Hospital advertising.

Reference books :

Sl. No.	Name of the Book	Author	Publisher
1	Applied Public Relations & Communication	K R Balan	Sultan Chand & Publications
2	Public Relations Concepts and Cases	Suresh K (Editor)	ICFAI University Press, Hyderabad
3	Marketing Management	Philip Kotler	--
4	Insurance Management	Dave	--
5	Text Book of Marketing Services	Mr. Nimit Chowdhary & Mrs. Monika Chowdhary	

SUB : PR / 02 - BUSINESS COMMUNICATIONS & BASIC KNOWLEDGE OF MEDICAL JARGONS

Total Hours - 40

Unit : 1

Definition & importance of communication in Health care Industry. What is oral Communication - Principles of successful oral communication- barriers to communication- What is conversation control- reflection and empathy, two sides of effective oral communication- effective listening non- verbal communication.

Unit : 2

Report Writing : Introduction, Types of reports, Structure of reports, Interview skills, Communication networks, Chart, tables and Diagrams, Qualities of good reports, Proof Readings. Precise writing of Press Meets, Press Notes, Correspondence, all types letters, Notice and Agendas, Minute sheets writing, Organizing of conferences and Group Discussions.

Unit : 3

Exposure to common Medical Terminology, Tele-conferencing, Video-conference.

Unit : 4

Preliminary Human anatomy and Physiology - Basic concepts of human anatomy, Basic concepts of human physiology. Common Pathological Conditions- Basic concepts of pathogenesis of common diseases, Basic concepts interpretation of investigations reports.

Unit : 5

Making oral presentations, Proposals & informal reports, Persuasive messages, Power point presentations (PPT) & Case study on importance of effective communication in Health Care Industry.

Reference Books :

Sl. No.	Name of the Book	Author	Publisher
1	Business Communication	Aparna Ramanan	
2	Health Education	V K Mahajan	
3	Effective communication methods -	Asha Kaul	
4	Hospital Administration	Tabish	
5	Pathology	Robbin, Cotran, Kumar	
6	Textbook of Microbiology	Ananantanarayan & Paniker	
	Human Anatomy	Prof. Samar Mitra	

SUB : PR / 03 - HUMAN RESOURCE MANAGEMENT (SEM-I)

Total Hours - 40

Unit : 1

Human Resources Management : Definition - Nature and scope - Objectives - Functions
- Role of HRM in hospitals - Human Resource Planning: Nature and scope - Objectives
- Need and importance - Human Resource planning process - Job analysis - Job
description - Job specification - Job rotation.

Unit : 2

Recruitment and Selection - Training & Development of Employees: Recruitment policy
- Sources, methods - Selection Process : Tests, Interviews, - Placements - Induction /
Orientation. Training needs - Identification - Training methods and evaluation of training
- Promotions - Policy - Transfers - Types - Dismissals.

Unit : 3

Wage and Salary Administration: Meaning - Purpose - developing wage and salary
structure - Job evaluation - Working conditions - Safety - Welfare - Employees' health
services.

Unit : 4

Labour Laws Applicable to Hospitals: Workmen's Compensation Act, 1923 - Industrial
Disputes Act, 1947 - Trade Union Act, 1926 - PF and Bonus Act

Unit : 5

Performance Appraisal - Types of Performance appraisal - Objectives, Needs,
Performance Counseling - Relationship between Potential and Performance in
Organizations. Examples of Appraisal Methods for hospital Sectors.

Reference Books :

Sl. No.	Name of the Book	Author	Publisher
1	HRM in Hospitals	Goel, R.C	
2	Personnel Management and Human Resources	Venkataraman C.S. & Srinivastava B.K	Tata McGraw Hill, 1991
3	Industrial Relations,	Arun Monappa	Tata McGraw Hill 1987
4	Personnel Management and Industrial Relations,	Dale Yoder & Paul D Standohar	Sterling Publishers, 1990
5	Organizational Behaviour	Fred Luthans	McGraw Hill Book Co. 1995
6	Human Behavior at Work	Keith Davis	McGraw Hill Book Co. 1991.

SUB : PR / 04 - BASICS OF COMPUTERS & HOSPITAL INFORMATION SYSTEMS (HIS) - SEM-I

Total Hours - 40

Unit : 1

What is computer and importance in Hospitals? Hardware and Software. Different types of Software's and Hardware devices. Installation of Hardware Devices & softwares. System Software - Operating Systems Programming languages.

Unit : 2

Introduction to Windows: Application in MS-OFFICE windows based applications like (word, Excel, PowerPoint etc).

Unit : 3

Introduction to HOSPITAL INFORMATION SYSTEMS : System: Definition, types and characteristics - administrative Information systems - Support Service Technical Information systems. Hospital Information System; Management Decision and Related Information requirement - Concept of networking Hospital information system

Unit : 4

Management Information system: Management Information System Definition, MIS design; Approaches to MIS design - Top down approach, bottom-up approach, total systems approach - decision support system, LIS - Laboratory Information Systems.

Unit : 5

Introduction to Internet: What is Internet? its Advantages in HOSPITAL INFORMATION SYSTEMS, types of internet connections Introduction to Computer networking. Types of Networks LAN, WAN, MAN etc.,

Reference Books:

Sl. No.	Name of the Book	Author	Publisher
1	Management Information	James A. O'Brien	
2	Managing a modern hospital	A.V. Sreenivasan	
3	Management Information Systems in Hospital	A.K. Sainy	

SUB : PR / 05 - HOSPITAL FINANCE & ACCOUNTING SYSTEM - SEM - I

Total Hours - 40

Unit : 1

Basics of Accounting, Management Accounting - Nature & Scope Development of Accounting, functions of Accounting, classification of Accounting - financial Accounting & Management Accounting. Installation of accounting system into Hospital financial Accounting V/s Cost accounting

Unit : 2

A) Funds Flow Analysis

Meaning of Funds Flow statement, uses of funds flow statement, preparation of funds flow statement, Sales / Services - IP Incomes, OPD incomes, Registrations, Income from credit companies

B) Cash Flow Analysis

Meaning of Cash Flow Analysis, Preparation of Cash flow analysis, Difference between CA & FA

Unit : 3

Hospital (Services) Accounting System, Accounting system of IP Bills, OP Bills charge sheet credit bills, MOU tie-up agreements. Maintenance of register's - cash/chq/sales/purchase etc. System of professional fees payable to doctors.

Unit : 4

Consumable Or Pharmacy Accounting System, Accounting System of Pharmacy, Sales or Issue register, return register, OT consumables, Equipments, Treatment for provision for taxation, Depreciation as a source of fund, cost centers- links between purchases & supplier.

Unit : 5

Ratio Analysis / Budgetary Control, Meaning of ratios, classification of ratios, profitability ratio, coverage ratio, turnover ratio, Financial ratio, Advantages of ratio, SWOT analysis, MIS reports Meaning of budget, Meaning of control, forecasts & Budget, Control ratios Budgetary control & standard costing

Reference Books:

Sl. No.	Name of the Book	Author	Publisher
1	Management Accounting	I M Pandey	
2	Managerial Accounting for Hospitals	G R Kulkarni	

SUB : PR / 06 - HOSPITAL OPERATIONS & SUPPORT SERVICES - SEM-II

Total Hours - 40

Unit : 1

Nursing Care and Ward Management - Meaning - Importance - Duties and Responsibilities - Documentation and records - Universal Precautions for infection Control.

Unit : 2

Emergency Services: Role and Functions - Ambulance Service & tracking - Golden Hour - Triage, Meaning - Importance of Social worker / PR in Trauma, Medico Legal Cases (MLC), Liaison with Police, crowd management etc. Code Blue & Code White.

Unit : 3

Intensive care services - Types of ICU - Equipment and Facilities - Infection Prevention.

Operation Theatre-Types of Manpower and Equipment required - Zoning of OT - Scheduling of Operations and OT Utilization - Managing Bio Medical Waste in OT.

Unit : 4

Diagnostic services - Types of Laboratories and Tests - Laboratory equipments - Quality Assurance - Safety in the Laboratory - Blood Bank Management.

Radio Imaging and Therapy Service-Planning of the facility - over view of various modern imaging Equipment and technologies - Radiation Hazards - Protection - Rules and Regulation - Concept of Digital Imaging.

Unit : 5

Methods of Sterilization CSSD, Nosocomial infection and hospital acquired infection control committee, Laundry services, Security Services (General & Others like fire, gas etc.), Ambulatory Care, Hospital Stores, Mortuary (Preservation, transportation & religious formalities), Kitchen services, House Keeping

Reference Books :

Sl. No.	Name of the Book	Author	Publisher
1	Hospital Facilities Planning	S.D. Kunders	
2	Management Process in Health Care	S. Srinivasan	
3	Principles of Hospital Administration	S.A. Tabish	
4	Hospita Administration	S.L. Goel	
5	Hospital Administration	Francis	
6	Hospital Administration	McGibony	

SUB : PR / 07 - MARKETING MANAGEMENT - SEM-II

Total Hours - 40

Unit : 1

Service marketing concepts: Marketing mix -4Ps in marketing - Market segmentation - Distinctive nature of services marketing - Characteristics of services - Services marketing mix -3Ps of service marketing - People-Physical evidence: - Process-Service quality dimensions

Unit : 2

Market Promotion: Importance of market Research - Definition and need for internal marketing - Word of Mouth Communication (WOM)- Customer Relationship Management (CRM)-Definition-Factors affecting the customer Relations-Different relationship markets-CRM strategy-customer loyalty ladder-Customer life cycle-Barriers for effective CRM.

Unit : 3

Pricing of Health services: Definition of price-cost-value-Factors to be considered for pricing of services- Pricing Objectives- profit oriented - Market skimming - Market penetration - Operations and Patronage oriented objectives - Pricing Strategies - Cost based pricing - Competition based pricing - Demand based pricing - Price discounting - Odd pricing-Place differentiates-Quantity Differentiates - Penetration pricing - Value pricing - Complementary pricing-Price bundling-Market segmentation and pricing.

Unit : 4

Health Insurance: Illness and Accident insurance - New insurance products - concept of Social Security - Role of TPAs, Medical Tourism-Business opportunities - Challenges.

Unit : 5

Positioning the market offering: Developing a positioning strategy - promotional method in service sector - medical camp, conferences, internet medicine, public interest programmes, referral doctor system, advertising media - press, radio, television, films, and hoardings.

Reference Books :

Sl. No.	Name of the Book	Author	Publisher
1	Text Book of Marketing services – Individual Experience	Mr. Nimit Chowdhary and Mrs. Monika Chowdhary	
2	Branding Concepts and Process	Mr. Debashis Pati	
3	Marketing Management	Philip Kotler	Prentice Hall
4	Services Marketing	S.M. Jha	Himalaya Publishing House

SUB : PR / 08 - MEDIA RELATIONS & EVENT MANAGEMENT - SEM-II

Total Hours - 40

Unit : 1

Introduction, Importance of Media Relation in Health Industry, Definition, Importance of Media List - Build and Create list. The role of media in health industry. Basic principles of media relations

Unit : 2

Types of Media - Print, Electronic & Broadcast Publications and publishes, Press releases written as well verbal. Relation building, differences in PR writing and Journalist writing preparing and releasing advertisements.

Unit : 3

The Techniques of Media Relation - Dealings with Media directly and effectively, content Style & Pattern of news release. News release distribution through internet and manual. Still Photography & video photography. Drafting of press releases.

Unit : 4

Introduction, Definition of Event management, its role in health industry, importance of media coverage. Live event management assignment.

Unit : 5

Types of Events in health industry - press conference / meet / briefings, CME, Workshop, Camps, Public awareness programs, Health programs with NGO/Govt., exhibitions and skits, indoor as well out door, pre and post event dealings.

References

SUB : PR / 09 - QUALITY MANAGEMENT & HOSPITAL ETHICS - SEM-II

Total Hours - 40

Unit : 1

Quality Management Programme, ISO clauses, quality manual, quality of clinical services, Critical Pathways,

Unit : 2

Medical Audits, NABL, NABH. JCI, BIS

Unit : 3

Performance review - Assessment / Methods

Quality Management of diagnostic facilities.

Quality of assurance procedures, Deming's Principles, Juran Trilogy, Kaizen, Phillip Crosby's Principles

Management of Social Services. Assessment of Client satisfaction

Quality Circle in Hospitals

Unit : 4

Laws pertaining to Health : Central Births and Deaths Registration Act, 1969-Medical Termination of Pregnancy Act, 1971 -Infant Milk Substitutes, Feeding Bottles and Infant Food Act, 1992.

Unit : 5

Labour Laws Applicable to Hospitals - Minimum Wages Act, 1948 - Payment of Wages Act, 1936 - Payment of Bonus Act, 1965.

Reference Book :

Sl. No.	Name of the Book	Author	Publisher
1	Total Quality Management	Aswathappa	Himalaya Books House
2	Quality Management	Barnett	Pitman Publishing
3	Industrial Laws	Kapoor, N.D.	
4	The Law of Health Care Administrations	Stuart Showalter	
5	Dynamics of Industrial relations	C.B. Memoria	

SUB : PR / 10 - PROJECT WORK - SEM - II

Total Hours - 40

This project is focused on applying the concepts and principles the candidate has acquired or learnt in class at a real world situations. The candidate will have to identify the project title. The internal guide will monitor & conduct the project till the end. On completion of the project Viva will be conducted by External examiner assigned by the University.

KLE VK Institute of Dental Sciences, Belagavi
LASERS IN DENTISTRY – CERTIFICATE COURSE

- “Lasers In Dentistry” –Certificate Course
- 3 Modules – Theory Classes + Demonstrations on Animal models and Hands-on on Live patients
- 1 year University Certificate course

Introduction

Lasers have been proved to be beneficial in clinical procedures for dental practitioners. Lasers have various hard and soft tissue applications. Application of lasers by Photobiomodulation, Photodynamic therapy and Photothermal therapy has shown good results. Even though, lasers cannot replace conventional procedures in dentistry, it helps as an adjunct in clinical procedures giving quick and excellent results.

Dental lasers have various applications in dentistry like in wound healing, aphthous ulcers, aesthetic gingival recontouring, frenectomies etc. Soft tissue laser therapy has shown its efficiency in the treatment of small oral ulcers to temporomandibular disorders. With the advantage of being a non-surgical treatment modality, it helps in faster tissue healing and pain relief.

Need for the course

Patients prefer the most advanced treatment facilities which are painless, bloodless and quick recovery. The use of lasers has shown to be an effective mode to enhance the efficiency, cost and comfort to the patient. Hence, application of lasers will help in providing stress -free patient care. A thorough understanding and knowledge of lasers, their features, and mechanisms of action helps dental professionals apply lasers for different cases during clinical procedures. Hence educating the graduates in the applications of laser will help them use lasers in their routine clinical practice.

Aim of the Course

Education and training of participants, on applications of Soft tissue Lasers in Dentistry.

Objectives of the course

By the end of the course the learner will be able to

- Acquire knowledge and understand the basics of Lasers and laser therapy
- Have the knowledge and understand the applications of Lasers in dentistry.
- Perform laser-assisted clinical procedures

Eligibility criteria –

Participants must have completed BDS.
(Dental Graduates of KLE VK Institute of Dental Sciences)

Maximum Intake –10 students

Course fees – 20,000/- per participant

Course content and hours

<u>Sl no</u>	<u>Topics</u>	<u>Hours</u>	<u>Mode of teaching</u>
1	Introduction to lasers and History of Lasers	2 hours	Didactic lectures
2	Laser physics	4 hours	Didactic lectures
3	Types of dental lasers and Diode lasers	2 hours	Didactic lectures
4	Laser safety	2 hour	Didactic lectures
5	Photobiomodulation	2 hours	Didactic lectures + demonstration + case discussions
6	Photodynamic therapy and Photothermal therapy	2 hours	Didactic lectures + demonstration + case discussions
7	Lasers in oral lesions	2 hours	Didactic lectures + case discussions
8	Lasers in periodontics	2 hours	Didactic lectures + case discussions
9	Lasers in conservative dentistry and endodontics	2 hours	Didactic lectures + case discussions
10.	Lasers in prosthodontics	2 hours	Didactic lectures + case discussions
11.	Lasers in orthodontics, oral surgery and pediatric dentistry	2 hours	Didactic lectures + case discussions
12.	Lasers in Implantology	2 hours	Didactic lectures + case discussions
	Total theory hours	26 hours	+ 2 hours for tips and techniques

Demonstration and Hands on- 8 hours

- Surgical
- Non surgical

(Photobiomodulation - demonstration on patients)

Photodynamic therapy – demonstration on patients and hands-on

Photothermal therapy – demonstration on patients and hands-on on models

Clinical hours – 44 hours

TOTAL HOURS OF THE COURSE

Theory – 28 hours

Practical's – 52 hours

Education strategies:

Instruction methods	Assessment Methods
1. Didactical lectures 2. Interactive lectures 3. Demonstration 4. Hands on	1. Formative Assessment *Assessment at the end of each module through Multiple choice questions using google forms.

Dr. Hema K
Course Co-ordinator

Criteria for the course certification

1. 80% Attendance
2. Score of assessments- (using google forms at the end of each module)
3. Completion of 12 cases at the end of 1 year and submission of log book.
 - Cases of Photobiomodulation
 - Cases of photodynamic therapy
 - Cases of photothermal therapy

The eligibility for the course certification will be done based on credit points scored by the participant.

Expected outcome

By the end of this course, the learner will be able to:

- Practice recent modality of treatment and to provide more efficient clinical practice.
- Apply lasers in most of the cases to obtain faster and better treatment outcomes.
- To provide cost effective bloodless, painless treatment procedure
- Provide more efficient and comfortable treatment procedures for patients
- To generate more income than conventional techniques

Syllabus

1. Introduction to lasers
2. Laser physics
3. Laser tissue interaction
 - Photobiological effects of lasers
4. Types of lasers
 - Hard and soft tissue lasers
5. Laser healing triangle
 - Photobiomodulation
 - Photodynamic therapy
 - Photothermal therapy
6. Clinical applications of lasers
 - Lasers in oral lesions
 - Lasers in periodontics
 - Lasers in conservative dentistry and endodontics
 - Lasers in oral surgery
 - Lasers in prosthodontics
 - Lasers in orthodontics
 - Lasers in pediatric and preventive dentistry
 - Lasers in implantology
7. Laser safety
8. Protocol for common clinical cases

Time Table for Laser University Course

MODULES	TOPIC	STAFF
MODULE 1	• Introduction to lasers	Dr. Hema K
	• Laser Physics	Dr. Vilas Pattar
	• Laser tissue interaction	Dr. Neelamma Shetti
	• Laser safety	Dr. Hema K
	• Diode lasers	Dr. Vilas Pattar
	• Photobiomodulation and Clinical applications	Dr. Neelamma
	• Photodynamic therapy and Photothermal therapy	Dr. Vilas Pattar
MODULE 2	• Assessment	
	• Lasers in Oral lesions	Dr. Vilas Pattar
	Lasers in periodontics	Dr. Neelamma Shetti
	• Lasers in conservative dentistry and endodontics	Dr. Vilas Pattar
	• Lasers in Prosthodontics	Dr. Hema K
	• Lasers in orthodontics , oral surgery and paediatric dentistry	Dr. Hema K
MODULE 3	• Lasers in Implantology	Dr. Hema K
	• Assessment	
	• Demonstration and Hands- on	Dr. Neelamma Shetti Dr. Vilas Pattar
	• Tips and Techniques	Dr. Hema Dr. Vilas Pattar
	• Assessment	
	• Clinical cases	Internship
	• Log Book Submission	Evaluation of log book and awarding of certificates



PRINCIPAL
KLE V.K. Institute of Dental Sciences
Nehru Nagar BELAGAVI-590010



KLE V.K. Institute of Dental Sciences

(A Constituent unit of KLE Academy of Higher Education & Research
Deemed-to-be-University u/s 3 of the UGC Act, 1956)

Nehru Nagar, Belagavi-590 010 INDIA

Accredited 'A' grade by NAAC (2nd Cycle) & Placed in Category 'A' by MHRD (GoI)

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Date : 14/06/2023

Certificate course Artificial Intelligence in Dentistry

Duration: 1 year

Total lecture duration required as per Syllabus: 4 months

Externship program: 8 months

Resource Persons: Dr. Prasad Rampure/ Dr.Sanjay Pujari / Dr. Sanjay Ankali/ Prof. Mahantesh Laddi/ Prof. Madhurani S./ Dr. Pragya Singh

Lesson Plan:

Name of Modules	Portion to be covered	Dates of classes conduction	Resource Persons
Module 1	Definition of AI, foundation, history, and types	06/01/2024	Dr. Prasad Rampure/ Dr. Sanjay Ankali
	Problem-solving agents, Example problems, Searching for Solutions, Uninformed	07/01/2024	
	Search Strategies: Breadth First Search, Depth First Search	13/01/2024	
	Overview of dentistry, oral health, and common dental issues for AI application.	20/01/2024	
Module 2	Machine Learning Fundamentals: Basics of machine learning: supervised, unsupervised, and reinforcement learning.	21/01/2024	Prof. Mahantesh L/ Prof. Madhurani
	Understanding Data Basics of Learning theory Similarity-Based Learning Regression Analysis	27/01/2024	
	Feature engineering, model evaluation, and selection. Application of machine learning in dental diagnostics.	03/02/2024	
Module 3	Medical Image Analysis <ul style="list-style-type: none">Importance of medical imaging in dentistry.	04/02/2024	Dr. Sanjay Ankali/ Prof. Mahantesh L


Module 3	<ul style="list-style-type: none"> • Image preprocessing, segmentation, and classification for • Case studies: Analyzing X-rays, 3D imaging interpretation. 		
	<p>Natural Language Processing in Dentistry</p> <ul style="list-style-type: none"> • Introduction to NLP, types and its applications. • Analyzing dental literature and patient records using NLP. • Building a dental chatbot for patient inquiries and education. 	10/02/2024	
	<p>AI in Diagnosis and Treatment Planning</p> <ul style="list-style-type: none"> • Developing an understanding of AI-assisted diagnosis in dentistry. • Personalized treatment planning using AI recommendations. • Incorporating patient preferences and variability. • AI use cases in dentistry 	17/02/2024	Dr. Sanjay Pujari
	<p>Robotics and Automation in Dentistry</p> <ul style="list-style-type: none"> • Introduction to robotics in dentistry and AI-driven assistance in dental procedures. • Automation of routine tasks in dental clinics. • Hands-on experience: Operating robotic dental tools. 	18/02/2024	Prof. Mahantesh Laddi
Module 4	<p>Ethical & Regulatory Considerations</p> <ul style="list-style-type: none"> • ABDM • CDSCO 	24/02/2024 (2 hours)	Dr. Pragya Singh
	<p>Addressing bias and fairness in AI Algorithms</p> <ul style="list-style-type: none"> • Ethical considerations in AI-powered diagnosis and treatment planning. 	02/03/2024 (2 hours)	
	<p>Exploring generative models and cutting-edge AI research in dentistry.</p>	03/03/24	
	<p>Predictions and discussions on the future of AI in oral healthcare.</p>	(1 hour)	

Module 5	Capstone Project and Future Directions Discussions on use cases by students/journal articles – Part 1	16/03/2024 (1+1 hour)	Dr. Pragya Singh/ Dr.Sanjay Pujari
	Capstone Project and Future Directions Discussions on use cases by students/journal articles – Part 2	17/03/2024 (3 hours)	
	Introduction to Entrepreneurship	06/04/2024 (1 hour)	Dr. Pragya Singh
	Ideation and Market research	07/04/2024 (1 hour)	
	Presentation of Ideas for the Project	13/04/2024 (3 hours)	
	Understanding product terminologies (POC, MVP, Prototype)	14/04/2024 (1 hour)	
	Presentation of roadmap of Product development	20/04/2024 (3 hours)	
	Understanding the basics of investment	21/04/2024 (2 hours)	
	Exploring the emerging trends and potential research directions.	04/05/2024 (1 hours)	
Externship program (8 months)	<ul style="list-style-type: none"> • Month 1-2: Introduction to entrepreneurship, start-ups, idea conversion to product <ul style="list-style-type: none"> • Students work on capstone projects applying AI in dentistry. • Presentations of capstone projects and peer feedback. • Exploring emerging trends and potential research directions • Month 2-4: Onboarding and Project Definition <ul style="list-style-type: none"> • Introduction to the externship program's goals and expectations. • Match students with externship hosts based on interests and skills. • Define externship project goals and objectives. • Month 4-6: Project Work and Hands-on Experience <ul style="list-style-type: none"> • Students collaborate with mentors on AI-related projects. • Gain practical experience implementing AI solutions in real dental scenarios. • Regular check-ins and progress assessments. • Month 6-8: Documentation, Presentation, and Reflection 		

- | | |
|---|--|
| <ul style="list-style-type: none">• Students document project work, challenges faced, and solutions implemented.• Prepare and deliver presentations on externship projects.• Reflect on integrating academic learning with practical experiences. | |
|---|--|



Dr. Anand Badavannavar
Course Co-ordinator


Dr. Alka Kale
Principal,
KLE V K Institute of Dental Sciences,
Belagavi.

PRINCIPAL
KLE V.K. Institute of Dental Sciences
Nehru Nagar BELAGAVI-590010

Ordinance Governing PG in Pharm Analysis

* * *

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)]

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COMPLIMENTARY



VISION

To be an outstanding KAHER of excellence ever in pursuit of newer horizons to build self-reliant global citizens through assured quality educational programmes.

MISSION

- To promote sustainable development of Higher Education consistent with statutory and regulatory requirements.
- To plan and 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 Programmes.
- 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 Mission.

OBJECTIVES

The objectives are to realize the following at KAHER and its Constituent Institutions :

- To implement effectively programmes through creativity and innovation in teaching, learning and evaluation.
- To make existing programmes more career oriented through effective system of review and redesign of curriculum.
- To impart spirit of inquiry 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 and 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 students welfare programmes.
- 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 & the Seven Stars....

The Palm is the palm of the teacher - the hand that acts, promises and 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 Knowledge 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 kingdom 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', the inscription at the base of the Emblem conveys that our Organization with its strength, maturity & wisdom will 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 forthcoming generations.

Table – : Course of study for M. Pharm. (Pharmaceutical Analysis)

Course Code	Course	Credit Hours	Credit Points	Hrs. /wk	Marks
Semester I					
MPA101T	Modern Pharmaceutical Analytical Techniques	4	4	4	100
MPA102T	Advanced Pharmaceutical Analysis	4	4	4	100
MPA103T	Pharmaceutical Validation	4	4	4	100
MPA104T	Food Analysis	4	4	4	100
MPA105P	Pharmaceutical Analysis Practical I	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650
Semester II					
MPA201T	Advanced Instrumental Analysis	4	4	4	100
MPA202T	Modern Bio-Analytical Techniques	4	4	4	100
MPA203T	Quality Control and Quality Assurance	4	4	4	100
MPA204T	Herbal and Cosmetic Analysis	4	4	4	100
MPA205P	Pharmaceutical Analysis Practical II	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650

Tables – : Schemes for internal assessments and end semester examinations
(Pharmaceutical Analysis-MPA)

Course Code	Course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
SEMESTER I								
MPA101T	Modern Pharmaceutical Analysis	10	15	1Hr	25	75	3 Hrs	100
MPA102T	Advanced Pharmaceutical Analysis	10	15	1Hr	25	75	3 Hrs	100
MPA103T	Pharmaceutical Validation	10	15	1Hr	25	75	3 Hrs	100
MPA104T	Food Analysis	10	15	1Hr	25	75	3 Hrs	100
MPA105P	Pharmaceutical Analysis Practical-I	20	30	6Hrs	50	100	6 Hrs	150
-	Seminar /Assignment	-	-	-	-	-	-	100
Total								650
SEMESTER II								
MPA201T	Advanced Instrumental Analysis	10	15	1Hr	25	75	3 Hrs	100
MPA202T	Modern Bio-Analytical Techniques	10	15	1Hr	25	75	3 Hrs	100
MPA203T	Quality Control and Quality Assurance	10	15	1Hr	25	75	3 Hrs	100
MPA204T	Herbal and Cosmetic analysis	10	15	1 Hr	25	75	3 Hrs	100
MPA205P	Pharmaceutical Analysis Practical -II	20	30	6 Hrs	50	100	6 Hrs	150
-	Seminar /Assignment	-	-	-	-	-	-	100
Total								650

PHARMACEUTICAL ANALYSIS (MPA)

MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (MPA 101T)

Scope

This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.

Objectives

After completion of course student is able to know about chemicals and excipients

- The analysis of various drugs in single and combination dosage forms
- Theoretical and practical skills of the instruments

THEORY

60 Hrs

- 1. a. UV-Visible spectroscopy:** Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV-Visible spectroscopy, Difference/ Derivative spectroscopy.
b. IR spectroscopy: Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier - Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy, Data Interpretation.
c. Spectrofluorimetry: Theory of Fluorescence, Factors affecting fluorescence (Characteristics of drugs that can be analysed by fluorimetry), Quenchers, Instrumentation and Applications of fluorescence spectrophotometer.
d. Flame emission spectroscopy and Atomic absorption spectroscopy: Principle, Instrumentation, Interferences and Applications. **10 Hrs**
- 2. NMR spectroscopy:** Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR and ¹³C NMR. Applications of NMR spectroscopy. **10 Hrs**
- 3. Mass Spectroscopy:** Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization like electron impact, chemical, field, FAB and MALDI, APCI, ESI, APPI Analyzers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Meta stable ions, Isotopic peaks and Applications of Mass spectroscopy. **10 Hrs**
- 4. Chromatography:** Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution, isolation of drug from excipients, data interpretation and applications of the following:
 - a. Thin Layer chromatography
 - b. High Performance Thin Layer Chromatography

- c. Ion exchange chromatography
 - d. Column chromatography
 - e. Gas chromatography
 - f. High Performance Liquid chromatography
 - g. Ultra High Performance Liquid chromatography
 - h. Affinity chromatography
 - 2. Gel Chromatography
5. **a. Electrophoresis:** Principle, Instrumentation, Working conditions, factors affecting separation and applications of the following:
 Paper electrophoresis b) Gel electrophoresis c) Capillary electrophoresis d) Zone electrophoresis e) Moving boundary electrophoresis f) Isoelectric focusing
- b. X ray Crystallography:** Production of X rays, Different X ray methods, Bragg's law, Rotating crystal technique, X ray powder technique, Types of crystals and applications of X-ray diffraction. **10 Hrs**
6. **a. Potentiometry:** Principle, working, Ion selective Electrodes and Application of potentiometry.
- b. Thermal Techniques:** Principle, thermal transitions and Instrumentation (Heat flux and power-compensation and designs), Modulated DSC, Hyper DSC, experimental parameters (sample preparation, experimental conditions, calibration, heating and cooling rates, resolution, source of errors) and their influence, advantage and disadvantages, pharmaceutical applications. Differential Thermal Analysis (DTA): Principle, instrumentation and advantage and disadvantages, pharmaceutical applications, derivative differential thermal analysis (DDTA). TGA: Principle, instrumentation, factors affecting results, advantage and disadvantages, pharmaceutical applications. **10 Hrs**

REFERENCES

1. Spectrometric Identification of Organic compounds - Robert M Silverstein, Sixth edition, John Wiley & Sons, 2004.
2. Principles of Instrumental Analysis - Douglas A Skoog, F. James Holler, Timothy A. Nieman, 5th edition, Eastern press, Bangalore, 1998.
3. Instrumental methods of analysis – Willards, 7th edition, CBS publishers.
4. Practical Pharmaceutical Chemistry – Beckett and Stenlake, Vol II, 4th edition, CBS Publishers, New Delhi, 1997.
5. Organic Spectroscopy - William Kemp, 3rd edition, ELBS, 1991.
6. Quantitative Analysis of Drugs in Pharmaceutical formulation - P D Sethi, 3rd Edition, CBS Publishers, New Delhi, 1997.
7. Pharmaceutical Analysis - Modern Methods – Part B - J W Munson, Vol 11, Marcel. Dekker Series

8. Spectroscopy of Organic Compounds, 2nd edn., P.S/Kalsi, Wiley eastern Ltd., Delhi.
9. Textbook of Pharmaceutical Analysis, K.A.Connors, 3rd Edition, John Wiley & Sons, 1982.

ADVANCED PHARMACEUTICAL ANALYSIS (MPA 102T)

Scope:

This subject deals with the various aspects of Impurity, Impurities in new drug products, in residual solvents, Elemental impurities, Impurity profiling and characterization of degradants, Stability testing of phytopharmaceuticals and their protocol preparation. It also covers the biological testing of various vaccines and their principle and procedure.

Objectives:

After completion of the course students shall able to know, Appropriate analytical skills required for the analytical method development. Principles of various reagents used in functional group analysis that renders necessary support in research methodology and demonstrates its application in the practical related problems. Analysis of impurities in drugs, residual solvents and stability studies of drugs and biological products

THEORY

60 Hrs

1. Impurity and stability studies:

Definition, classification of impurities in drug Substance or Active Pharmaceutical Ingredients and quantification of impurities as per ICH guidelines

Impurities in new drug products: Rationale for the reporting and control of degradation products, reporting degradation products content of batches, listing of degradation products in specifications, qualification of degradation products. **Impurities in residual solvents:** General principles, classification of residual solvents, Analytical procedures, limits of residual solvents, reporting levels of residual solvents

2. **Elemental impurities:** Element classification, control of elemental impurities, Potential Sources of elemental Impurities, Identification of Potential Elemental Impurities, analytical procedures, instrumentation & C, H, N and S analysis Stability testing protocols: Selection of batches, container orientation, test parameters, sampling frequency, specification, storage conditions, recording of results, concept of stability, commitment etc. Important mechanistic and stability related information provided by results of study of factors like temperature, pH, buffering species ionic strength and dielectric constant etc. on the reaction rates. With practical considerations.

3. **Impurity profiling and degradant characterization:** Method development, Stability studies and concepts of validation accelerated stability testing & shelf life calculation, WHO and ICH stability testing guidelines, Stability zones, steps in development, practical considerations. Basics of impurity profiling and degradant characterization with special emphasis. Photostability testing guidelines, ICH stability guidelines for biological products

4. **Stability testing of phytopharmaceuticals:** Regulatory requirements, protocols, HPTLC/HPLC finger printing, interactions and complexity.

5. **Biological tests and assays of the following:** a. Adsorbed Tetanus vaccine b. Adsorbed Diphtheria vaccine c. Human anti haemophilic vaccine d. Rabies vaccine e. Tetanus Anti toxin f. Tetanus Anti serum g. Oxytocin h. Heparin sodium IP i. Antivenom. PCR, PCR studies for gene regulation, instrumentation (Principle and Procedures)

6. Immunoassays (IA) Basic principles, Production of antibodies, Separation of bound and unbound drug, Radioimmunoassay, Optical IA, Enzyme IA, Fluoro IA, Luminiscence IA, Quantification and applications of IA.

REFERENCES:

1. Vogel's textbook of quantitative chemical analysis - Jeffery J Bassett, J. Mendham, R. C. Denney, 5th edition, ELBS, 1991.
2. Practical Pharmaceutical Chemistry - Beckett and Stenlake, Vol II, 4th Edition, CBS publishers, New Delhi, 1997.
3. Textbook of Pharmaceutical Analysis - K A Connors, 3rd Edition, John Wiley & Sons, 1982. 103
4. Pharmaceutical Analysis - Higuchi, Brochmman and Hassen, 2nd Edition, Wiley – Inter science Publication, 1961.
5. Quantitative Analysis of Drugs in Pharmaceutical formulation – P D Sethi, 3rd Edition, CBS Publishers New Delhi, 1997.
6. Pharmaceutical Analysis- Modern methods - J W Munson – Part B, Volume 11, Marcel Dekker Series.
7. The Quantitative analysis of Drugs - D C Carratt, 3rd edition, CBS Publishers, NewDelhi, 1964.
8. Indian Pharmacopoeia Vol I , II & III 2007, 2010, 2014.
9. Methods of sampling and microbiological examination of water, first revision, BIS
10. Practical HPLC method development – Snyder, Kirkland, Glajch, 2nd edition, John Wiley & Sons.
11. Analytical Profiles of drug substances – Klaus Florey, Volume 1 – 20, Elsevier, 2005
12. Analytical Profiles of drug substances and Excipients – Harry G Brittan, Volume 21 – 30, Elsevier, 2005.
13. The analysis of drugs in biological fluids - Joseph Chamberlain, 2nd edition, CRC press, London.
14. ICH Guidelines for impurity profiles and stability studies.

PHARMACEUTICAL VALIDATION (MPA 103T)

Scope:

The main purpose of the subject is to understand about validation and how it can be applied to industry and thus to improve the quality of the products. The subject covers the complete information about validation, types, methodology and application.

Objectives:

Upon completion of the subject student shall be able to

- Explain the aspect of validation
- Carryout validation of manufacturing processes
- Apply the knowledge of validation to instruments and equipments
- Validate the manufacturing facilities

THEORY

60 Hrs

1. Introduction: Definition of Qualification and Validation, Advantage of Validation, Streamlining of Qualification & Validation process and Validation Master Plan.

Qualification: User Requirement Specification, Design Qualification, Factory Acceptance Test (FAT)/ Site Acceptance Test (SAT), Installation Qualification, Operational Qualification, Performance Qualification, Re- Qualification (Maintaining status Calibration Preventive Maintenance, Change management), Qualification of Manufacturing Equipments, Qualification of Analytical Instruments and Laboratory equipments.

12 Hrs

2. Qualification of analytical instruments: Electronic balance, pH meter, UV-Visible spectrophotometer, FTIR, GC, HPLC, HPTLC Qualification of Glassware: Volumetric flask, pipette, Measuring cylinder, beakers and burette.

12 Hrs

3. Validation of Utility systems: Pharmaceutical Water System & pure steam, HVAC system, Compressed air and nitrogen. Cleaning Validation: Cleaning Validation - Cleaning Method development, Validation and validation of analytical method used in cleaning. Cleaning of Equipment, Cleaning of Facilities. Cleaning in place (CIP).

12 Hrs

4. Analytical method validation: General principles, Validation of analytical method as per ICH guidelines and USP Computerized system validation: Electronic records and digital significance- 21 CFR part 11 and GAMP 5.

12 Hrs

5. General Principles of Intellectual Property: Concepts of Intellectual Property (IP), Intellectual Property Protection (IPP), Intellectual Property Rights (IPR); Economic importance, mechanism for protection of Intellectual Property –patents, Copyright, Trademark; Factors affecting choice of IP protection; Penalties for violation; Role of IP in pharmaceutical industry; Global ramification and financial implications. Filing a patent applications; patent application forms and guidelines. Types patent applications-provisional and non-provisional, PCT and convention patent applications; International patenting requirement procedures and costs; Rights and responsibilities of a patentee; Practical aspects regarding maintaining of a Patent file; Patent infringement meaning and scope. Significance of transfer technology (TOT), IP and ethics-positive and negative aspects of IPP; Societal responsibility, avoiding unethical practices. 12 Hrs

REFERENCES:

1. B. T. Loftus & R. A. Nash, "Pharmaceutical Process Validation", *Drugs and Pharm Sci. Series*, Vol. 129, 3rd Ed., Marcel Dekker Inc., N.Y.
2. *The Theory & Practice of Industrial Pharmacy*, 3rd edition, Leon Lachman, Herbert A. Lieberman, Joseph. L. Karig, Varghese Publishing House, Bombay.
3. *Validation Master plan by Terveeks or Deeks*, Davis Harwood International publishing.
4. *Validation of Aseptic Pharmaceutical Processes*, 2nd Edition, by Carleton & Agalloco, (Marcel Dekker).
5. Michael Levin, *Pharmaceutical Process Scale-Up*ll, *Drugs and Pharm. Sci. Series*, Vol. 157, 2nd Ed., Marcel Dekker Inc., N.Y.
6. *Validation Standard Operating Procedures: A Step by Step Guide for Achieving Compliance in the Pharmaceutical, Medical Device, and Biotech Industries*, Syed Imtiaz Haider
7. *Pharmaceutical Equipment Validation: The Ultimate Qualification Handbook*, Phillip A. Cloud, Interpharm Press
8. *Validation of Pharmaceutical Processes: Sterile Products*, Frederick J. Carlton (Ed.) and James Agalloco (Ed.), Marcel Dekker, 2nd Ed.
9. *Analytical Method validation and Instrument Performance Verification* by Chung Chan, Heiman Lam, Y.C. Lee, Yue. Zhang, Wiley Inter Science.

FOOD ANALYSIS (MPA 104T)

Scope:

This course is designed to impart knowledge on analysis of food constituents and finished food products. The course includes application of instrumental analysis in the determination of pesticides in variety of food products.

Objectives:

At completion of this course student shall be able to understand various analytical techniques in the determination of

- Food constituents
- Food additives
- Finished food products
- Pesticides in food
- And also student shall have the knowledge on food regulations and legislations

THEORY

60 Hrs

1. **Carbohydrates:** classification and properties of food carbohydrates, General methods of analysis of food carbohydrates, Changes in food carbohydrates during processing, Digestion, absorption and metabolism of carbohydrates, Dietary fibre, Crude fibre and application of food carbohydrates
Proteins: Chemistry and classification of amino acids and proteins, Physico-Chemical properties of protein and their structure, general methods of analysis of proteins and amino acids, Digestion, absorption and metabolism of proteins. **12 Hrs**
2. **Lipids:** Classification, general methods of analysis, refining of fats and oils; hydrogenation of vegetable oils, Determination of adulteration in fats and oils, Various methods used for measurement of spoilage of fats and fatty foods.
Vitamins: classification of vitamins, methods of analysis of vitamins, Principles of microbial assay of vitamins of B-series. **12 Hrs**
3. **Food additives:** Introduction, analysis of Preservatives, antioxidants, artificial sweeteners, flavors, flavor enhancers, stabilizers, thickening and jelling agents. Pigments and synthetic dyes: Natural pigments, their occurrence and characteristic properties; permitted synthetic dyes, Non-permitted synthetic dyes used by industries, Method of detection of natural, permitted and non-permitted dyes. **12 Hrs**

4. General Analytical methods for milk, milk constituents and milk products like ice cream, milk powder, butter, margarine, cheese including adulterants and contaminants of milk
Analysis of fermentation products like wine, spirits, beer and vinegar. **12 Hrs**

5. **Pesticide analysis:** Effects of pest and insects on various food, use of pesticides in agriculture, pesticide cycle, organophosphorus and organochlorine pesticides analysis, determination of pesticide residues in grain, fruits, vegetables, milk and milk products
Legislation regulations of food products with special emphasis on BIS, Agmark, FDA and US-FDA. **12 Hrs**

REFERENCES:

1. The chemical analysis of foods – David Pearson, Seventh edition, Churchill Livingstone, Edinburgh London, 1976
2. Introduction to the Chemical analysis of foods – S. Nielsen, Jones & Bartlett publishers, Boston London, 1994.
3. Official methods of analysis of AOAC International, sixth edition, Volume I & II, 1997.
4. Analysis of Food constituents – Multon, Wiley VCH.
5. Dr. William Horwitz, Official methods of analysis of AOAC International, 18th edition, 2005

PHARMACEUTICAL ANALYSIS PRACTICALS - II (MPA 105P)

1. Analysis of Pharmacoepoeial compounds and their formulations by UV-Vis spectrophotometer
2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry
3. Experiments based on HPLC
4. Experiments based on Gas Chromatography
5. Estimation of riboflavin/quinine sulphate by fluorimetry
6. Estimation of sodium/potassium by flame photometry
7. Assay of official compounds by different titrations
8. Assay of official compounds by instrumental techniques.
9. Quantitative determination of hydroxyl group.
10. Quantitative determination of amino group
11. Colorimetric determination of drugs by using different reagents
12. Impurity profiling of drugs
13. Calibration of glasswares
14. Calibration of pH meter
15. Calibration of UV-Visible spectrophotometer
16. Calibration of FTIR spectrophotometer
17. Calibration of GC instrument
18. Calibration of HPLC instrument
19. Cleaning validation of any one equipment
20. Determination of total reducing sugar
21. Determination of proteins
22. Determination of saponification value, Iodine value, Peroxide value, Acid value in food products
23. Determination of fat content and rancidity in food products
24. Analysis of natural and synthetic colors in food
25. Determination of preservatives in food
26. Determination of pesticide residue in food products
27. Analysis of vitamin content in food products
28. Determination of density and specific gravity of foods
29. Determination of food additives

ADVANCED INSTRUMENTAL ANALYSIS (MPA 201T)

Scope:

This subject deals with various hyphenated analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are LC-MS, GC-MS, and hyphenated techniques.

Objectives:

After completion of course student is able to know,

- interpretation of the NMR, Mass and IR spectra of various organic compounds
- theoretical and practical skills of the hyphenated instruments
- identification of organic compounds

THEORY

60 Hrs

1. **HPLC:** Principle, instrumentation, pharmaceutical applications, peak shapes, capacity factor, selectivity, plate number, plate height, resolution, band broadening, pumps, injector, detectors, columns, column problems, gradient HPLC, HPLC solvents, trouble shooting, sample preparation, method development, New developments in HPLC-role and principles of ultra, nano liquid chromatography in pharmaceutical analysis. Immobilized polysaccharide CSP's: Advancement in enantiomeric separations, revised phase Chiral method development and HILIC approaches. HPLC in Chiral analysis of pharmaceuticals. Preparative HPLC, practical aspects of preparative HPLC. **12 Hrs**
2. **Biochromatography:** Size exclusion chromatography, ion exchange chromatography, ion pair chromatography, affinity chromatography general principles, stationary phases and mobile phases.

Gas chromatography: Principles, instrumentation, derivatization, head space sampling, columns for GC, detectors, quantification. High performance Thin Layer chromatography: Principles, instrumentation, pharmaceutical applications. **12 Hrs**

3. **Super critical fluid chromatography:** Principles, instrumentation, pharmaceutical applications. Capillary electrophoresis: Overview of CE in pharmaceutical analysis, basic configuration, CE characteristics, principles of CE, methods and modes of CE. General considerations and method. **12 Hrs**

4. **Mass spectrometry:** Principle, theory, instrumentation of mass spectrometry, different types of ionization like electron impact, chemical, field, FAB and MALD, APCI, ESI, APPI mass fragmentation and its rules, meta stable ions, isotopic peaks and applications of mass spectrometry. LC-MS hyphenation and DART MS analysis. Mass analysers (Quadrupole, Time of flight, FT-ICR, ion trap and Orbitrap) instruments. MS/MS systems (Tandem: QqQ, TOF-TOF;Q-IT, Q-TOF, LTO-FT, LTQ-Orbitrap. **12 Hrs**

5. **NMR spectroscopy:** Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR with reference to ¹³CNMR: Spin spin and spin lattice relaxation phenomenon. ¹³C NMR, 1-D and 2-D

NMR, NOESY and COSY techniques, Interpretation and Applications of NMR spectroscopy,
LC-NMR hyphenations. **12 Hrs**

REFERENCES:

1. Spectrometric Identification of Organic compounds - Robert M Silverstein, Sixth edition, John Wiley & Sons, 2004.
2. Principles of Instrumental Analysis - Douglas A Skoog, F. James Holler, Timothy A. Nieman, 5th edition, Eastern press, Bangalore, 1998.
3. Instrumental methods of analysis – Willards, 7th edition, CBS publishers.
4. Organic Spectroscopy - William Kemp, 3rd edition, ELBS, 1991.
5. Quantitative analysis of Pharmaceutical formulations by HPTLC - P D Sethi, CBS Publishers, New Delhi.
6. Quantitative Analysis of Drugs in Pharmaceutical formulation - P D Sethi, 3rd Edition, CBS Publishers, New Delhi, 1997.
7. Pharmaceutical Analysis- Modern methods – Part B - J W Munson, Volume 11, Marcel Dekker Series.
8. Organic Spectroscopy by Donald L. Pavia, 5th Edition

MODERN BIO-ANALYTICAL TECHNIQUES (MPA 2021)

Scope:

This subject is designed to provide detailed knowledge about the importance of analysis of drugs in biological matrices.

Objectives:

Upon completion of the course, the student shall be able to understand Extraction of drugs from biological samples Separation of drugs from biological samples using different techniques Guidelines for BA/BE studies.

THEORY

60 Hrs

- 1. Extraction of drugs and metabolites from biological matrices:** General need, principle and procedure involved in the Bioanalytical methods such as Protein precipitation, Liquid - Liquid extraction and Solid phase extraction and other novel sample preparation approach. Bioanalytical method validation: USFDA and EMEA guidelines.
 - 2. Biopharmaceutical Consideration:** Introduction, Biopharmaceutical Factors Affecting Drug Bioavailability, In Vitro: Dissolution and Drug Release Testing, Alternative Methods of Dissolution Testing Transport models, Biopharmaceutics Classification System, Solubility: Experimental methods. Permeability: In-vitro, in-situ and In-vivo methods.
 - 3. Pharmacokinetics and Toxicokinetics:** Basic consideration, Drug interaction (PK-PD interactions), The effect of protein-binding interactions, The effect of tissue-binding interactions, Cytochrome P450-based drug interactions, Drug interactions linked to transporters: Microsomal assays Toxicokinetics-Toxicokinetic evaluation in preclinical studies, Importance and applications of toxicokinetic studies. LC-MS in bioactivity screening and proteomics.
 - 4. Cell culture techniques** Basic equipments used in cell culture lab. Cell culture media, various types of cell culture, general procedure for cell cultures; isolation of cells, subculture, cryopreservation, characterization of cells and their applications. Principles and applications of cell viability assays (MTT assays), Principles and applications of flow cytometry. **12 Hrs**
 - 5. Metabolite identification:** In-vitro / in-vivo approaches, protocols and sample preparation. Microsomal approaches (Rat liver microsomes (RLM) and Human liver microsomes (HLM) in Met -ID. Regulatory perspectives. In-vitro assay of drug metabolites & drug metabolizing enzymes. **12 Hrs**
- Drug Product Performance, In Vivo:** Bioavailability and Bioequivalence: Drug Product Performance, Purpose of Bioavailability Studies, Relative and Absolute Availability. Methods for Assessing Bioavailability, Bioequivalence Studies, Design and Evaluation of Bioequivalence Studies, Study Designs, Crossover Study Designs, Generic Biologics (Biosimilar Drug Products), Clinical Significance of Bioequivalence Studies. **12 Hrs**

REFERENCES:

1. Analysis of drugs in Biological fluids - Joseph Chamberlain, 2nd Edition. CRC Press, New York 1995.
2. Principles of Instrumental Analysis - Douglas A Skoog, F. James Holler, Timothy A. Nieman, 5th edition, Eastern press, Bangalore, 1998.
3. Pharmaceutical Analysis - Higuchi, Brochman and Hassen, 2nd Edition, Wiley – Interscience Publications, 1961.
4. Pharmaceutical Analysis- Modern methods – Part B - J W Munson, Volume 11, Marcel Dekker Series 5. Practical HPLC method Development – Snyder, Kirkland, Glajch, 2nd Edition, John Wiley & Sons, New Jersey. USA.
6. Chromatographic Analysis of Pharmaceuticals – John A Adamovics, 2nd Edition, Marcel Dekker, New York, USA. 1997.
7. Chromatographic methods in clinical chemistry & Toxicology – Roger L Bertholf, Ruth E Winecker, John Wiley & Sons, New Jersey, USA. 2007.
8. Good Laboratory Practice Regulations, 2nd Edition, Sandy Weinberg Vol. 69, Marcel Dekker Series, 1995.
9. Good Laboratory Practice Regulations – Allen F. Hirsch, Volume 38, Marcel Dekker Series, 1989.
10. ICH, USFDA & CDSCO Guidelines.
11. Palmer

QUALITY CONTROL AND QUALITY ASSURANCE (MPA 203T)

Scope:

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

Objectives:

At the completion of this subject it is expected that the student shall be able to know

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

THEORY

60 hrs

1. Concept and Evolution of Quality Control and Quality Assurance Good Laboratory Practice, GMP, Overview of ICH Guidelines - QSEM, with special emphasis on Q-series guidelines. Good Laboratory Practices: Scope of GLP, Definitions, Quality assurance unit, protocol for conduct of non clinical testing, control on animal house, report preparation and documentation. **12 Hrs**
2. cGMP guidelines according to schedule M, USFDA (Inclusive of CDER and CBER) Pharmaceutical Inspection Convention (PIC), WHO and EMA covering: Organization and personnel responsibilities, training, hygiene and personal records, drug industry location, design, construction and plant lay out, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination and Good Warehousing Practice: CPCSEA guidelines. **12 Hrs**

3. Analysis of raw materials, finished products, packaging materials, in process quality control (PQC), Developing specification (ICH Q6 and Q3)

Purchase specifications and maintenance of stores for raw materials. In process quality control and finished products quality control for following formulation in Pharma industry according to Indian, US and British pharmacopoeias: tablets, capsules, ointments, suppositories, creams, parenterals, ophthalmic and surgical products (How to refer pharmacopoeias), Quality control test for containers, closures and secondary packing materials. **12 Hrs**

4. **Documentation in pharmaceutical industry:** Three tier documentation, Policy, Procedures and Work instructions, and records (Formats), Basic principles- How to maintain, retention and retrieval etc. Standard operating procedures (How to write), Master Formula Record, Batch Formula Record, Quality audit plan and reports: Specification and test procedures, Protocols and reports. Distribution records: Electronic data. **12 Hrs**

5. **Manufacturing operations and controls:** Sanitation of manufacturing premises, mix-ups and cross contamination, processing of intermediates and bulk products, packaging operations, IPQC, release of finished product, process deviations, charge-in of components, time limitations on production, drug product inspection, expiry date calculation, calculation of yields, production record review, change control, sterile products, aseptic process control, packaging. **12 Hrs**

REFERENCES:

1. Quality Assurance Guide by organization of Pharmaceutical Procedures of India, 3rd revised edition, Volume I & II, Mumbai, 1996.
2. Good Laboratory Practice Regulations, 2nd Edition, Sandy Weinberg Vol. 69, Marcel Dekker Series, 1995.
3. Quality Assurance of Pharmaceuticals- A compedium of Guide lines and Related materials Vol I & II, 2nd edition, WHO Publications, 1999.
4. How to Practice GMP's – P P Sharma, Vandana Publications, Agra, 1991.
5. The International Pharmacopoeia – vol I, II, III, IV & V - General Methods of Analysis and Quality specification for Pharmaceutical Substances, Excipients and Dosage forms, 3rd edition, WHO Geneva, 2005.
6. Good laboratory Practice Regulations – Allen F. Hirsch, Volume 38, Marcel Dekker Series, 1989
7. ICH guidelines
8. ISO 9000 and total quality management
9. The drugs and cosmetics act 1940 – Deshpande, Nilesh Gandhi, 4th edition, Susmit Publishers 2006. 10. QA Manual – D.H. Shah, 1st edition, Business Horizons, 2000.
11. Good Manufacturing Practices for Pharmaceuticals a plan for total quality control – Sidney H Willig, Vol. 52, 3rd edition, Marcel Dekker Series.
12. Steinborn L. GMP/ISO Quality Audit Manual for Healthcare Manufacturers and Their Suppliers, Sixth Edition, (Volume 1 - With Checklists and Software Package). Taylor & Francis 2003.
13. Sarker DK. Quality Systems and Controls for Pharmaceuticals. John Wiley & Sons; 2008.

HERBAL AND COSMETIC ANALYSIS (MPA 204T)

Scope:

This course is designed to impart knowledge on analysis of herbal products. Regulatory requirements, herbal drug interaction with monographs. Performance evaluation of cosmetic products is included for the better understanding of the equipments used in cosmetic industries for the purpose.

Objectives:

At completion of this course student shall be able to understand Determination of herbal remedies and regulations Analysis of natural products and monographs Determination of Herbal drug-drug interaction Principles of performance evaluation of cosmetic products.

THEORY

- Herbal remedies- Toxicity and Regulations:** Herbals vs Conventional drugs, Efficacy of herbal medicine products, Validation of Herbal Therapies, Pharmacodynamic and Pharmacokinetic issues. Herbal drug standardization: WHO and AYUSH guidelines. **60 Hrs**
- Adulteration and Deterioration:** Introduction, types of adulteration/substitution of herbal drugs, Causes and Measure of adulteration, Sampling Procedures, Determination of Foreign Matter, DNA Finger printing techniques in identification of drugs of natural origin, heavy metals, pesticide residues, phototoxin and microbial contamination in herbal formulations. Regulatory requirements for setting herbal drug industry: Global marketing management, Indian and international patent law as applicable herbal drugs and natural products and its protocol. **12 Hrs**
- Testing of natural products and drugs:** Effect of herbal medicine on clinical laboratory testing, Adulterant Screening using modern analytical instruments, Regulation and dispensing of herbal drugs, Stability testing of natural products, protocol. Monographs of Herbal drugs: Study of monographs of herbal drugs and comparative study in IP, USP, Ayurvedic Pharmacopoeia, American herbal Pharmacopoeia, British herbal Pharmacopoeia, Siddha and Unani Pharmacopoeia, WHO guidelines in quality assessment of herbal drugs. **12 Hrs**
- safety monitoring of natural medicine, Spontaneous reporting schemes for bio drug adverse reactions, bio drug-drug and bio drug-food interactions with suitable examples. Challenges in monitoring the safety of herbal medicines. **12 Hrs**
- Evaluation of cosmetic products:** Determination of acid value, ester value, saponification value, iodine value, peroxide value, rancidity, moisture, ash, volatile matter, heavy metals, fineness of powder, density, viscosity of cosmetic raw materials and finished products. Study of quality of raw materials and general methods of analysis of raw material used in cosmetic manufacture as per BIS. Indian Standard specification laid down for sampling and testing of various cosmetics in finished forms such as baby care products, skin care products, dental products, personal hygiene preparations, lips sticks. Hair products and skin creams by the Bureau Indian Standards **12 Hrs**

REFERENCES:

1. Pharmacognosy by Trease and Evans
2. Pharmacognosy by Kokate, Purohit and Gokhale
3. Quality Control Methods for Medicinal Plant, WHO, Geneva
4. Pharmacognosy & Pharmacobiotechnology by Ashutosh Kar
5. Essential of Pharmacognosy by Dr.S.H.Ansari 12 Hrs 12 Hrs
6. Cosmetics – Formulation, Manufacturing and Quality Control, P.P. Sharma, 4th edition, Vandana Publications Pvt. Ltd., Delhi
7. Indian Standard specification, for raw materials, BIS, New Delhi.
8. Indian Standard specification for 28 finished cosmetics BIS, New Delhi
9. Harry's Cosmeticology 8th edition
10. Suppliers catalogue on specialized cosmetic excipients
11. Wilkinson, Moore, seventh edition, George Godwin. Poucher's Perfumes, Cosmetics and Soaps
12. Hilda Butler, 10th Edition, Kluwer Academic Publishers. Handbook of Cosmetic Science and Technology, 3rd Edition.

PHARMACEUTICAL ANALYSIS PRACTICALS - I

(MPA 205P)

1. Comparison of absorption spectra by UV and Wood ward – Fiesure rule
2. Interpretation of organic compounds by FT-IR
3. Interpretation of organic compounds by NMR
4. Interpretation of organic compounds by MS
5. Determination of purity by DSC in pharmaceuticals
6. Identification of organic compounds using FT-IR, NMR, CNMR and Mass spectra
7. Bio molecules separation utilizing various sample preparation techniques and Quantitative analysis of components by gel electrophoresis.
8. Bio molecules separation utilizing various sample preparation techniques and Quantitative analysis of components by HPLC techniques.
9. Isolation of analgesics from biological fluids (Blood serum and urine).
10. Protocol preparation and performance of analytical/Bioanalytical method validation.
11. Protocol preparation for the conduct of BA/BE studies according to guidelines.
12. In process and finished product quality control tests for tablets, capsules, parenterals and creams
13. Quality control tests for Primary and secondary packing materials
14. Assay of raw materials as per official monographs
15. Testing of related and foreign substances in drugs and raw materials
16. Preparation of Master Formula Record.
17. Preparation of Batch Manufacturing Record.
18. Quantitative analysis of rancidity in lipsticks and hair oil
19. Determination of aryl amine content and Developer in hair dye
20. Determination of foam height and SLS content of Shampoo.
21. Determination of total fatty matter in creams (Soap, skin and hair creams)
22. Determination of acid value and saponification value.
23. Determination of calcium thioglycolate in depilatories

Ordinance Governing
**M.Sc. Cosmetic
Science**

**Syllabus/Curriculum
2023-24**



Accredited '**A+**' Grade by NAAC (3rd Cycle)
Placed in '**A**' Category by MoE (GoI)

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)]

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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.



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Ref. No. KAHER/AC/23-24/D-12052325

Dated : 28th April, 2023

NOTIFICATION

**Sub : Ordinance governing the curriculum of
M.Sc. Cosmetic Science**

**Ref : Minutes of the 52nd Academic Council Meeting
held on 21st March 2023.**

In exercise of the powers conferred under Rule 19 (iv) of the Memorandum of Association of the KAHER, the Academic Council of the KAHER in its meeting held on **21st March, 2023** has approved the governing the curriculum of **M.Sc. Cosmetic Science**.

The Ordinance shall be effective for the students admitted to **M.Sc. Cosmetic Science** program under the **Faculty of Pharmacy** in the constituent college of the KAHER viz. KLE College of Pharmacy, Belagavi from the academic session **2023-24** onwards.

By Order

REGISTRAR

To

The Dean

Faculty of Pharmacy,
KAHER, Belagavi.

CC to:

1. The PA to Hon. Chancellor, KAHER, Belagavi.
2. The Special Officer to Hon. Vice- Chancellor, KAHER, Belagavi.
3. The Principal, KLE College of Pharmacy, Belagavi.
4. The Controller of Examinations, KAHER, Belagavi.
5. The Director, Academic Affairs, KAHER, Belagavi.
6. The Director, IQAC, KAHER, Belagavi.
7. The I/C Principal, School of Allied Health Science, KAHER, Belagavi.
8. The Secretary, University Grants Commission, New Delhi,

Pre-amble:

Scope of Cosmetic Science in India and abroad: India has been involved in development and manufacturing of Cosmetic products both in synthetic and herbals for the past many years and is now on its way to becoming a major hub for it for personal care and hygiene products. The program provides scientific knowledge to gain expertise in the field and to respond high demand and growth of the job market in the cosmetic and personal care industry, strategies will be taught to gain theoretical as well as hands-on experience, marketing approaches studying consumer needs and in managing competition in the global market effectively. The program provides keen knowledge on skin biology, formulation science and analytical techniques for designing and developing cosmetic products in line with regulatory and quality assurance criteria.

About Cosmetic Science

The program provides scientific knowledge to gain expertise in the field and to respond high demand and growth of the job market in the cosmetic and personal care industry, strategies will be taught to gain theoretical as well as hands-on experience, marketing approaches studying consumer needs and in managing competition in the global market effectively. Cosmetic science has huge demand for the experts in research, manufacturing and testing.

Career Opportunities:

There is a huge demand for qualified and trained cosmetic science Professionals. Cosmetic sciences as well as pharmaceutical industries are rapidly expanding in India, creating exciting opportunities for trained professionals.

The Candidates qualified in the Masters of Cosmetic science can work in cosmetic / perfumery

industries. Interested candidates can also pursue higher studies.

- The Candidates interested in academia, can teach the prospective students in cosmetic science.
- Cosmetic and Soap industries- as a cosmetic Chemist.
- Perfume industries – as a perfumer, perfume evaluator
- As a formulation / R&D scientist at cosmetic, dermatology and pharmaceutical sectors
- As a regulatory expert or toxicologist in cosmetics or pharmaceuticals.
- As a production engineer/officer – production in large scale and process
- As a Quality control chemist.
- As a technical marketing manager
- As a product developer.
- Entrepreneur – Start your own cosmetic or perfume line / Unit or R&D lab
- Entrepreneur- Start your own Beauty clinic or Spa.

EMERGING TRENDS IN COSMETIC SCIENCE

This industry is evolving towards greater transparency and inclusivity. In addition, from personalized skincare products to nostalgic trends and styles, beauty is genuinely evolving self-care. There are countless new beauty brands that have emerged, and there are lots of new ingredients used in formulating a product. Cosmetic science, a critical component of synthetic and herbal pharma R&D, ensures a quicker and better return on investment. It also helps organizations deliver better health and beauty of the general public.

ORDINANCE, SCHEME & SYLLABUS FOR M.Sc in Cosmetic Science

Course Title	: M.Sc in Cosmetic Science.
Type of Course	: Four Semesters (Two years) post-graduate course
Medium of instruction	: English
Course Fees	: As per University norms
Pattern	: Semester wise
Award of the Degree	: Degree will be awarded for those passing in all the semesters as per rules and regulations.

3.1 DURATION OF THE COURSE: The duration of the course shall be for two academic years, with each academic year of two semesters. Each semester extends for 6 months duration from the date of commencement of the course.

3.2 Total Intake: 10 Students

3.3 ELIGIBILITY FOR ADMISSION:

3.3.1 Candidates wishing to apply for the course need to fulfill the following eligibility criteria:

- Minimum eligibility needed for applying to the course is Graduation completed from a recognized university with a minimum aggregate score of 50% (Aggregate of three/four years for graduate degree holders) (45% for SC/ST/OBC candidates) at the level of graduation
- The successful completion of graduation from a recognized university in any of:
 - Health sciences [Pharmacy, Nursing, Ayurveda, Homeopathy, Unani etc.]
 - Life science graduates [biotechnology, botany/zoology, Biochemistry, Pharmacology, Microbiology, Toxicology, etc.]

- Post-graduates in the above disciplines can also apply

3.3.2 Selection Procedure:

To maintain high academic standard, university gives due importance to the quality of students enrolled. To ensure this, the selection of individual student will undergo the following procedure:

- Written examination
- Personal interview

3.4 Attendance and progress:

3.4.1 A candidate is required to put in **at least 80% attendance** in individual courses considering theory and practical separately.

3.4.2 The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.

3.5. 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/extracurricular activities is dependent upon the quantum of work expected to be put in for each of these activities per week/per activity.

3.6. Credit assignment:

3.6.1. Theory and Practical/Laboratory courses

Courses are broadly classified as Theory and Practical. Theory courses consist of lectures (L) and Practical (P) courses consist of hours spent in the laboratory/Practical assignments. 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)/Assignment 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/assignment hours per week throughout semester carries a credit of 1/2. 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.

Minimum credit requirements:

3.7. 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.

3.8 ELIGIBILITYFOR APPEARING IN EXAMINATION:

- (a) Only such candidates who are approved from the Head of the Academic Institution in proof of his/her having regularly and satisfactorily undergone the course of study by attending not less than 80% of the classes held both in theory and in practical separately in each, shall be eligible for appearing at the M.Sc in Cosmetic Science examination.

(b) A candidate can have a relaxation of 10% attendance on medical ground by producing a certificate from medical officer of government hospital and a 5% relaxation by the vice-chancellor on request

M.Sc in Cosmetic Science Course Scheme of Instruction

Table – 1: List of M.Sc Cosmetic Science subjects and their Code

I Semester Theory

Code	Course(Subjects)	Theory/ Practical		Tutorials	Credit points
		Total Hrs	Hrs/Wk		
FU0123 1.1T	Integumentary System [Anatomy, Physiology & Pathophysiology of Skin & Hair]	45	3	1	4
FU0123 1.2T	Cosmetic Chemistry / Perfumery and color Science	45	3	1	4
FU0123 1.3T	Cosmetic Formulation Science	45	3	1	4
FU0123 1.4T	Cosmetic Law and Regulations	45	3	1	4
Total Credits					16

I Semester Practical

Code	Course(Subjects)	Theory/ Practical		Tutorials	Credit points
		Total Hrs	Hrs/Wk		
FU0123 1.1P	Integumentary System	60	4	-	2
FU0123 1.2P	Cosmetic Chemistry	60	4	-	2
FU0123 1.3P	Cosmetic Formulation Science	60	4	-	2
Total Credits					6

II Semester Theory

Code	Course(Subjects)	Theory/ Practical		Tutorials	Credit points
		Total Hrs	Hrs/Wk		
FU0123 2.1T	Industrial Cosmetics- Liquids and Semisolids	45	3	1	4
FU0123 2.2T	Safety and Toxicology of Cosmetics	45	3	1	4
FU0123 2.3T	Cosmetic Product Testing and Evaluation [Analytical Techniques]	45	3	1	4
FU0123 2.4T	Natural and Herbal Cosmetics	45	3	1	4
Total Credits					16

II Semester Practical

Code	Course(Subjects)	Theory/ Practical		Tutorials	Credit points
		Total Hrs	Hrs/Wk		
FU0123 2.1P	Industrial Cosmetics	60	4	-	2
FU0123 2.2P	Safety and toxicology of cosmetics	60	4	-	2
FU0123 2.3P	Cosmetic Product Testing and Evaluation [Analytical Techniques]	60	4	-	2
FU0123 2.4P	Natural and Herbal Cosmetics	60	4	-	2
Total Credits					08

III Semester (Project)

Code	Course(Subjects)	Theory		Tutorials	Credit points
		Total Hrs	Hrs/Wk		
FU0123 3.1	Seminar/ Journal Club meetings	-	2	-	2
FU0123 3.2	Discussion / Presentation (Proposal Presentation)	-	2	-	2
FU0123 3.3	Research Work	-	32	-	16
Total Credits					20

IV Semester (Project)

Code	Course(Subjects)	Theory		Tutorials	Credit points
		Total Hrs	Hrs/Wk		
FU0123 4.1	Seminar /Journal Club meetings	-	2		2
FU0123 4.2	Research Work	-	32		16
FU0123 4.3	Viva-voce & Dissertation Presentation	4	-		2
Total Credits					20

Distribution of Hours and Credits for M.Sc in Cosmetic Science

Sr. No.	Semester	Theory		Practical		Total Hours	Total credits
		Hours	Credits	Hours	Credits		
1.	I	16	16	12	06	28	22
2.	II	16	16	16	08	32	24
3.	III	2	2	34	18	36	20
4.	IV	2	2	36	18	38	20
Total						134	86

Scheme of examination

Table – 1: Schemes for internal assessments and end semester examinations

I Semester Theory

Sl. No	Subject Code	Name of the Subject	Sessional Exams		End-Semester Exams		Total Marks
			Marks	Duration	Marks	Duration	
1.	FU0123 1.1T	Integumentary System [Anatomy, Physiology & Pathophysiology of Skin & Hair]	20	1 Hr	80	3 Hrs	100
2.	FU0123 1.2T	Cosmetic Chemistry / Perfumery and color Science	20	1 Hr	80	3 Hrs	100
3.	FU0123 1.3T	Cosmetic Formulation Science	20	1 Hr	80	3 Hrs	100
4.	FU0123 1.4T	Cosmetic Law and Regulations	20	1 Hr	80	3 Hrs	100
Total			80		320		400

I Semester Practical

Sl. No.	Subject Code	Name of the Subject	Sessional Exams		End-Semester Exams		Total Marks
			Marks	Duration	Marks	Duration	
1.	FU0123 1.1P	Integumentary System	20	1 Hr	80	3 Hrs	100
2.	FU0123 1.2P	Cosmetic Chemistry	20	1 Hr	80	3 Hrs	100
3.	FU0123 1.3P	Cosmetic Formulation Science	20	1 Hr	80	3 Hrs	100
Total			60		240		300

II Semester Theory

Sl. No.	Subject Code	Name of the Subject	Sessional Exams		End-Semester Exams		Total Marks
			Marks	Duration	Marks	Duration	
1.	FU0123 2.1T	Industrial Cosmetics- Liquids and Semisolids	20	1 Hr	80	3 Hrs	100
2.	FU0123 2.2T	Safety and Toxicology of Cosmetics	20	1 Hr	80	3 Hrs	100
3.	FU0123 2.3T	Cosmetic Product Testing and Evaluation [Analytical Techniques]	20	1 Hr	80	3 Hrs	100
4.	FU0123 2.4T	Natural and Herbal Cosmetics	20	1 Hr	80	3 Hrs	100
Total			80		320		400

II Semester Practical

Sl. No.	Subject Code	Name of the Subject	Sessional Exams		End-Semester Exams		Total Marks
			Marks	Duration	Marks	Duration	
1.	FU0123 2.1P	Industrial Cosmetics	20	1 Hr	80	3 Hrs	100
2.	FU0123 2.2P	Safety and toxicology of cosmetics	20	1 Hr	80	3 Hrs	100
3.	FU0123 2.3P	Cosmetic Product Testing and Evaluation [Analytical Techniques]	20	1 Hr	80	3 Hrs	100
4.	FU0123 2.4P	HERBAL COSMETICS	20	1 Hr	80	3 Hrs	100
Total			80		320		400

III Semester

Sl. No.	Subject Code	Name of the Subject	Sessional Exams		End-Semester Exams		Total Marks
			Marks	Duration	Marks	Duration	
1.	FU0123 3.1	Seminar/ Journal Club meetings	25	1 Hr	-	-	25
2.	FU0123 3.2	Discussion / Presentation (Proposal Presentation)	25	1 Hr	-	-	25
3.	FU0123 3.3	Research Work	-	-	100	1 Hr	100
Total			50		100		150

IV Semester

Sl. No.	Subject Code	Name of the Subject	Sessional Exams		End-Semester Exams		Total Marks
			Marks	Duration	Marks	Duration	
1.	FU0123 4.1	Seminar /Journal Club meetings	25	1 Hr	-	-	25
2.	FU0123 4.2	Research Work Presentation	25	1 Hrs	-	-	25
3.	FU0123 4.3	Viva-voce & Dissertation Presentation	-	-	400	3 Hrs	400
Total			50		400		450

Grand Total Marks: 700 + 800 + 150 + 450 = 2100

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 in the table. The average marks of two sessional exams shall be computed for internal assessment as per the requirements given in tables.

Promotion and award of grades

A student shall be declared PASS and eligible for getting grade in a course of M.Sc.

programme if he/she secures at least 50% marks in that particular course including internal assessment.

Carry forward of marks

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

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.

Re-examination of end semester examinations

Reexamination of end semester examination shall be conducted as per the schedule given in table 3. The exact dates of examinations shall be notified from time to time.

Table – 3: Tentative schedule of end semester examinations

Semester	For Regular Candidates	For Failed Candidates
I and III	November / December	May / June
II and IV	May / June	November / December

Allowed to keep terms (ATKT):

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

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

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

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

Grading of performances

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 – 4.

Table – 4: 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

The student 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.

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 and C4 and the student’s grade points in these courses are G1, G2, G3 and G4, respectively, and then students’ SGPA is equal to:

$$C1S1 + C2S2 + C3S3 + C4S4$$

$$CGPA = \frac{C1S1 + C2S2 + C3S3 + C4S4}{C1 + C2 + C3 + C4}$$

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,.... .

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**

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 50 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.

Internal Evaluation seminar-II marks 100 Marks

Evaluation of Project Presentation:

Final Presentation of work 200 Marks

Communication skills 50 Marks

Question and answer skills 50 Marks

Total: 400 Marks

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 M.Sc Cosmetic Science program shall not be eligible for award of ranks. Moreover, the candidates should have completed the M.Sc Cosmetic Science program in minimum prescribed number of years, (two years) for the award of Ranks.

Award of degree

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

Revaluation/ Re-totaling of answer papers

There is no provision for revaluation of the answer papers in any examination. However, the candidates can apply for re-totaling by paying prescribed fee.

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 prescribed fees.

SYLLABUS

SEMESTER: I

CODE: FU0123 1.1T	COURSE NAME: Integumentary System	Total Hrs: 45 [3 Hrs/ Wk]
SCOPE: <p>This course provides an in-depth study of the integumentary system, which includes the skin, hair, nails, and glands. Students will learn about the structure, function, and regulation of the integumentary system as well as common diseases and disorders of the skin. The course will also cover wound healing and the effects of aging on the skin.</p>		
OBJECTIVES: Upon completion of the course, students will be able to: <ol style="list-style-type: none">1. Identify the major structures and functions of the integumentary system.2. Describe the mechanisms of skin protection, sensation, thermoregulation, and vitamin D production.3. Identify the common diseases and disorders of the skin and their causes, symptoms, and treatments.4. Discuss the effects of aging on the skin and related changes in structure and function.5. Discuss the reason for the hair fall and its treatment.		
UNIT. 1	Unit I. Introduction to the Integumentary System <ul style="list-style-type: none">• Definition and components of the integumentary system• Function and importance of the integumentary system in cosmetics	4 hr
UNIT. 2	Unit II. Anatomy and Physiology of the Skin, Hair and Nail <ul style="list-style-type: none">• Layers of the skin (epidermis, dermis, subcutaneous layer)• Skin appendages (hair, nails, sweat glands, sebaceous glands)• Blood supply and nerve endings in the skin• Skin types and variations.• Hair- Shaft/Cortex structure. Scalp.	10 hr

UNIT. 3	Unit III. Skin Structure and Function in Relation to Cosmetics <ul style="list-style-type: none"> • Skin barrier function and its role in cosmetic formulation • Skin hydration and moisturization • Role of skin in thermoregulation • Skin pH and its effect on product efficacy • Vitamin D production • Skin aging and the impact of cosmetic products 	12 hr
UNIT. 5	Unit V. Skin Diseases and Disorders <ul style="list-style-type: none"> • Common skin conditions and their impact on cosmetic treatment (e.g., acne, eczema, psoriasis, rosacea). • Dermatological disorders and their treatment options • Skin cancer and the importance of sun protection • Microbiome in skin, hair and nail. • Different aspects of dry skin, collagen, elastin, fat cells, glycosaminoglycans, aquaporins, melanocytes, exfoliation, desquamation, dark circle causes, acne causes. • Multiethnic skin • Mechanism of skin aging • Scalp health, Hair greying, dandruff, hair growth and hair loss mechanism 	12 hr
UNIT. 6	Unit VI: Integumentary System and Other Body Systems <ul style="list-style-type: none"> • Relationship between the integumentary system and other body systems • Skin and the immune system • Skin and the nervous system 	4hr
UNIT 7	Cosmetic microbiology.	3

BOOKS RECOMMENDED

TEXT BOOKS.

1. Ross & Wilson Anatomy & Physiology in health & Illness; 11th Edition, Churchill livingstone
2. Text Book of Medical Physiology; Guyton & Hall 11th Edition; Elsever SAUNDERS
3. Katzung's Basic & clinical Pharmacology 12th Edition Mc Grew Hill

REFERENCE BOOKS.

1. Pharmacology in Drug Discovery; Terry P. Kenakin
2. Functional Ingredients & Formulated Products for Cosmetics & Pharmaceuticals: NOF Corporation
3. Mi lady: Skin Care And Cosmetic Ingredients, Dictionary, CENGAGE Learning

CODE: FU0123 1.1P - PRACTICALS:

4 Hrs/week

1. Microscopic study of skin transvers section
2. Microscopic study of sebaceous and sweat glands
3. Microscopic study of various types of skin
4. Practical study of Nail structure
5. Practical study of Hair.

CODE: FU0123 1.2T	COURSE NAME: Cosmetic Chemistry / Cosmetic Raw Material	Total Hrs: 45 [3 Hrs/ Wk]
SCOPE: Cosmetic Chemistry 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.		
OBJECTIVES: 1. Understand molecular mechanisms behind various organic reactions and water properties 2. Understand the basic concept of biomolecules such as carbohydrates, proteins, lipids and nucleic acids and their functions in brief		
UNIT. 1	Properties of water: Structure and properties of water, importance of water in biological systems, Ionic product of water. Buffers: acids-bases, pH, pKa, Henderson Hasselbalch equation, buffers, buffer action and Physiological buffer systems (Bicarbonate, Phosphate buffers).	10
UNIT. 2	Chemical bonding and Reactions: Properties of covalent bond, non-	10

	covalent bonds and their importance in biological systems. Types of biochemical reactions: oxidation reduction, condensation, rearrangement, cleavage, group- transfer, Resonance bond, electrophilic and nucleophilic substitution reactions	
UNIT. 3	Amino acids and Proteins: Structure and physico-chemical properties of amino acids, Role of non-protein amino acids, peptides, peptides of physiological significance, peptide bond, peptide synthesis. Structural features of proteins and their biological functions.	10
UNIT 4	Advanced Cosmetic Chemistry: Surfactant / emulsifier Chemistry, Polymer science and wax, photo chemistry. Sunscreen , preservatives, fragrance and moisturizers, pigment and dye chemistry	15

BOOKS RECOMMENDED

TEXT BOOKS.

1. Principles of Biochemistry by Lehninger.
2. Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell.
3. Textbook of Biochemistry by Deb.
4. Principles of Physical Biochemistry by Van Holde, Johnson and P.S. Ho, (1998) Prentice-Hall, Inc. Jersey.
5. Organic chemistry by R.T. Morrison & R.N. Boyd, (2000) Prentice Hall of India, New Delhi

REFERENCE BOOKS.

1. Lenhinger's Principles of Biochemistry D.L. Nelson, David L and M.M. Cox, (2000) Macmillan Worth Pub. Inc. NY.
2. Biochemistry: The Chemical reactions of living cells volumes I and II by Metzler (2004) Elsevier Science

CODE: FU0123 1.2P - PRACTICALS:**3 Hrs/week**

1. Preparation of buffers.
2. Titration curves of weak acids/amino acids and determination of pKa
3. Determination of serum total cholesterol.
4. Specifications and analytical methods for Shampoo, skin care and Tooth paste.
5. Analytical testing methods for ointments, creams, gels, sunscreens, etc

CODE: FU0123 1.3T	COURSE NAME: COSMETIC FORMULATION SCIENCE	Total Hrs: 45 [3 Hrs/ Wk]
SCOPE:		
<ul style="list-style-type: none"> • To impart knowledge on the fundamental principles of cosmetic product development. • To understand key ingredients used in cosmetics. • To understand the building blocks in the formulation of cosmetic products. 		
OBJECTIVES:		
Upon completion of the course, the students will be able to:		
<ol style="list-style-type: none"> 1. Know various key ingredients used to develop cosmetics. 2. Combine the ingredients together to develop cosmetics with desired sensory property. 		
UNIT. 1	Formulation Principles: <ul style="list-style-type: none"> • Definition of Cosmetics as per EU and Indian Guidelines • Cleansing and care needs for face, eye lids, lips, hands, feet, nail, scalp, neck, body and underarms. Examples of marketed product. • Formulation requirements for ethnic needs. • Cosmetic product development process 	07
UNIT. 2	Formulation Building blocks: Building blocks for different product formulations of Cosmetics: <ul style="list-style-type: none"> • Surfactants- Classification and application. • Emollients and rheological additives: classification and application. • Antimicrobial used as preservatives, their merits and demerits. Factors affecting microbial preservative efficacy. 	12

	<ul style="list-style-type: none"> • Perfumes; Classification of perfumes. Perfume ingredients listed as allergens. • Application of various product forms in cosmetics: Solution, creams, lotion, ointment, paste, gels, stick, powders, Depilatories and aerosol. • Excipients / polymers used for various cosmetic formulations. 	
UNIT. 3	<p>Skin cleansing and care</p> <ul style="list-style-type: none"> • Skin Cleansing: Building blocks and formulation of Soap, syndet bars, face wash, body wash, face mask and tissue wipes. Their relative advantages and disadvantages. • Skin Care: Classification, requirement of an Ideal skin cream. • Building blocks and formulation of cold cream, vanishing cream, moisturizing cream, moisturizing gel, body lotion, petroleum Jelly, peel-off. • Sun Protection. Classification of Cosmetic Sun screens and SPF • Pigments and dyes used in make-up and different product types- Kajal, Mascara, eye shadow, lipstick, foundation, lip gloss, concealers, etc • Baby skin Care Products. 	12
UNIT. 4	<p>Hair care products- Formulation and development</p> <ul style="list-style-type: none"> • Hair Care: Ideal requirements of a shampoo. • Formulation of shampoos, anti-Dandruff shampoo, Hair conditioners, Hair oil, hair cream and hair styling gels. • Chemistry and formulation of Parapheylene diamine based Hair dyes. • Baby hair care products. 	07
UNIT. 5	<p>Oral care, color cosmetics and deodorants</p> <ul style="list-style-type: none"> • Identification and study of Colors, pigments and dyes used in cosmetics • Oral Care: Ideal requirement of a tooth paste. Building blocks and formulation of tooth paste and mouth wash. • Color Cosmetics: Building blocks and formulation of Lipstick, Mascara, nail polish/ lacquer and Face Powder. • Deodorants and antiperspirants: Ingredients and mechanism of action and method of preparation. 	07

BOOKS RECOMMENDED

TEXT BOOKS.

1. Harry's Cosmeticology. 8th edition
2. Poucher's perfume cosmetics and Soaps, 10th edition
3. Cosmetics - Formulation, manufacture and quality control PP.Sharma, 4th edition
4. Handbook of cosmetic science and Technology A.O.Barel, M.Paye and H.I.Maibach. 3rd edition
5. Cosmetic and Toiletries recent suppliers' catalogue.
6. CTFA directory.

CODE: FU0123 1.3T PRACTICALS:

4 Hr/week

1. Formulation of moisturizing cream
2. Formulation of lip stick
3. Formulation of shampoo o
4. Formulation of lip Balm
5. Formulation of nail lacquer
6. Formulation of cosmetic compact.

CODE: FU0123 1.4 T	COURSE NAME: COSMETIC LAW AND REGULATIONS and INTELLECTUAL PROPERTY	Total Hrs: 45 [3 Hrs/ Wk]
SCOPE: This Course deals with the understanding of laws and regulations for manufacture, sale, import and export of cosmetics. This course also deals with the intellectual property, patents – Design patents and process patents.		
OBJECTIVES: Upon completion of the course the students shall be able to understand 1. Definitions of Cosmetics 2. Regulatory provisions relating to manufacture of cosmetics Schedule S and Schedule M II 3. Regulatory provisions related to manufacture of herbal cosmetics 4. Import and export of cosmetics 5. Role of FDA in regulating cosmetics, labelling for cosmetics FDA		
UNIT. 1	<ul style="list-style-type: none"> Definition of Cosmetics according to CDSCO, FDA and EU ,Indian regulatory requirements of labelling of cosmetics Regulatory provisions relating to import of cosmetics Misbranded and spurious cosmetics Regulatory provisions relating to manufacture of cosmetics Schedule S and M II 	10 hrs
UNIT. 2	<ul style="list-style-type: none"> Conditions and timeline for obtaining license, Prohibition of manufacture of cosmetics and sale of certain cosmetics, Loan license, offences and penalties, Registration of import of cosmetics 	10 hrs
UNIT. 3	<ul style="list-style-type: none"> Regulatory provisions related to manufacture of herbal cosmetics, License, GMP related to manufacture of herbal cosmetics, Offences and Penalties, Import and export of herbal and natural cosmetics 	10 Hrs
UNIT. 4	<ul style="list-style-type: none"> Laws that FDA enforces for cosmetics, Labelling for cosmetics FDA, Regulations related to cosmetics from Title 21 of CFR, Role of FDA in regulating cosmetics. Cosmetic Product labelling. Drug and Cosmetic Act 	5 Hrs

UNIT. 5	<ul style="list-style-type: none"> • Cosmetics and US laws Key legal concepts of interstate commerce, adulterated and misbranded cosmetics , Current issues in labelling of cosmetics, Prohibited and restricted ingredients in cosmetics, Color additives permitted for use in cosmetics and BIS standards, Recall of hazardous cosmetics 	10 Hrs
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BOOKS RECOMMENDED

TEXT BOOKS

1. Cosmetics- Formulation, Manufacturing and Quality Control, P.P. Sharma 5th Edition, Vandana Publications, Delhi-110034
2. A Consice Book of Cosmetic, Prof K. Sampath, Birla Publications Pvt Ltd
3. Harry'sCosmeticology, 8th edition
4. Poucher's perfume cosmetics and soaps, 10th editon

REFERENCE BOOKS

1. CTFA directory
2. Cosmetic and Toiletries recent suppliers' catalogue

Semester: II

Code FU0123 2.1T : INDUSTRIAL COSMETICS		45 Hrs
Course Preamble: This course involves a scientific value addition approach for the candidates to have knowledge and become the master in Cosmetic technology. The following modules provide an understanding of the Manufacturing Operations and Processes involved, planning and management concepts, GMP and quality assurance in product development. Emphasis to ensure product safety by sensory evaluation, packaging and stability studies is comprehended.		
Course Objective: At the end of the course students must be able to		
<ul style="list-style-type: none">• Summarize the Cosmetic Manufacturing and Processes involved in Product development.• Understand the Concepts of Management, GMP and Quality Assurance in Cosmetic Technology• Plan for Sensorial evaluation of Cosmetics Products.• Summarise Packaging and Stability of Cosmetics.		
Module 1:	Manufacturing - Plant layout, Manufacturing Operations and Processes. Mixing <ul style="list-style-type: none">• Wet Systems -Single Phase (Miscible) Systems• Wet Systems - Multiphase Systems• Wet Systems Liquid Solid Systems• Dry System (Powders and compacts)• Aerosols and Roll Ons• Wet wipes	10 Hrs

Module 2:	<p>Good Manufacturing Practices & Quality Assurance in Cosmetic Technology.</p> <p>GMP- Specific Guidance for Cosmetics- Documentation, Records, Building and Facilities, Equipments, Personal, Raw material, Prohibited and Restricted Cosmetic Ingredients, Production, Lab controls, Complaints, Adverse Events, and Recalls.</p> <p>COSMETICS QUALITY ASSURANCE</p> <ul style="list-style-type: none"> • Implementing a quality management system • Internal audits and external audits • Training on hygiene and other quality aspects • Sustainability, quality and legislation • Manufacturing process flow for various cosmetic preparations. • Principle and working of Machinery and Equipment for Cosmetics: Cream, Liquid, Powder, compacts and emulsion making machinery 	10 Hrs
Module 3:	<p>Sensorial evaluation of cosmetics- concept and need, sensory perception, requirements for sensory testing, methods used, interpretation and documentation/representation.</p> <ul style="list-style-type: none"> • Sebumeter • Corneometer • Measurement of TEWL • Measurement of Skin Color • Measurement of Hair tensile strength • Hair combing properties • Texture Analysis 	3 Hrs
Module 4:	<p>Product Packaging and Stability.</p> <ul style="list-style-type: none"> • Stability and compatibility of a cosmetic product with packaging • Cosmetic Packaging Materials • Guidelines on stability testing of cosmetic products • Evaluation of various marketed packing system for cosmetic 	8 Hrs

	preparations of skin, hair and nail.	
Module 5:	Advances in Cosmetic formulation design: <ul style="list-style-type: none"> • Introduction to nanomaterials / nanocarriers in designing novel drug delivery systems for cosmetics. • Preparation, characterization and application of Nanotechnology in the development of cosmetic formulation. 	8 Hrs
Module 6:	<ul style="list-style-type: none"> • Eye preparations in cosmetics: Introduction, formulation and manufacturing of eye shadow, eye liner, eyebrow cosmetics, mascara and manufacturing of eye makeup removers. • Mesotherapy, skin polishing, chemical peels, methods of tightening of skin. 	3 Hrs
Module 7:	Basic Concepts of Management – <ul style="list-style-type: none"> • Planning & Organizing • Inventory Management & Quality Control ,Inventory models, • Cost consideration, Budgeting, Economic order quantity model. • Marketing of cosmetic products and consumer behaviour • Career prospects: R&D, manufacturing, quality control/ Auality Assurance and marketing / sales. 	3 Hrs

REFERENCE Books

1	Cosmetics Science and Technology, Edited by M.S. Balsam, E. Sagarin, S.D. Gerhon, S.J.Strianse and M.M.Rieger, Volumes 1,2 and 3.Wiley-Interscience, Wiley India Pvt. Ltd.,2008
2	Poucher’s Perfumes, Cosmetics & Soaps, 10th Ed, Editor- Hilda Butler, Klewler Academic Publishers, Netherlands, 2000
3	ISO 13299:2016(en) Sensory analysis — Methodology — General guidance for

	establishing a sensory profile
4	Formulation and function of cosmetics by Jellinek Stephan, Wiley Interscience.

Recommended Books	
1	Harry's Cosmetology, 8 th Edition edited by Martin N.Reiger ; Chemical Publishing.Co.Inc
2	Cosmetics-Formulations,Manufacturing and Quality Control, P P Sharma.4 th Edition : Vandana Publications Pvt.Ltd., New Delhi.
3	Handbook of Cosmetic Science and Technology, edited by M. Paye, A.O.Barel, H. I. Maibach, Informa Healthcare USA,Inc. 3 rd edition
4	Textbook of Cosmelicology by Sanju Nanda and Roop K Khar., Tata Publications
5	Sensory Evaluation Techniques, Fourth Edition, Morten C. Meilgaard, B. Thomas Carr, Gail Vance Civile, CRC Press

Code FU0123 2.1P - LIST OF PRACTICALS	
1	Preparation and evaluation of face packs and masks.
2	Preparation and evaluation of gels (Hair styling gels, skin care gels, oral care gels)
3	Preparation and evaluation of antiperspirants
4	Determination of Zeta potential of using given suspension & emulsion a demonstration

5	Accelerated stability studies on emulsion & suspension
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CODE: FU0123 2.2T	COURSE NAME: Safety and toxicology of cosmetics	Total Hrs: 45 [3 Hrs/ Wk]
SCOPE: <p>This course provides a comprehensive understanding of the principles of toxicology in cosmetic science. The course covers the basics of toxicology, including the effects of toxic substances on the human body, and provides students with knowledge of regulatory requirements for cosmetic products. It also covers the various toxicological tests and methods used in the cosmetic industry, and students will be able to evaluate the safety of cosmetic ingredients and finished products.</p>		
OBJECTIVES: <p>By the end of the course, students will be able to:</p> <ul style="list-style-type: none"> ▪ Understand the principles of toxicology and its application in cosmetic science. ▪ Identify the different types of toxicological tests and methods used in the cosmetic industry. ▪ Evaluate the safety of cosmetic ingredients and finished products based on their toxicological profiles. ▪ Understand the regulatory requirements for cosmetic products and their impact on toxicological testing. ▪ Critically analyze and interpret toxicological data and communicate findings effectively. 		
UNIT. 1	Introduction to Product Safety and Toxicology in Cosmetics <ul style="list-style-type: none"> • Historical perspective of cosmetic product safety • Toxicology principles and terminology • The role of toxicity testing in cosmetics safety assessment • Factors affecting toxicity • Overview of cosmetic products and their ingredients • Types of hazards associated with cosmetic products 	8hr
UNIT. 2	Cosmetic Ingredients and their Impact on the Skin <ul style="list-style-type: none"> • Types of cosmetic ingredients (e.g., emollients, humectants, preservatives) 	7hr

	<ul style="list-style-type: none"> • Ingredient safety and regulatory considerations • Cosmetic formulation techniques and their impact on ingredient efficacy and safety 	
UNIT. 3	Potential Health Effects of Cosmetics <ul style="list-style-type: none"> • Skin irritation and sensitization • Systemic toxicity • Endocrine disruption • Carcinogenicity 	7hr
UNIT. 4	Unit IV. In vitro Toxicity Testing <ul style="list-style-type: none"> • Cell culture techniques and assays • Cytotoxicity assays • Genotoxicity assays 	7hr
UNIT. 5	In vivo Toxicity Testing <ul style="list-style-type: none"> • Acute and subchronic toxicity testing • Local and systemic toxicity testing • Dermal and ocular irritation testing 	8hr
UNIT. 6	Safety Evaluation of Finished Products <ul style="list-style-type: none"> • Safety assessment of finished cosmetic products • Interaction between ingredients in finished products • Safety evaluation of cosmetic packaging 	8hr

BOOKS RECOMMENDED

TEXT BOOKS.

1. Katzung Basic & Clinical Pharmacology 12 Edition Mc Graw Hill
2. Text book of Cosmetic Dermatology, 5th Edition Robert Baran & H.I Maibach: CRC Press
3. H.G. Vogel; Drug Discovery and Evaluation, Pharmacological Assaya, Springer

REFERENCE BOOKS.

1. A colour Guide to Diagnosis and Therapy; 6th Edition Thomas P. habif
2. A Guide to practical Toxicology; Evaluation, prediction and Risk: 2nd Edition, Adam Woolley, Informa health care
3. Medical Terminology for health profession; 8th Edition CenGAGE learning

CODE: FU0123 2.2P- PRACTICALS:

1. Acute dermal toxicity studies as per OECD guidelines.
2. Determination of acute skin irritation / corrosion of a test substance
3. Determination of acute eye irritation / corrosion of a test substance
4. Repeated dose toxicity studies- Serum biochemical, haematological, functional observation tests and histological studies.

CODE: FU0123 2.3T	COURSE NAME: Cosmetic Product Testing and Evaluation [Analytical Techniques]	Total Hrs: 45 [3 Hrs/ Wk]
<p>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 Cosmetic Product testing.</p> <p>of</p>		
<p>OBJECTIVES:</p> <ol style="list-style-type: none"> 1. Understand the chromatographic separation and analysis of Cosmetic Product 2. Perform quantitative & qualitative analysis of drugs using various analytical instruments. 3. Understand the interaction of matter with electromagnetic radiations and its applications 		
UNIT. 1	Sources of impurities and their control. Limit tests, limit test of chlorides, sulfates, lead, arsenic and heavy metals.	10
UNIT. 2	Evaluation of cosmetic products: Determination of acid value, ester value, saponification value, iodine value, peroxide value, rancidity, moisture, ash, volatile matter, heavy metals, fineness of powder, density, viscosity of cosmetic raw materials and finished products.	10
UNIT. 3	UV-Visible spectroscopy: Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV-Visible spectroscopy. Nepheloturbidometry - Principle, instrumentation and applications Study of skin permeation, Spreadability test, Particle size analysis, bulk density and tapped density, angle of repose, viscosity testing,	10
UNIT. 4	Chromatography: Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution and applications of the following:	10

	a) Paper chromatography b) Thin Layer chromatography, c) Column chromatography, d) Gas chromatography e) High Performance Liquid chromatography	
UNIT. 5	Principle, brief Instrumentation and Applications of IR spectroscopy and Mass spectrometry	5

BOOKS RECOMMENDED

TEXT BOOKS.

1. Text book of Practical Pharmaceutical Chemistry by Beckett and Stentake
2. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
3. Text Book of Organic Chemistry by Morrison and Boyd.

REFERENCE BOOKS.

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Harry's-Cosmeticology
3. L.M. Atherdon, Bentley and Driver's Text Books of Pharmaceutical Chemistry. Oxford University Press, London

CODE: FU0123 2.3T PRACTICALS: _

1. Preparation of Standard solutions: 1 normal, 1 molar, % w/v solution, % v/v solution
2. Volumetric estimation involving Acidimetry, Alkalimetry
3. Separation of amino acids by paper chromatography
4. Separation of sugars by thin layer chromatography
5. Separation of plant pigments by column chromatography
6. Analysis of oils and fats a) acid value, b) Saponification value c) Iodine value

CODE: FU0123 2.4T	COURSE NAME: NATURAL AND HERBAL COSMETICS	Total Hrs: 45 [3 Hrs/ Wk]
SCOPE: This subject aims with the study of preparation and standardization of herbal/natural cosmetics and also emphasis to various national and international standards prescribed regarding herbal cosmeceuticals.		
OBJECTIVES: 1. Identify the herbal raw materials used in cosmetic formulations 2. Understand the basic principles of various herbal/natural cosmetic preparations		
UNIT. 1	Introduction: Herbal/natural cosmetics, Classification & Economic aspects. Regulatory Provisions in relation to Import & Export of Herbal/natural cosmetics. Industries involved in the production of Herbal/natural cosmetics. Principles of botanical, Ayurveda, natural herb, traditional Chinese medicine, sustainability and vegan cosmetics	10
UNIT. 2	Herbal Raw material: Sources and description of raw materials of herbal origin used. Fixed oils, Waxes, Gums, Colorants, Perfumes, Protective agents, Bleaching agents, Surfactants, humectants and antioxidants Various Extraction procedures of Herbal constituents.	10
UNIT. 3	Preformulation and Compatibility studies: Possible interactions between chemicals and herbs, design of herbal cosmetic formulation. Industries involved in the production of Herbal/natural cosmetics.	08
UNIT. 4	Cosmeceuticals of herbal and natural origin: Hair growth formulations: Shampoos, Conditioners, Colorants & hair oils Fairness formulations: Vanishing & foundation creams, anti-sun burn preparations, moisturizing creams, deodorants. Oral hygiene product: Herbal toothpaste	10
UNIT. 5	Good Agriculture Practice: Cultivation of herbs or medicinal plants Pest and Pest management in herbs	07

REFERENCE BOOKS

1. Panda H. Herbal Cosmetics (Hand book), Asia Pacific Business Press Inc, New Delhi.
2. Thomson EG. Modern Cosmetics, Universal Publishing Corporation, Mumbai.
3. P. P. Sharma. Cosmetics - Formulation, Manufacturing & Quality Control, Vandana Publications, New Delhi.
4. Supriya K B. Handbook of Aromatic Plants, Pointer Publishers, Jaipur
5. Skaria P. Aromatic Plants (Horticulture Science Series), New India Publishing Agency, New Delhi.
6. Kathi Keville and Mindy Green. Aromatherapy (A Complete Guide to the Healing Art), Sri Satguru Publications, New Delhi.
7. Chattopadhyay PK. Herbal Cosmetics & Ayurvedic Medicines (EOU), National Institute of Industrial Research, Delhi
8. Balsam MS & Edwsard Sagarin. Cosmetics Science and Technology, Wiley Interscience, New York.

PRACTICALS:

1. Formulation of herbal cosmetics such as Lip balm, Lipstick, Hair and Nail care products.
2. Preparation of Sunscreen screen cream and UV protection cream.
3. Formulation & Standardization of herbal shampoo
4. Formulation & Standardization of herbal hair color
5. Preparation of Herbal Skin care formulations.

Semester III & IV

CODE: FU012- 3 & FU012- 4	COURSE NAME: Research Work	Total Hrs: --
SCOPE: This subject aims with the study is to carry out a novel research work in cosmetic technology.		
OBJECTIVES: 1. To propose for the formulation and development of a novel product either in synthetic or herbal/natural cosmetics.		
UNIT. 1	Nil	



**Ordinance Governing
Post Graduate Course
In Roga-nidana evam Vikruti vigyana
Syllabus/Curriculum
2021-22**



**KLE ACADEMY OF HIGHER EDUCATION & RESEARCH
(DEEMED-TO-BE-UNIVERSITY)
(Re-Accredited 'A' Grade by NAAC (2nd Cycle) || Placed under Category 'A' by MHRD
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CONTENTS

Chapter I	General need assessment <ol style="list-style-type: none"> 1. Health care problem 2. Current approach 3. Ideal approach
Chapter II	Target need Assessment <ol style="list-style-type: none"> 1. Choose targeted learners 2. Find out information about the targeted learners 3. Determine characteristics of the learning environment
Chapter III	Goal, Competencies and objectives <ol style="list-style-type: none"> 1. Define goal 2. Identify and define competencies 3. Objectives -specific and measurable
Chapter IV :	Educational strategies -Content, T-L methods <ol style="list-style-type: none"> 1. Cognitive Objectives: Lecture, SDL 2. Psychomotor Objectives 3. Skill or Competency Objectives- simulations 4. Affective Objectives- Reflection, role models
Chapter V	Implementation
Chapter VI	Evaluation Program and assessment -formative and summative methods
Chapter VII	Annexure – Evaluation Formats

Preamble-

Ayurveda is upaveda of Atharva Veda. It is the oldest system of medicine in the world. The word Ayurveda derived from two samskrit words, **AYUR** (life) and **VEDA** (science/knowledge) means the ‘science of life’. It has complimented its therapeutic benefits to many chronic and unhealed ailments it is also suitable system of medicine for life style disorders and to meet the changes in pathological conditions due to modern life style.

It is revealed that there were three World famous Universities teaching *Ayurveda* – all located in ancient India, namely ‘Takshashila’, ‘Vikramshila’ and ‘Nalanda’. Students from all over the world studied in these universities and through them, the Principles of *Ayurveda* spread to other many countries. Other Systems of Medicine developed taking inspiration from *Ayurveda* that was learnt by foreign students from India and carried all over the World. *Ayurveda* therefore can be considered – in true sense – the ‘Mother of all Medical branches’.

During the period 2000-1000BC Ayurveda a unique system of medicine developed in India by the sages with use of their observations, natural resources and their experience. Under the **Guru Shishya Parampara** the regular teaching and training began with creation of Samhitas. Gradually it institutionalized at ancient University of ‘Takshashila’, ‘Vikramshila’ and ‘Nalanda’ during 7th century.

Recent years in India various courses were like Ayurveda Vaidya Visharad (AVV), AyurvedBhishak (AB), etc., conducted by different establishments. To rejuvenate, regularize and to bring uniformity in teaching and training of Ayurveda in India, the ‘Central Council of Indian Medicine’ a regulatory body for Ayurvedic Education was established. Now Bachelor of Ayurvedic Medicine and Surgery, MD/MS in various discipline of Ayurveda started with the intention to encourage integrated teaching and de- emphasis compartmentalization of disciplines so as to achieve horizontal and vertical integration in different phases and promote research which helps to support National Health Services.

To meet the needs of the student and the public with respect to learning and the health care, an emerging branch like Roga-nidana evam Vikruti vigyana play a major essential role in both areas of life. The post graduate Curriculum of Roga-nidana evam vikruti vigyana is competent enough to make the PG scholar a better Clinician with over all development in all possible diagnostics.

Chapter 1

General needs assessment.

1. Health care problem.

The traditionally rich developing country like India is stratified into multiple communities bifurcated with respect to caste, creed, culture and geographical distribution. The reflection of physical, mental, psychological, social expression is all the matter that is going to make a difference in the hallmark of health & diseases. Along with the maintenance of health (swastha) ,timely attention to the disease (Dukha) is the need of the hour. Due to delay in approach to the healthcare provider, non availability of health provisions, poverty & ignorance are the hurdles in the prosperity of health care system. Due to rapid changes in the ecology, environment, lifestyle changes, work culture the newer pathologies are getting added to the existing ones.

The thorough understanding and the diagnosis of the ailment in time with maximum accuracy and specificity makes a great difference in the healthcare system. Emphasis is laid on timely diagnosis. The department of Roga- Nidana & Vikruti Vigyan strives hard in teaching communication skills for better history taking & clinical examination also the interpretation of available diagnostic modalities.

2. Current approach.

The technological era with maximum sedentary lifestyle has contributed to the infinite non-communicable diseases with existing vulnerable communicable diseases. Roga- nidana effectively adopts OSCE in collaboration to irreplaceable traditional Ayurveda pariksha for better understanding of the clinical examination to arrive at a final diagnosis (from the list of diseases of provisional diagnosis) Vikruti vigyan imbibes the orthodox ways of learning the steps of pathogenesis.

3. Ideal Approach

Integrated diagnostic protocols are need of the hour .A thorough knowledge of Ayurveda & the contemporary science guide for a better diagnosis .An ideal approach

would be with proper history taking (skillful) clinical examination (OSCE) interpretation of the required investigation to help in timely arriving at a pinpoint diagnosis for the disease ailment.

In the order to attain the competencies, several advanced techniques in teaching-learning assessments & evaluation, are genuinely incorporated with due consideration of unaltered Ayurvedic concepts. Scientifically adoption of newer teaching methodologies into the curriculum will bring out an outstanding Ayurvedic PG scholar to contribute for better healthcare to the society.

Chapter 2

Target need assessment.

- **Choose target learners.**

The post graduates of Roga- nidana (Part I and II).

- **Find out information about the targeted learners.**

A post – graduate of Ayurveda in general & Roga-Nidana scholar in specific, will have learnt and oriented the basic knowledge & skills with certain limitation and conditions .As an undergraduate student, the scholar lacks the confidence in clinical examination ,differentiating the diseases & decision making skill & timely referral as well.

The post –graduate scholar of Roga-Nidana should be competent enough to extract patient history, clinical examination & interpretations of diagnostics report/ techniques efficiently. Thus the enhanced communication skills, confident attitude, teamwork, leadership qualities by proper decision making caliber will make the scholar a perfect clinician to practice authenticated principals of Roga-nidana & Vikruti Vigyan.

- **Determine characteristics of learning environment.**

The scholar are the main stake holder of the teaching learning program hence the curriculum needs to be designed with flexibility, student centric, availability & openness to access to the learning resources . The scholastics learning platform can be created with proper planning of timely feedback from stakeholders (PG Scholar) subject specialty teachers, alumni of the Roga nidana speciality, external peers at regular intervals.

Chapter 3 - Goals, Competencies and objectives

Goals -

The goals of post –graduate training program in Roga-Nidana evam Vikruti vigyana are,

- To provide & practice the basic knowledge of Ayurveda diagnostic modalities, understand & justify the sequential reflection of Ayurveda pathology & Pathogenesis.
- To provide & facilitate a platform for learning Hematology, Biochemistry, microbiology related techniques & interpretation of the result.
- To expertise the scholar with communication skills for better history taking & clinical examination skills.
- To understand & interpret the reports of Invasive & Non- invasive techniques, by comprehending the working principals.
- To execute the Basic Knowledge of Roga- nidana for better differential diagnosis by proper interpretation of the diagnostics to have a pin point diagnosis

Objectives

On completion of the curriculum the following objectives will be achieved with various subheadings.

- Knowledge (cognitive domain)
- Skills (Psycho-motor domains)
- Human values, Ethical practice & communication abilities.

Knowledge

A list of objectives related to knowledge and higher cognitive abilities that are expected to be achieved during the course are given.

1. Describe the Nidana, Samprapti, Pareeksha, NidanaSaadhana(Diagnostic aids), Chikitsa possibilities, Sadhyasadyata with respect to Ayurveda and the contemporary science and also timely referral to save the life.
2. Basic knowledge of Dosha,Dhatu,Upadhatu,Mala,Agni with respect to sthana,Vruddhi,Kshaya,Prakopa effects on health & disease and exhibited laxanas and karana of the same.
3. Basic knowledge of srotus with respect to Moolasthan,laxanas, kaarana and Vikara for dusti & Pradushan of Srotus to produce srotodusti Vikara and Indriya pradhushaja Vikara.
4. Basic knowledge of basic Pathology of Contemporary science.
5. Knowledge of Ayurveda modalities of Pareeksha and Principles of Clinical examinations.
6. Basic knowledge of Microbiology and it's units like Serology, Parasitology, virology etc.
7. Basics and Principles in Biochemistry, Pathology, Radiology, ECG,EEG....etc.
8. Update the knowledge component by attending Seminars, workshops, Electives,emerging courses as required.
9. Apply the knowledge for carrying out the Research activities and also Presenting & Publishing the outcomes of research.

Skills

1. Capability in accurate appraisal of Ayurvedic fundamental parameters like Darshanadi, Pratyakshadi, Nadyadi, Prakrutyadi etc.
2. Ability to frame the customised Samprapti (Pathogenesis) & differentiate specific samprapti Ghataka.
3. Competency in History taking, Clinical examination and co-relating the History with clinical outcomes by Ayurveda & contemporary science.
4. Expertise in requisiting minimum investigatory modalities to arrive at a Pin Point diagnosis.
5. Accomplishment in performing biochemical, Haematological, Serological, Microbiological tests individually.
6. Proficiency in commenting/justifying the invasive&non invasive techniques

Human values, Ethical practice and Communication abilities

- Adopt ethical principles in all aspects of History taking and Clinical examination, Professional honesty and integrity are to be fostered. Clinical care is to be delivered irrespective of the social status, caste, creed or religion of the patient.
- To develop communication skills to reveal the outcomes of clinical examination, interpret the diagnostic findings, possible treatment modalities in Ayurveda and the contemporary science, Prognosis etc.
- Inculcating leadership qualities for timely decision with respect to choosing the diagnostics, prognosis, possible medical or surgical intervention and also a timely referral, to maintain the healthy work culture.
- Adopt and practice high moral ethics and etiquettes in carrying out the Human & animal research studies.
- Accept the limitations & possibilities available with respect to basic knowledge and skill for better health care provision to the society.
- Provision to provide patients rights and privileges.

COMPONENTS OF THE PG CURRICULUM-

The major components of the PG curriculum shall be:

- a. Theoretical knowledge
- b. Practical/Clinical Skills
- c. Training in Thesis.
- d. Attitudes, including communication.
- e. Training in Research methodology.

a) Theoretical knowledge-

Roga-nidana evam vikruti vigyana syllabus topics include the following:

All the candidates admitted for P.G Degree (MD Ayurveda) are required to pursue the recommended duration of three academic years as full time candidates out of which:

- (i) Preliminary course for one year - MD Part 1 and
- (ii) Specialty course for two years - MD Part 2.

(i) Syllabus of Preliminary course for one year -MD/MS Part 1 Roganidana evam vikruti vigyana

Name Of The Subject : <u>ROGA NIDANA AVUM VIKRITI VIGYAN</u> (Pathology and Diagnostic Procedure)			
Theory-100 Marks		Practical-100 Marks	
Theory- 100 Hours		Practical- 200 Hours	
Part- A			
Marks-50 Hours:50			
Unit	Contents (Theory)	Hours	Teaching Methods
1	Understanding of Samprapti of diseases in Charaka Nidana Sthana in contemporary context	8	Didactic/Interactive/ audiovisual
2	Clinical aspects of Dosha, Dhatu, Upadhatu, Mala, Agni, Ama, Srotas and Indriya	8	Didactic lecture /Interactive /audio-visual
3	Understanding of the role of Trividha Avasthapaka in the vitiation of Dosha	4	Didactic/Interactive/ audiovisual
4	Concept of Nanatmaja and Samanyaja Vikara	4	Didactic/Interactive/ audiovisual
5	Clinical application of Avarana in diagnosis of various diseases	6	Didactic/Interactive/ audiovisual
6	Clinical application of Shatkriyakala in diagnosis of diseases.	5	Didactic/Interactive/ audiovisual

7	Clinical and applied aspects of concept of Upadrava and Arista	5	Didactic/Interactive/ audio visual
50	Part- B	Marks – 50	Hours -
1	Ayurvedic interpretation of various laboratory investigations to derive treatment principles.	10	Didactic/Interactive/ audio visual
2	Interpretation of various Rogi Bala and Roga Bala technique to plan Chikitsa Sutra	10	Didactic/Interactive/ audio visual
3	Clinical examination of Deha Bala, Roga Bala, Agnibala And Chetas Bala	6	Didactic/Interactive/ audio visual
4	Knowledge of current diagnostic tools like ECG, X-Ray, CT scan, MRI and USG	15	Didactic/Interactive/ audio visual
5	Ayurvedic interpretation of various laboratory investigations to derive treatment principles.	9	Didactic/Interactive/ audio visual

PRACTICAL

100 marks

Contents:

1. Duty in hospital OPD and IPD.
2. Duty in pathology laboratory.
3. Case taking – 25 cases
4. Performance of pathology and biochemistry practicals – 10
5. Interpretation of ECG, EEG, X-ray, CT-Scan, MRI and USG

Practical exam pattern for 1st MD

Distribution of marks (practical):

Sr No	Particulars	Details	Internal Distributions	Marks Distributions
01	Records	1.In Patient case history records-25 2.Biochemistry&Pathology record-10 3.Microbiology record 4.Haematology record		10
02	Bedside Clinical	Long Case		20
	Case taking	Short Case		10
03	Procedure	Haematology-01,Biochemistry-01, Microbiology-01		20
04	Spotting	Interpretation of ECG,EEG,X-ray, CT, MRI, USG etc, of the given specimen diagnostics		10
05	Viva Voce	Part A - 15 Marks		30
		Part B – 15 Marks		
Total				100

REFERENCE BOOKS:

No	Title Of The Book	Name of The Authors and commentators	Edition	Name of the Publication
1.	Charak Samhita	Agnivesha & Chakrapanidatta	1 st -2015	Chaukhambha Sanskrit Series Office
2.	Sushruta Samhita	Sushruta & Dalhana	RP-2019	Chaukhambha Sanskrit Series Office
3.	Ashtang sangara	Laghuvaghbata & Arunadatta & Hemadri	3 rd -2012	Chaukhambha Sanskrit Series Office
4.	Madhava Nidan part 1	Yadunandan Upadhyaya	32 nd -2002	Chaukhambha Sanskrit Series Office
5.	Madhava Nidan part 2	Yadunandan Upadhyaya	31 st -2002	Chaukhambha Sanskrit Series Office
6.	Siddhantanidanam	Gananath Sen	6 th -1966	Charuchandra Bisharada
7.	Nidan Panchakam	Kudatarkar V N	1959	VN Kudatarkar
8.	Ayurvediya Vyadhi Vijnana	Acharya Y T	2 nd -1976	Vaidyanath Ayurved Bhavan
9.	Ayurvediya Vikruti Vijnana	Shrikanthmurthy K R	6 th -1972	Karnatak University
10.	Vikruti Vijnana	Subhash Ranade; Others	1994	Anmol Prakashan
11.	Nidan Chikitsa Hastamalaka	Ranjeet Rai Desai	2 nd RP-2010	Vaidyanath Ayurved Bhavan
12.	Madhava Nidan	Shrikanthmurthy K R	7 th -2005	Chaukhamba Orientalia 1
13.	Madhava Nidan	Narendranath Shastri	1 st -1979	Motilal Banarasidas
14.	Ayurvediya Vikruti Vijnana	Vidyadhar Shukla	2003	Chaukhamba Sanskrit Pratishthan

15.	Vikruti Vijnana	Hiremath K J	1 st -1995	Smt. Prabhavati K Hiremath, Kalmeshwar Prakashana
16	Roga Vijnana Evam Vikruti Vijnana	Vinaykumar Sharma	1 st -2000	Rishi Publications
17	Nadi Pariksha	Indradev Tripathi	1 st -1987	Chaukhamba Orientalia
18	Rogi Pariksha Vidhi	Sharma P V	1998	Chaukhambha Bharati Academy
19	Ayurvediya Vikruti Vijnana	Dwivedi B K	1 st -2003	Chaukhamba Sanskrit Pratishtan
20	Roga Vijnana	Radhakant Sharma	5 th -2004	Publication Scheme
21	Roga Vijnana	Vinaykumar Sharma	1 st -2000	Nath Pustak Bhandar
22	Roga Vijnana	Vinaykumar Sharma	1 st -2000	Nath Pustak Bhandar
23	Vikruti Evam Rogavijnan	Madhavsimha Baghel; Others	1 st -1983	Publication Scheme
24	Ayurveda Nidan	Kulkarni P H	2 nd -2000	Satguru Publication Delhi
25	Madhava Nidan	KRL Gupta	2 nd -1997	Satguru Publication Delhi
26	Madhava Nidan	Anantram Sharma	1 st -2007	Chaukhambha Sanskrit Series Office
27	Siddhantanidanam	Shrikanthmurthy K R	6 th -1966	Chaukhambha Sanskrit Series Office
28	Madhava Nidan	P Himasagara Chandra Murthy	1 st -2006	Chaukhambha Sanskrit Series Office
29	Roga Vijnana & Vikruti Vijnana	Manoj Sankarnarayana	1 st -2007	Chaukhambha Sanskrit Series Office
30	Madhava Nidan Atankadarpan	Yadavji Tricumji Acharya	6 th -2001	Chukhamba Orientalia
31	Madhava Nidan	Brahmanand Tripathi	1 st -2005	Chaukhamba Surbharati Prakashan

32	Madhava Nidan	Ravidatta Tripathi	1993	Varanasiya Sanskrit Sansthan Varanasi
33	Ayurvediya Vikruti Vijnana and Roga Nidan	Byadgi PS	1 st -2016	Chaukhamba Publications Delhi
34	Diabetes Ayurvedic Overview	Nishant Shukla: C P Shukla	1 st -2006	Chaukhamba Orientalia
35	Over view of Nadi Pariksha	Suresh Babu	1 st -1983	Choukhamba Krishnadas Academy
36	Vikruti evam Roga Vijnana	Madhav Sihna : Others	1 st -1983	Publication Scheme
37	Ayurvediya Roga Vijnana and Vikruti Vijnana	Radha Vallabha Sati	2008	Chaukhamba Orientalia
38	Shlokavali of Roga Vijnana & Vikruti Vijnana	Ragini Patil;Shivaji Wavhal	4 th -2009	Shantanu Prakashan Pune
39	Textbook of Microbiology	Surinder Kumar	1 st -2009	Jaypee Brothers Medical Publishers
40	Charmaroga Nidarshika	Raghuveer Prasad Trivedi	3 rd -2011	Baidyanath Ayurveda Bhawan Ltd
41	Andrology Laboratory manual	Kamini A Rao	1 st -2010	Jaypee Brothers Medical Publishers
42	Stem Cells	Eapen Cherian	1 st -2011	Jaypee Brothers Medical Publishers
43	Robbins Basic Pathology	Vinaykumar: Others	9 th -2013	Saunders an Inprint of Elsevier
44	Diagnostic Imaging	Andrea Rockall:Others	7 th -2013	WILEY-BLACKWELL
45	Demonstrations of Physical Signs Picture Tests	Hamilton Bailey	1 st -2013	Butterworth Heinemann
46	Good Laboratory Practice	Jurg P Seiler	2 nd -2007	Springer Pvt Lte New Delhi
47	Prescotts Microbiology	Joanne M Willey:Others	8 th -2011	Mc Graw Hill Asia
48	Interpretation of Common Investigations	Gupta L C;Others	5 th -2006	Jaypee Brothers Medical Publishers
49	Microbiology Theory for MLT	Namita Jaggi	2 nd -2013	Jaypee Brothers Medical Publishers
50	Textbook of Pathology	Harshmohan	7 th -2015	Jaypee Brothers Medical Publishers
51	Pathology Practical Book (with cd)	Harshmohan	2 nd -2007	Jaypee Brothers Medical Publishers

52	Medical Laboratory Technology	Ramnik Sood	6 th -2009	Jaypee Brothers Medical Publishers
53	Medical Laboratory Technology	Ramnik Sood	6 th -2009	Jaypee Brothers Medical Publishers
54	Microbiology	Richard A Harvey:Others	2 nd -2008	Lippincott Williams & Willkins Wolters Kluwer Co.
55	Symptoms and Signs in Clinical Medicine	Chamberlain;Ogilvie	12 th -1997	The English Language Book Society
56	Hutchinsons Clinical Methods	Michael Swash	22 nd 2007	The English Language Book Society
57	Macleod"s Clinical Examination	Dauglas Graham : Others	11 th -2007	Elsevier
58	Ttext book of clinical Biochemistry	Sood Ramnik	1 st -2019	CBS Publications and Distributors
59	Dacie and Lewis practical Haematology	Bain barbara j;bates imelda ;laffan m.a	12 th -2017	Elsevier

ii) Specialty course for two years -MD/MS Part 2.

**MD/MS Part 2. (AYU) ROGA NIDANA AVUM VIKRITI VIGYAN
(Pathology and Diagnostic Procedure)**

- Theory Papers : 04
- Theory Marks : 400 Marks (100 each)
- Practical Marks : 200 Marks
- Duration : 02 Years
- Grand Total : 600 Marks

PAPER	NAME OF PAPER	MARKS	TEACHING HOURS
PAPER I	FUNDAMENTAL PRINCIPLES OF ROGANIDANA	100 Marks	100 Hours
PAPER II	ROGA VIGYANA	100 Marks	100 Hours
PAPER III	PARIKSHA VIGYANA	100 Marks	100 Hours
PAPER IV	VIKRITI VIGYANA AND JIVANU VIGYANA	100 Marks	100 Hours

Name Of The Subject : ROGA NIDANA AVUM VIKRITI VIGYAN			
(Pathology and Diagnostic Procedure)			
PAPER-I		FUNDAMENTAL PRINCIPLES OF ROGANIDANA	
Marks- 100		Hours- 100	
1	Concept of Tridosha and its Pathological implications. 63 permutations and combination of Tridosha. Lina and Stambhita Dosh, their cause and importance in manifestation of Samprapti	4	didactic lecture/ audiovisual/interactive
2	Concept of Rakta as a Chaturtha Dosh. Importance of Rakta in the manifestation of diseases.	3	didactic lecture/ audiovisual/interactive
3	Concept of Ashrayashrayi bhava and its applied utility.	3	didactic lecture/ audiovisual/interactive
4	Different types of Dosh Gati.	3	didactic lecture/ audiovisual/interactive
5	Causative factors and practical utility of movement of Doshas from Koshtha to Shakha and Shakha to Koshtha.	3	didactic lecture/ audiovisual/interactive
6	concept of Ashayapakarsha. Trayo roga marga, their diseases and clinical importance of Roga Marga.	3	didactic lecture/ audiovisual/interactive
7	Concept and classification of Avarana, its role in pathogenesis, mode of diagnosis of Avarana and its importance in chikitsa sutra.	3	didactic lecture/ audiovisual/interactive
8	Applied aspect of Dhatu Poshana Krama and Dhatu Samvahana.	3	didactic lecture/ audiovisual

			sual/int eractive
9	Concept of Margaga and Sthanastha Dhatus. Conept and applied aspects of Doshapaka and Dhatupaka Fundamental and applied aspect of Dhatu, Upadhatu and Mala.	3	didactic lecture/ audiovi sual/int eractive
10	Diseases developed due to their vitiation (pradoshaja vikara). Concept and applied aspects of Srotas, their importance in health and diseased conditions.	3	didactic lecture/ audiovi sual/int eractive
11	Concept of Rakta as a Chaturtha Dosha. Importance of Rakta in the manifestation of diseases.	3	didactic lecture/ audiovi sual/int eractive
12	Concept of Ashrayashrayi bhava and its applied utility. Different types of Dosha Gati.	3	didactic lecture/ audiovi sual/int eractive
13	Causative factors and practical utility of movement of Doshas from Kostha to Shakha and Shakha to Koshtha.	3	didactic lecture/ audiovi sual/int eractive
14	Concept of Ashayapakarsha. Trayo roga marga, their diseases and clinical importance of Roga Marga.	3	didactic lecture/ audiovi sual/int eractive
15	Concept and classification of Avarana, its role in pathogenesis, mode of diagnosis of Avarana and its importance in chikitsa sutra. 3	3	didactic lecture/ audiovi sual/int eractive
16	Applied aspect of Dhatu Poshana Krama and Dhatu Samvahana.	3	didactic lecture/ audiovi sual/int eractive
17	Concept of Margaga and Sthanastha Dhatus. Conept and applied aspects of Doshapaka and Dhatupaka Fundamental and applied aspect of Dhatu, Upadhatu and Mala.	3	didactic lecture/ audiovi sual/int eractive
18	Diseases developed due to their vitiation (pradoshaja vikara). Concept and applied aspects of Srotas, their importance in health and diseased conditions.	3	didactic lecture/ audiovi

			sual/int eractive
19	Concept and applied aspects of Sroto Dushti and Khavaigunya	3	didactic lecture/ audiovi sual/int eractive
20	Understanding the various srotas which are not included in classical list of srotas but enumerated while describing the samprapti of diseases.	3	didactic lecture/ audiovi sual/int eractive
21	Description of Dosha-Dushya-Sammurchhana, Concept of Prakriti Sama Samaveta and Vikriti Vishama Samaveta Sammurchhana.	3	didactic lecture/ audiovi sual/int eractive
22	Importance of Dosha-Dushya-Sammurchhana in Diagnosis and treatment.	3	didactic lecture/ audiovi sual/int eractive
23	Concept of Vikara vighata bhavabhava prativishesha.	3	didactic lecture/ audiovi sual/int eractive
24	Concept of Agni and its role in manifestation of health and disease.	3	didactic lecture/ audiovi sual/int eractive
25	Concept and pathogenesis of Ama. Contemporary interpretation of Ama and its role in pathogenesis. Sama, Nirama stages of Dosha, Dhatu and Mala.	3	didactic lecture/ audiovi sual/int eractive
26	Understanding Samprapti of Santarpanottha and Apatarpanottha Vyadhi	3	didactic lecture/ audiovi sual/int eractive
27	Detailed classification of diseases as described in Ayurveda. Knowledge of ICD and DSM classification.	3	didactic lecture/ audiovi sual/int eractive
28	Detailed understanding of Nidan Panchaka with their classification and clinical importance.	3	didactic lecture/ audiovi

			sual/int eractive
29	Relation between 'Hetu & Lakshana' and 'Samprapti & Lakshna'.	3	didactic lecture/ audiovi sual/int eractive
30	Explanation and applied aspects of Kriyakala and its utility in diagnosis and treatment.	3	didactic lecture/ audiovi sual/int eractive
31	Importance of Upadrava, Arishta and Sadhyasadyata and Udarka. 1.	3	didactic lecture/ audiovi sual/int eractive
32	Natural History of the Diseases, concept of vyadhisankara in Ayurveda.	3	didactic lecture/ audiovi sual/int eractive
33	Understanding of Samprapti of diseases in Charaka Nidana Sthana in contemporary context	3	Didacti c lecture/ audiovi sual/int eractive
<p>Paper II ROGA VIGYANA</p> <p>Marks – 100 Hours -100</p>			
<p>Knowledge of classical Samprapti of following diseases with interpretation of Nidana Panchaka including Upadrava, Arishta and Sadhyasadyata and Chikitsa Sutra. Knowledge of commonly occurring diseases of the respective systems mentioned in contemporary medicine and their Ayurvedic interpretation.</p>			
1	Diseases of Pranavaha srotas- Kasa - Shwasa - Hikka – Urahkshata – Shosha – Rajayakshma and Ayurvedic understanding of common clinical entities like Pneumonia, Pleural effusion, Bronchitis, Bronchiectasis, Pulmonary Tuberculosis, Bronchial Asthma.	6	didactic lecture/ audiovi sual/int eractive

2	Diseases of Annavaha- Pureeshavaha Srotas- Agnimandya - Ajirna - Aruchi- Chhardi, Amlapitta- Shoola, Grahani –Gulma-Udara Roga –Vibandha, Atisara – Pravahika along PG Final Year Syllabus-33 with various clinical presentations. Ayurvedic understanding of common clinical entities like Peptic Ulcer, Irritable Bowel Syndrome, Diarrhoea, Dysentery, Constipation, ulcerative colitis.	6	didactic lecture/ audiovi sual/int eractive
3	Diseases of Udakavaha Srotas- Trishna, Daha and knowledge of water and electrolyte imbalance disorders	6	didactic lecture/ audiovi sual/int eractive
4	Diseases of Rasavaha Srotas - jwara and Ayurvedic understanding of common clinical entities like various types of Fever- Malaria, Typhoid, viral fevers. Pandu, Amavata, Hridroga, Shotha and Ayurvedic understanding of common clinical entities like Anaemia & its Classification, Rheumatic fever, Rheumatoid Arthritis, Angina, Ischaemic Heart Disease, Hypertension, Myocardial Infarction ,Congestive cardiac failure.	6	didactic lecture/ audiovi sual/int eractive
5	Diseases of Raktavaha Srotas- Kamala - Raktapitta - Vatarakta – Kroshtukaseersha - Shitapitta – Maha Kushta – Visarpa – Shwitra and Kshudra Kushta and Ayurvedic understanding of common clinical entities like jaundice, hepatitis, bleeding disorders, Gout, Thrombo Angitis Obliterans (TAO), Deep Vein Thrombosis (DVT), Leukaemia, Thalessemia, Sickle cell Anaemia. Introduction to Urticaria, Psoriasis, Eczema, Pemphigus, Herpes.	6	didactic lecture/ audiovi sual/int eractive
6	Diseases of Mamsavaha srotas- Introduction to Granthi, Arbuda,Galaganda and Arsha. Ayurvedic understanding of all types neoplasia and Thyroid diseases.	6	didactic lecture/ audiovi sual/int eractive
7	Diseases of Medovaha srotas- Sthoulya - Karshya – Prameha and Ayurvedic understanding of common clinical entities like Obesity and Diabetes Mellitus.	6	didactic lecture/ audiovi sual/int eractive
8	Diseases of Asthi - Majjavaha srotas- Sandhigatavata, Introduction to Asthimajjaparipaka, Asthigata Vidradhi and Ayurvedic understanding of common clinical entities like Osteo-Arthritis, Osteomyelitis, Osteoporosis.	6	didactic lecture/ audiovi sual/int eractive

9	Vatavyadhi-Akshepaka - Apatanaka - Ardita - Pakshaghata – Gridhrasi – Viswachi, Avabahuka, Manyasthambha – Katigraha-Pangutwa- Khanja-Khalwee and Ayurvedic understanding of common clinical entities like Hemiplagia, Parkinson’s disease, Lumbago- Sciatica syndrome, Bell’s Palsy, Ankylosing Spondylitis, MND and other commonly occurring neurological diseases.	6	didactic lecture/ audiovi sua/inter active
10	Diseases of Sukravaha srotas- Klaihya and Vandhyatva and understanding of male and female Infertility, Impotence.	6	didactic lecture/ audiovi sua/inter active
11	Diseases of Mutravaha srotas -Mutrakrichha – Mutraghata, Ashmari and Ayurvedic understanding of common clinical entities like Urinary Tract Infection, Urolithiasis, Nephropathies and Renal failure.	6	didactic lecture/ audiovi sua/inter active
12	Diseases of Swedavaha srotas-knowledge of khalitya, Palitya and Cosmetology.	6	didactic lecture/ audiovi sua/inter active
13	Diseases of Manovaha Srotas - Vishada, Udvega, Bhaya, Bhrama, Anidra, Mada, Murchha, Sanyasa, Apasmara, Unmada, Atatwabhinivesha and Ayurvedic understanding of common clinical entities like Depression, Anxiety neurosis, Phobia, Personality disorders.	6	didactic lecture/ audiovi sua/inter active
14	Indriya Pradoshaja Vikara.	5	didactic lecture/ audiovi sua/inter active
15	Jara janya Vyadhi: Alzheimer’s Disease	5	didactic lecture/ audiovi sua/inter active
16	Concept and tools for the study of Anukta Vyadhi (Unexplained and newly emerging diseases).	6	didactic lecture/ audiovi sua/inter active
17	Understanding the concept of karmaja vyadhi	6	didactic lecture/ audiovi sua/inter active

PAPER- III		PARIKSHA VIGYANA	
Marks– 100		Hours:-100	
1	Introduction to Clinical methods and technique for the study of clinical examination	4	didactic lecture /audio visual/ interactive
2	Importance of medical history taking and its importance in clinical medicine.	8	didactic lecture /audio visual/ interactive
3	Aims, Objectives and Methods, applied aspects and importance of various Rogi and Roga Pariksha as per classics.	6	didactic lecture /audio/ interactive visual
4	Srotas Pariksha, Shadanga Pariksha vis-à-vis general & systemic examination of patient.	8	didactic lecture /audio visual/ interactive
5	Interpretation of Charakokta trividha pramana pariksha and Sushrutokta shadvidha pariksha with clinical methods mentioned in modern medicine.	6	didactic lecture /audio visual/ interactive
6	Interpretation and use of ashtasthana nirikshana along with use of current tools as per Ayurveda. PG Final Year Syllabus-34	6	didactic lecture /audio visual/ interactive

7	Charakokta dashavidha and Sushrutokta Dwadashavidha pariksha along with the use of modern supportive tools for understanding of rogibala and roga bala concept to derive chikitsa sutra	8	didactic lecture /audio visual/ interac tive
8	Ayurvedic interpretation of all relevant findings of modern clinical examinations, various Laboratory and other Diagnostic tools.	6	didactic lecture /audio visual/ interac tive
9	Understanding of diagnostic procedures in medical emergencies. 10	6	didactic lecture /audio visual/ interac tive
10	Concept of Good clinical practice in Ayurveda and modern medicine.	6	didactic lecture /audio visual
11	Knowledge of standard clinical laboratory set up useful for Ayurvedic practice.	6	didactic lecture /audio visual/ interac tive
12	Knowledge of Ancillary common laboratory investigations for diagnosis of diseases, their methods, normal and abnormal values, factors influencing values and their Ayurvedic interpretations & clinical significance as mentioned in practical syllabus.	6	didactic lecture /audio visual/ interac tive
13	Importance of Bio markers and their utility in clinical researches .	6	didactic lecture /audio visual/ interac tive
14	Update knowledge of emerging diagnostic tools and technologies.	6	didactic lecture

			/audio visual/ interac tive
15	Knowledge of various Ayurvedic diagnostic softwares/programmes available.	6	didacti c lecture /audio visual/ interac tive
16	Avayava Pariksha – Radio- Imaging Techniques, Sonological Techniques, ECG, EEG etc and their clinical interpretation	6	didacti c lecture /audio visual/ interac tive
Paper IV VIKRITI VIGYANA AND JIVANU VIGYANA			
Marks – 100		Hours - 100	
1	Introduction to pathology and technique for the study of pathology	4	didacti c lecture /audio visual/ interac tive
2	Cell injury and cellular adaptations	8	didacti c lecture /audio visual/ interac tive
3	Immunopathology including amyloidosis and its interpretation with the concept of Ojas vis-à-vis Bala	10	didacti c lecture /audio visual/ interac tive

4	Concept of Shotha versus Inflammation, oedema and healing Derangement of Homeostasis and Hemodynamic disorders	10	didactic lecture /audio visual/ interactive
5	General character and classification of Neoplasia	6	didactic lecture /audio visual/ interactive
6	Upasargjanya Vyadhi (Communicable diseases)- Romantika – Masurika – Upadamsha – Phirang and introduction to Syphilis, AIDS, Leprosy, Tuberculosis	10	didactic lecture /audio visual
7	Detail study of Krimi Vigyanam versus infectious and parasitic diseases along with their mode of infection and life cycle	8	didactic lecture /audio visual/ interactive
8	Concept of Snayuka, Shleepada and introduction to Filariasis and classification of common parasites.	10	didactic lecture /audio visual/ interactive
9	Concept and applied aspects of Janapadodhvamsa and Environmental diseases	8	didactic lecture /audio visual/ interactive
10	Nutritional disorders	6	didactic lecture /audio visual/ interactive

11	Concept of genetic diseases and its interpretation in terms of Bija dosha	8	didactic lecture /audio visual/ interac tive
12	Knowledge of common Bacteria, Virus, Parasites, Fungi and their classification with their disease processes, Nutrition requirements, media and methods for culture and sensitivity	12	Didactic lecture /audio visual/ interac tive

PRACTICAL DEMONSTRATION AND HANDS ON EXPERIENCE

1. Regular posting in Roga Nidana O.P.D.
2. Regular posting in Roga nidana I.P.D.
3. Regular posting in Laboratories
4. Regular posting in other departmental units and Educational Tour to update current medical knowledge
5. Laboratory record – maintenance of observation diary and laboratory record book.
6. Experience in conducting following laboratory investigations for diagnosis of diseases and their methods
 - a) Hematological, Biochemical and Serological measures, Peripheral blood film examination
 - b) Rapid diagnostic techniques.
 - c) Screening test for bleeding disorders- Platelet Count, bleeding time (BT), Clotting time (CT), Prothrombin time (PT).
 - d) Blood grouping - ABO system, Rh typing (Rhesus system)
7. Urine Examination a. Ayurveda anusara mutra pariksha. PG Final Year Syllabus-35 b. Physical Examination, Chemical Examination, and Microscopic Examination c. Dip stick examination
8. Stool Examination i.e Ayurveda anusara purisha pariksha-Physical examination - Sama-Nirama Pariksha ii. Microscopic and macroscopic examination of stool
9. Sputum Examination
 - i. Ayurveda pariksha anusara sthivana.
 - ii. Physical, Chemical and Microscopic Examination of the sputum.
10. Semen examination
 - 1) Ayurvediya anusara Retas pariksha.
 - 2) Semen examination & clinical interpretation
11. Biochemical tests related to various organ panels- Liver, Kidney, Heart, Thyroid, Pituitary and Bones.
- 12 Knowledge of different staining techniques in microbiology.
13. Knowledge of Sero-immunological Investigations: RA, Widal test,ASLO titer,ANA,Etc
14. Physical, chemical, microscopic, biochemical and bacteriological tests for various kinds of body aspirates
15. Knowledge of histopathological techniques.

BEDSIDE PRACTICAL /CLINICAL METHODS

1. Expertise in clinical methods (General and Systemic Examination).
2. Practical knowledge of examination of Roga based on Pancha Nidan.
3. Practical knowledge of instruments used for clinical examination.
4. Practical records of clinical examination of at least 30 long cases in I.P.D.
5. Practical records of clinical examination of at least 50 short cases.
6. Practical knowledge of ECG, USG and Imaging techniques and their clinical interpretation
7. Understanding of various Ayurvedic diagnostic softwares/programmes available like Ayu soft, Rudra,Ayut Nidana etc

PATTERN OF PRACTICAL EXAMINATION MD Part-II 200 MARKS

Sl. No	Practical	Marks	Total Marks
1	Long case/ Long Practical as the case may be	40 marks	200 marks
2	Short case/ Short Practical as the case may be	20 marks	
3	Medical Procedure/ Lab Analysis	30 marks	
4	Identification of Specimen/ Radiograph and Instruments	30 marks	
5	Thesis presentation	20 marks	
6	Micro teaching/Topic presentation	20marks	
7	Viva- voce	40 marks	
	TOTAL		200 marks

REFERENCE BOOKS LIST

SL.NO	TITLE	AUTHOR	EDITION
1	Charaka Samhita with Various Commentaries	Yadav Sharma	2015
2	Madhava Nidana with Various Commentaries	Acharya V.J.T	2010
3	Abhinava Vikriti Vigyana	Acharya Raghuvir Prasad	-
4	Dosha karanatwa Mimansa	P.V Sharma	2003
5	Nadi Darshan	T.S Mishra	2012
6	Nadi Vigyanam	Tika	-
7	Nadi Vigyan	Vashisht S.D	-
8	Nadi Vigyana	Gangadhar Tika	-
9	Nadi Pariksha	Athavale	2014
10	Nadi Pariksha	Upadhyay GP	
11	Rogi Pariksha Vidhi	P.V Sharma	1998
12	Roga Vigyan	Vinay Kumar	1985
13	Siddhanta Nidan	Gananath Sen	1966
14	Ayurvediya Roga Vargikaran	Ramanth VD	-
15	Ayurvediya Nidan Evum Chikitsa ke Siddhanta	Ram Harsh Singh	2015
16	Relevant Portion of Charaka Samhita, Sushruta Samhita, & Vagbhata	-	-

17	Clinical Methods in Ayurveda	KRS Murthy	1996
18	Parameswarappa's Ayurvediya Vikriti Vigyana	Byadgi PS	2018
19	Nidana Panchaka	Dhyani SC	1987
20	Samprapti Lakshana yoh Sambhandha	Sadashiv Sharma	-
21	Clinical Diagnosis in Ayurveda	Vasant Patil	1 st /2013
22	Oxford H.B of clinical Examination	-	2nd /2014
23	Symptoms & Signs in clinical medicine	chamberlains	13 th /2010
24	Clinical methods	Hutchinson	23 rd /2012
25	Bedside clinics in medicine vol-I & II	Kundu	7 th /2014
26	Practical Pathology	Uma Chaturvedi	2002
27	Medical Laboratory Technology	R. Sood	6 th /2009
28	Clinical Diagnosis and Management	Todd	2016
29	Robbins Basic Pathology	Kumar	2018
30	T.B of Pathology	Boyds W	10/2013
31	T.B of Pathology	Harsh Mohan	8 th /2019
32	T.B of Pathology	Dey	2003
33	T.B of Parasitology	R. Sood	2019
34	Clinical Pathology & Bacteriology	S.P Gupta	-
35	A T. B of Microbiology	Ananthanarayan	11 th /2020

Chapter 4. Educational strategies:

Contents-

- A) Cognitive Objectives : Theoretical knowledge (Lecture)
- B) Psychomotor Objectives- Practical/clinical Skills/Competency
- C) Affective Objectives- Reflection, role models

A) Cognitive Objectives : Theoretical knowledge (Lecture)

Teaching and Learning Activities

A candidate pursuing the course should work in the institution as a fulltime student. No candidate should be permitted to run a clinic/laboratory/nursing home while studying postgraduate course. 75% of attendance is must for 1st year and final year for calculating attendance.

Every student shall attend teaching and learning activities during each year as prescribed by the department and not absent himself / herself from work without valid reasons.

A list of teaching and learning activities is designed to facilitate students to acquire essential knowledge and skills outlined are given below:

1) **Lectures:** Lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated.

- 1) Bio-statistics
- 2) Research Methods
- 3) GCP and GLP
- 4) Medical code of conduct and medical Ethics
- 5) Communication Skills etc.

These topics may preferably taken up in the first few weeks of the 1st year (PART-I). The remaining two years (PART-II) the scholars should attend following activities.

2) **Integrated Lectures:**

- Krimi Vidnyanam with Microbiology,
- Comparison of ayurvedic concept of Mala and Shukra Parikshan with Modern Physical, chemical and Microscopic examination of Stool and Semen analysis
- Avayavika Parikshan with USG and X-ray and ECG Examination at Diagnostic wing of our Hospital.

3) **Journal Club:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the e-Log Book, the relevant details.

4) **Subject Seminars:** Further, every candidate must make a presentation from the allotted respective topics (both Ayurveda & Modern), Investigation seminar, Classical Text Review, Formulation seminars, selected articles and Clinical case presentations at least four every week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book, the relevant details. The presentations would be evaluated using check lists, containing names of the student and the evaluator etc.

5) **Student Symposium:** The scholar must attend minimum 2 National seminars and 2 State level seminars and Recommended to present at least two scientific papers / posters.

6) **Publications:** the scholars must publish at least 2 articles in Pubmed /Indexed journals, or UGC mandate Journals one among them should be from their dissertation.

7) **Teaching Skills:** Post graduate students must teach Under graduate students by taking Theory classes, Demonstrations, Bed side clinics, Tutorials, Lectures etc. Assessment is made using a checklist by faculty. Record of their participation be kept in Log book.

3. Research/Dissertation:

Every candidate pursuing MD Ayurveda degree course is required to carry out work on a selected research project under the guidance of a recognized post graduate teacher/ guide. The results of such a work shall be submitted in the form of a dissertation. The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions.

Every candidate shall submit to the Registrar (Academic) of the University in the prescribed Proforma, a synopsis containing particulars of proposed dissertation work within six months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel. 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 dissertation should be written under the following headings:

- i. Introduction
- ii. Aims or Objectives of study
- iii. Review of Literature- both Ayurveda and Modern science
- iv. Material and Methods
- v. Results
- vi. Discussion
- vii. Conclusion
- viii. Summary
- ix. References
- x. Tables
- xi. Annexures

The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexures. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the Institution.

Four copies of dissertation thus prepared shall be submitted to the Registrar (Evaluation), six months before final examination on or before the dates notified by the University.

The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the University examination

B) Psychomotor Objectives- Practical/clinical Skills/Essential Skills

The Department of Roga Nidana and Vikriti Vigyana deals with the factors which are essential to understand disease process as well as the diagnosis of disease. Apart from undertaking teaching, research etc. both at UG and PG levels, this Department is also involved in conducting various laboratory diagnostic investigations, pathological tests, ECG , invasive and non- invasive radiological techniques, and mainly in interpretation of all the diagnostic modalities for patient care. The investigations are conducted in well-equipped departmental Laboratory.

Ward Rounds: Ward rounds may be service or teaching rounds.

- a) Service Rounds: Postgraduate students should do service rounds twice a day for the care of the patients and should be available in emergencies. Newly admitted patients should be worked up by the PGs and inform to the seniors the following day.
- b) Teaching Rounds: Every unit should have at least weekly one 'grand rounds' for teaching purpose, where in all consultants/teachers, PG scholars will discuss regarding the cases.
- c) Rotation and posting in other departments:

The scholar successfully completes the PART I exams and enters into PART-II curriculum the scholars will be sent compulsory (Mandatory) and Optional postings (Inter-departmental). In the course of the posting the scholar is supposed to record all the cases in the Log Book relevant details and get signed from the respective authority.

Skills may be considered under the following headings

- a) History Taking and Clinical Examination
- b) Clinical case presentation.
- c) Performance of diagnostic procedures
- d) Interpretation of diagnostic procedures
- e) Skill for differential diagnosis .

- a) History Taking and Clinical Examination. –

The scholars should be thorough in documenting the patient's details (rogi pareeksha) and details of the disease(roga pareeksha) and writing daily reports about the patients care.

- b) Clinical case presentation

The scholar should be able to thoroughly study the case and should be able to present the case. Each individual scholar should present at least one case per week on rotation bases.

- c) Performance of diagnostic procedures

Diagnostic procedures forms an important part of the clinical training of the Ayurvedic Physician. In addition to the routine examination of the patient with proper recording of findings, meticulous practice of the following is recommended.

- Calibrate various steps involved in performing various laboratory Investigations.
- Practice interpretation of Avayavika Pariksha like -USG, X-ray, MRI, CT, ECG etc.

The scholar should be capable enough to perform lab investigation and diagnostic techniques when posted in the respective units.

- d) Interpretation of diagnostic procedures

The scholar should be capable enough to interpret lab investigations and diagnostic technique findings.

- e) To develop the Skill for differential diagnosis.

I. History Taking & Clinical Examination, Interpretation of Diagnostics, Differential diagnosis, Prognosis etc. (Roga pareeksha & Rogi pareeksha)

S. No	History Taking and Clinical Examination, interpretation of diagnostics and differential diagnosis, Prognosis (Roga pareeksha & Rogi pareeksha)	Part -I	Part-II	Minimum Number
1.	Respiratory system(Pranavaha srotus)	05	05	10
2.	Neurology system(Vatavahanaadi)	05	05	10
3.	Musculoskeletal system (Majjavahasrotus)	05	05	10
4.	Skin(Raktavahasrotus)	05	05	10
5.	Gastro-enterology(Anna-Pureeshavaha srotus)	05	05	10
6.	others	02	02	04

II. Ayurvedanusara Pareeksha krama

S.No	Ayurvedanusara Pareeksha krama	Part -I	Part-II	Minimum Number
1	Mootra pareeksha	1	1	2
2	Mala pareeksha	1	1	2
3	Shteevana pareeksha	1	1	2
4	Reto pareeksha	1	1	2

III. Performance and interpretation of diagnostic procedures

S. No	Biochemistry	Part -I	Part-II	Minimum Number
1	Lipid profile	1	1	2
2	Renal profile	1	1	2
3	Liver profile	1	1	2
4	Thyroid profile	1	1	2
5	Electrolytes	1	1	2
6	Others(Each)	1	1	2

IV. Performance and interpretation of diagnostic procedures

S.No	Microbiology & Serology	Part -I	Part-II	Minimum Number
1	Staining techniques	-	5	5
2	Culture & sensitivity	-	5	5
3	Tube method (widal, RA, CRP etc) Qualitative tests each 1	- (each parameter)	1 (each parameter)	1 (each parameter)
4	Card method (Pregnancy, Dengue etc)	1 (each parameter)	1 (each parameter)	1 (each parameter)
5	Quantitative (RA, CRP, ASL-O)	1 (each parameter)	1 (each parameter)	1 (each parameter)

V. Radiology

S.No	Radiology	Part -I	Part-II	Minimum Number
1	Invasive techniques	-	To involve, attend and interpret maximum number of exposures	NA
2	Non-invasive techniques	-	To involve, attend and interpret maximum number of exposures	NA

* NOTE

1. The tables reflected above are indicative of Procedures the Scholars of Roga-Nidan Evam Vikruti vigyana need to perform to acquaint the SOPs , which help in better interpretation of the investigatory modalities with respect to faults at levels of collection of samples, type of procedure, method of procedure, calibrations at different levels, normal ranges according to the kits, clinical correlations etc.
2. The scholars are expertised in reading (ECG, Radio films), interpreting(all available Diagnostics), justifying the investigatory modalities and clinical findings, and also co-relating the Roga& Rogi pareeksha ,rather than performing the procedures/techniques.

Skill or Competency Objectives- simulations

At the completion of each Phase the assessments will be conducted in the form of essay questions to assess the cognitive knowledge and practical examinations to assess psychomotor skills.

C) Affective Objectives-

- Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion and timely referral of the patient to the higher centre.
- Always adopt ethical principles and maintain proper etiquette in dealing with patients, attender/relatives and other health personnel, also to respect the rights of the patient including the right to information and second opinion.
- Develop communication skills to reveal the reports, obtain a proper relevant history and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and also skill for effective teaching.
- Obtain informed consent for any examination/procedure and explain to the patient and attendants the disease and its prognosis with a humble and kind approach.

provide appropriate care that is ethical, compassionate, responsive and cost effective and in conformation with statutory rules

Chapter 5- Implementation

Planning-

Essential Knowledge

Includes anatomy , physiology and pathology as found in current text books as well as classical Ayurvedic knowledge concerned to Roga Nidana Avum Vikruti Vigyana .These topics are recommended to be studied in Roga Nidana Avum Vikruti Vigyana as much as they are applicable to the Clinical practice. The stress is on patho-physiology, diagnostic and laboratory procedures for diagnosis and management of diseases in both Ayurveda and contemporary science.

Method of training

The training of postgraduate for degree shall be residency pattern with graded responsibilities in the examination, management and treatment of patients entrusted to his/her care. The participation of the students in all facets of educational process is essential. Every candidate should take part in seminars, group discussions, grand rounds, case demonstration, clinics, journal review meetings, CCP and clinical meetings. Every candidate should be required to participate in the teaching and training program of undergraduate students. Training should include involvement in laboratory and experimental work, and research studies. Basic medical sciences students should be posted to allied and relevant clinical departments or institutions.

5. Attendance, Progress and Conduct

1. A candidate pursuing degree course should work in the concerned department of the institution for the full period as a full time student. No candidate is permitted to run a clinic/laboratory/nursing home while studying postgraduate course.
2. Each year shall be taken as a unit for the purpose of calculating attendance.
3. Every student shall attend symposia, seminars, conferences, journal review meetings, grand rounds, Clinical case presentation, clinics and lectures during each year as prescribed by the department and not absent himself / herself from work without valid reasons.
4. Every candidate is required to attend a minimum of 75% of the training during each academic year of the post graduate course. Provided further, leave of any kind shall

not be counted as part of academic term without prejudice to minimum 75% attendance of training period every year.

5. Any student who fails to complete the course in the manner stated above shall not be permitted to appear for the University Examinations.

6. Monitoring Progress of Studies:

6.1 Work diary / Log Book - Every candidate shall maintain a work diary and record of his/her participation in the training programs conducted by the department such as journal reviews, seminars, etc. (please see Annexures for model checklists). Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate. The work diary shall be scrutinized and certified by the Head of the Department in the form of Half yearly assessment.

6.2 Periodic tests: In case of degree courses of three years duration (MD), the concerned departments may conduct five tests, two of them be annual tests, one at the end of first year and the other in the second year. The third, and fifth test may be held one months before the final examination. fourth test will be conducted when PG scholar has completes one year of IInd Phase of MD course. The tests may include written papers, practical's / clinical and viva voce. Records and marks obtained in such tests will be maintained by the Head of the Department and sent to the University, when called for.

6.3 Records: Records and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University.

7. Dissertation

7.1 Every candidate pursuing MD degree course is required to carry out work on a selected research project under the guidance of a recognized post graduate teacher. The results of such a work shall be submitted in the form of a dissertation.

7.2 The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and 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.

7.3 Every candidate shall submit to the Registrar (Academic) of the University in the prescribed preforma, a synopsis containing particulars of proposed dissertation work within eight months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.

7.4 Such synopses will be reviewed by Institutional research committee and will be processed to Institutional Ethical clearance committee (IEC) and Institutional Animal Ethical clearance committee (IAEC) for the approval, then the dissertation topic will be registered by the University.

7.5 The dissertation should be written under the following headings:

- i. Introduction
- ii. Aims or Objectives of study
- iii. Review of Literature
- iv. Material and Methods
- v. Results
- vi. Discussion
- vii. Conclusion
- viii. Summary
- ix. References
- x. Tables
- xi. Annexures

7.6 Typing instructions: Fonts type Times New Roman and font size of 12. The size of the titles should be 14 and Bold, the size of subtitles should be 12 and bold. Print should be letter quality or laser (not dot matrix) printing with dark black characters that are consistently clear and dense. Use the same type of print and print size throughout the document.

Pagination: All the pages of the thesis to be numbered including the principal text and also all the plates, tables, diagrams, maps, and so on. Roman numerals are used on the preliminary pages (pages up to the first page of text) and Arabic numerals are used on the text pages. The numbers should be placed on the bottom center of the page and they should be consistent.

Spacing: The text matter should be double spaced and single spaced for the long quotations, footnotes, and endnotes.

Margins: For binding purpose, the left-hand margin must be 1.5". Other margins should be 1.0". Diagrams; photographs, or facsimiles in any form should be of a standard page size, or if larger, folded so that a free left-hand margin of 1.5" remains and the folded sheet is not larger than the standard page.

Photographs: Professional quality colour photographs are allowed and should indicate the arrows for changes in the photograph.

7.7 Followings documents are to be submitted by the scholar, Dissertation hard copy

- a. One soft copy of dissertation as per the university instructions (without mentioning the name of the scholar, guide, co-guide) and one soft copy with all credentials are to be submitted to the university for evaluation and approval.
- b. One soft copy of original article drawn out of dissertation and other articles published/Accepted.
- c. Candidates should strictly adhere to the timelines in submitting the dissertations to the college office.
- d. Candidates are informed not to lock the documents with any passwords; it shall be in open access form.
- e. The soft copy should contain Thesis copy in chapter wise, word documents. Photographs shall be in JPEG format only.
- f. All annexure and images shall be labeled and kept in one separate folder. Along with Thesis, Copy of the Plagiarism report is to be submitted.
- g. As per the University notification, acknowledgement copy of online article submitted copy is to be attached.

7.8 The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the University *examination*.

7.9 **Guide:** The academic qualification and teaching experience required for recognition by this University as a guide for dissertation work is as per National Council for Indian system of medicine Minimum Qualifications for Teachers in Medical Institutions Regulations. Teachers in a medical college/institution having a total of five years teaching experience out of which at least five years teaching experience as Lecturer or Assistant Professor gained after obtaining post graduate degree shall be recognized as post graduate teachers.

A **Co-guide** may be included provided the work requires substantial contribution from a sister department of the institution.

7.10 **Change of guide:** In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the university.

7.11 Checklist for submission of Dissertation by the PG scholar

Name of the Scholar:

University Reg no:

Dept:

Particular	Remarks by the Guide (ensured that as per guidelines/ not ensured that as per guidelines)	Remarks by PG-coordinator (Submitted/ Not submitted as per instructions)
1. Evaluation Copy: folder is labeled with only Registration Number and not contained any Identity of the Candidate in all the certificates and only registration number is mentioned. Any certificates issued by the other Departments, the Identity of the Candidate is masked and scanned copy is attached.		
2. Office Copy folder is labeled with Name and Registration Number and Contained the Following : <i>Certificates of Undertaking I Copyright declaration, Declaration by-the candidate, Certificate of Guide, Co Guide, Endorsement by HOD & Head of the Institution</i>		
3. The documents are not locked with any passwords; they are in open access form and not enabled 'copy protect' in PDF files.		
4. One soft copy of original article drawn out of dissertation and other articles published/Accepted is submitted		
5. Adherence of the scholar to the timelines in submitting the dissertations to the college office.		
6. Contents are in PDF documents.		
7. Photographs are in JPGE format only.		
8. Copy of the Plagiarism report is attached		
9. Acknowledgement copy of online article submitted copy is attached.		
Remarks of HOD-		
Remarks of PG Coordinator:		

Step 6: Evaluation

6.1. Schedule of Examination

The examination for M.D courses shall be held at the end of Phase I and Phase II academic years.

6.2. Scheme of Examination

M.D. Degree

M.D Degree examinations in any subject shall consist of written paper (Theory), Practical/Clinical, Viva voce and evaluation of the dissertation,.

6.2.1 Dissertation: Every candidate shall carryout work and submit a dissertation as indicated in Sl.NO.9. Acceptance of dissertation shall be a precondition for the candidate to appear for the final examination.

6.2.2 Written Examination (Theory): A written examination shall consist of **four** question papers, each of **three** hours duration. Each paper shall carry 100 marks.

6.2.3 Practical / Clinical Examination:

In case of practical examination, it should be aimed at assessing competence and skills of techniques and procedures as well as testing students ability to make relevant and valid observations, interpretations and inference of laboratory or experimental work relating to his/her subject.

In case of clinical examination, it should aim at examining clinical skills and competence of candidates in accordance with OSCE for undertaking independent work as a specialist. Each candidate should examine at least one long case and **one** short case.

The total marks for practical / clinical examination shall be 200.

6.2.4 Viva Voce: Viva Voce Examination shall aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills. The total marks shall be 100 and the distribution of marks shall be as under:

- (i) For examination of all components of syllabus - 80 Marks
- (ii) For Pedagogy - 20 Marks

6.2.5 Examiners: There shall be at least four examiners in each subject. Out of them two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the National commission for Indian Medicine.

6.2.6 Criteria for declaring as pass in University Examination: A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical including clinical and viva voce examination.

A candidate securing less than 50% of marks as described above shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Registrar (Evaluation).

6.2.7 Declaration of distinction: A successful candidate passing the University examination in first attempt will be declared to have passed the examination with distinction, if the grand total aggregate mark is 75 percent and above. Distinction will not be awarded for candidates passing the examination in more than one attempt.

Annexures for evaluation

Section VI

LOG BOOK:

Every student must maintain Log Book in which every activities of teaching training evaluation programs recorded.

The log book is a record of the all the activities of the candidates during his training. Internal assessment is based on the evaluation of log book. Totally, logbooks are a tool for the evaluation of the training programme of Institution by external agencies. The record includes academic activities as well as the presentations and procedures, etc., carried out by candidate.

CONTENT OF THE LOG BOOK:

- 1 Subject Seminar Presented
- 2 Analysis Seminar Attended.
- 3 Analysis Seminar Presented.
- 4 Animal Module Seminar Attended
- 5 Animal Module Seminar Presented
- 6 Classical Text Review Seminar Attended.
- 7 Classical Text Review Seminar Presented.
- 8 Clinical Case Presentation Attended
- 9 Clinical Case presented .
- 10 Clinical Seminar Attended
- 11 Clinical Seminar presented
- 12 Synopsis/Dissertation Activities
- 13 Formulation Seminar Attended.
- 14 Formulation Seminar Presented.
- 15 General Seminar Attended
- 16 General Seminar Presented
- 17 Guest Lectures Attended
- 18 Instrument Seminar Attended.
- 19 Instrument Seminar Presented.
- 20 Interdepartmental seminars Attended
- 21 Investigation Seminar Attended.
- 22 Investigation Seminar Presented.
- 23 Journal Article Review Attended.
- 24 Journal Article Review Presented.
- 25 Practical/Clinics Attended
- 26 Research article Published
- 27 Seminar/workshop / conference. Attended.
- 28 Shloka Seminar Presented
- 29 Shlokas Seminar Attended.
- 30 Subject Seminar Attended.
- 31 Theory Class Attended
- 32 Under Graduate Practical Classes Conducted
- 33 Under Graduate Theory Classes Conducted

Section VII
MODEL CHECK LISTS

Assessment of student's activities helps to improve their performance. Each activity shall be assessed by at least two teachers and one student from first, second and third year. All the observations summarized and suggestions are made at the end of respective presentation.

1. SUBJECT SEMINAR

NAME OF THE PRESENTER:

TOPIC:

No.	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES of the Topic			
2	Understanding of the subject & content			
3	Organizing the matter in Logical sequences			
4	Use of specific cross references, examples to explain subject			
5	Incorporation of own Research Views			
6	Presentation skill (Body language, Language fluency, , change of pace etc.)			
7	Answering skill to the question			
8	A/V aid use			
9	Critical analysis of the subject			
10	Summarized the matter at the end			
	TOTAL			

Suggestions:

Date:

Sign & Name

2. SHLOKA SEMINAR

NAME OF THE PRESENTER:

Shloka:

Reference:

No.	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES of Topic			
2	Breakup of shloka			
3	Use of specific cross references, examples to explain subject			
4	Collection & explanation skill of the Matter			
5	Understanding of the subject			
6	Incorporation of own research views			
7	Presentation skill (body language, A/V aid use, change of pace, language fluency etc.)			
8	Organizing matter in logical sequence			
9	Answering skill to the question			
10	Summarizing the matter at the end			
	TOTAL			

Suggestions:

Date:

Sign & Name

3. SUBJECT SEMINAR

NAME OF THE PRESENTER:

TOPIC:

No.	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES of the Topic			
2	Understanding of the subject & content			
3	Organizing the matter in Logical sequences			
4	Use of specific cross references, examples to explain subject			
5	Incorporation of own Research Views			
6	Presentation skill (Body language, Language fluency, , change of pace etc.)			
7	Answering skill to the question			
8	A/V aid use			
9	Critical analysis of the subject			
10	Summarized the matter at the end			
	TOTAL			

Suggestions:

Date:

Sign & Name

4. SHLOKA SEMINAR

NAME OF THE PRESENTER:

Shloka:

Reference:

No.	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES of Topic			
2	Breakup of shloka			
3	Use of specific cross references, examples to explain subject			
4	Collection & explanation skill of the Matter			
5	Understanding of the subject			
6	Incorporation of own research views			
7	Presentation skill (body language, A/V aid use, change of pace, language fluency etc.)			
8	Organizing matter in logical sequence			
9	Answering skill to the question			
10	Summarizing the matter at the end			
	TOTAL			

Suggestions:

Date:

Sign & Name

5. ANALYSIS

NAME OF THE PRESENTER:

NAME OF THE TECHNIQUE:

NO	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES			
2	Narration of History, types of technique			
3	Description of the technique			
4	Narration of Method of use, unit & applied aspects			
5	Narration of its limitations, precautionary measures			
6	Collection of the Matter			
7	Organizing matter in logical sequence			
8	Presentation skill (body language, A/V aid use, change of pace, Language fluency etc.)			
9	Answering skill to the question			
10	Summarizing the matter at the end			
	TOTAL			

Suggestions:

Date-

Sign & name

6. FORMULATION

NAME OF THE PRESENTER:

Formulation:

Reference:

NO	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES of Topic			
2	Assessment of ingredients using cross references			
3	Assessment of Pharmacodynamics of ingredients			
4	Explanation of applied aspects			
5	Explanation of quality tests (Shastric/Lab)			
6	Explanation of related recent Research Works			
7	Incorporation of own research views			
8	Presentation skill (body language, A/V aid use, change of pace, language fluency etc.)			
9	Answering skill to the question			
10	Summarizing the matter at the end			
	TOTAL			

Suggestions:

Date-

Sign & Name

7. INSTRUMENT

NAME OF THE PRESENTER:

NAME OF THE INSTRUMENT:

	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES			
2	Narration of History, types of instruments			
3	Description of the Instrument			
4	Narration of Method of use, unit & applied aspects			
5	Narration of its limitations, precautionary measures			
6	Collection of the Matter			
7	Organizing matter in logical sequence			
8	Presentation skill (body language, A/V aid use, change of pace, Language fluency etc.)			
9	Answering skill to the question			
10	Summarizing the matter at the end			
	TOTAL			

Suggestions:

Date-

Sign & Name

8. INVESTIGATION

NAME OF THE PRESENTER:

TITLE:

	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES of topic			
2	Narration of History, types of investigation & instruments /equipment's used			
3	Narration of method of Investigation			
4	Narration of method of calibration & possible errors			
5	Narration of its application & Incorporation of own research views			
6	Presentation skill (body language, A/V aid use, change of pace Language fluency etc)			
7	Organizing matter in logical sequence			
8	Answering skill to the question			
9	Understanding of the subject			
10	Summarizing the matter at the end			
	TOTAL			

Suggestions:

Date-

Sign with name

9. CLASSICAL TEXT REVIEW

NAME OF THE PRESENTER:

CLASSICAL TEXT TITLE:

NO	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES			
2	About Author, commentators, publication,			
3	About content, volume, chapters,			
4	Uniqueness of the text			
5	Incorporation of own views			
6	Presentation skill (body language, A/V aid use, change of pace etc)			
7	Language fluency			
8	Organizing matter in logical sequence			
9	Answering skill to the question			
10	Summarizing the matter at the end			
	TOTAL			

Suggestions:

Date-

Sign & Name.

10. ARTICLE PUBLISHED IN JURNAL/PERIODICAL

NAME OF THE PRESENTER:

TITLE:

JURNAL/PERIODICAL:

NO	OBSERVATIONS	Good	Average	Poor
1	Article & Journal/Text selected			
2	Narration of the OBJECTIVES of Article			
3	Understanding of the subject			
4	Use of specific cross references, examples to explain subject			
5	Incorporation of own research views			
6	Presentation skill (body language, A/V aid use, change of pace etc.)			
7	Language fluency			
8	Organizing matter in logical sequence			
9	Answering skill to the question			
10	Summarizing the matter at the end			
	TOTAL			

Suggestions:

Date-

Sign & Name.

11. CLINICAL PRESENTATION

NAME OF THE PRESENTER:

NO	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES			
2	Completeness of the History			
3	Accuracy of general physical examination			
4	Incorporation of own research views			
5	Diagnosis-whether it follows logically from History & findings			
6	Organizing matter in logical sequence			
7	Investigation required, interpretation of investigations			
8	Ability to defend diagnosis & to justify differential diagnosis			
9	Justification of Line of treatment			
10	Presentation skill (body language, A/V aid use, change of pace, Language fluency etc)			
11	Answering skill to the question			
	TOTAL			

Suggestions:

Date-

Sign & Name.

12. UG TEACHING SKILLS

Date-

NAME OF THE TEACHER:

SUBJECT:

NO	SKILLS PRACTICED	YES	TO SOME EXTENT	NO
1	Raised interest in the beginning relating to topic by questing or by throwing new idea			
2	Specified the OBJECTIVES of presentation			
3	Teaching material organized in a logical sequence			
4	Used relevant content matter			
5	Changed pace of presentation			
6	Used specific examples to explain subject			
7	Used non-verbal clues, eye contact, etc,			
8	Used teaching aids effectively			
9	Allowed questions from students			
10	Asked questions to students			
11	Rewarded students answers/questions			
12	Summarized the matter at the end			

Suggestions:

Date-

Sign & Nam

LOG BOOK

Table 3:

Departmental Theory classes/Interdepartmental classes/OPDs/IPDs/All kinds of Seminars, workshops/ Hands on training/ Any others

Name:

Admission Year:

College:

Date	Name of the duty posted/ classes/Practical/Seminars/any other	Attended	Presented	Remarks



**ORDINANCE GOVERNING
POST GRADUATE COURSE IN
PRASUTI AVUM STRIROGA
2021-22**

Version - I



**KLE ACADEMY OF HIGHER EDUCATION & RESEARCH
(DEEMED-TO-BE-UNIVERSITY)**

**(Re-Accredited 'A+' Grade by NAAC (3rd Cycle) || Placed under Category 'A' by MHRD GoI
JNMC Campus, Nehru Nagar, Belagavi-590010, Karnataka, INDIA.
Phone:+91 0831-2444444, 2493779. Fax: +91 0831-249377
Email:info@kleuniversity.edu.in ; Website:www.kleuniversity.edu.in**

Preamble

Ayurveda is upaveda of Atharva Veda. It is the oldest system of medicine in the world. The word Ayurveda derived from two samskrit words, **AYUR** (life) and **VEDA** (science/knowledge) means the ‘science of life’. It has complimented its therapeutic benefits to many chronic and unhealed ailments, it is also suitable system of medicine for life style disorders and to meet the changes in pathological conditions due to modern life style.

It is revealed that there were three World famous Universities teaching *Ayurveda* – all located in ancient India, namely ‘Takshashila’, ‘Vikramshila’ and ‘Nalanda’. Students from all over the world studied in these universities and through them, the Principles of *Ayurveda* spread to other many countries. Other Systems of Medicine developed taking inspiration from *Ayurveda* that was learnt by foreign students from India and carried all over the World. *Ayurveda* therefore can be considered – in true sense – the ‘Mother of all Medical branches’.

During the period 2000-1000BC *Ayurveda* a unique system of medicine developed in India by the sages with use of their observations, natural resources and their experience. Under the **Guru Shishya Parampara** the regular teaching and training began with creation of Samhitas. Gradually it institutionalized at ancient University of ‘Takshashila’, ‘Vikramshila’ and ‘Nalanda’ during 7th century.

Recent years in India various courses were like *Ayurveda Vaidya Visharad* (AVV), *Ayurved Bhishak* (AB), etc., conducted by different establishments. To rejuvenate, regularize and to bring uniformity in teaching and training of *Ayurveda* in India, the ‘Central Council of Indian Medicine’ a regulatory body for *Ayurvedic Education* was established. Now Bachelor of *Ayurvedic Medicine and Surgery*, MD/MS in various discipline of *Ayurveda* started with the intention to encourage

integrated teaching and de- emphasis compartmentalization of disciplines so as to achieve horizontal and vertical integration in different phases and promote research which helps to support National Health Services.

Looking in to the health services provided to the public, understanding the need of Practitioners of Ayurvedic system of medicine, need of research in contest with application of treatment modalities to present generation, to establish new formulations/medicines, to answer the problems related to the present days lifestyle disorders as per the guidelines of apex body CCIM and suggestions provided by the faculty of various sections, stake holders and strategy of University, this Post Graduate studies in Ayurveda is framed.

Health care problem

Women are responsible for 70-80% of all the health care provided in India.

Female health care providers can play an important role in educating the society to recognize their health & nutritional needs

Reproductive Health concerns now a days are Endometriosis, Uterine fibroids, PCOD ,STDs ,Uterine & Breast cancers, safe motherhood (maternal & neonatal health), family planning and adolescent health. Approximately 10-15% of couples are impacted by Infertility. The pivotal role that the life style factors are playing in development of these conditions is of concern and every effort towards disease identification, prevention and appropriate management of the condition is the need of the hour.

Hence a trained and skilled Ayurveda scholar to potentially shoulder the health care needs of a woman is the absolute necessity. Hence a planned approach in educating them is the priority.

Ayurveda believes in the principle of “Swastasya Swasthya Rakshanum and Aturasya Vikar Shamanum”. Emphasis is given for treating diseases and also prevention of the diseases in Ayurveda.

Current approach

Currently challenging issues are menstrual disorders, various gynaecological disorders (yonivyapad) like endometriosis, dysmenorrhea, genital prolapse, genital infections, infertility, fibroids, malignancies , pregnancy pathologies like early pregnancy haemorrhage, various medical conditions developing during pregnancy like Anaemia, hypertension ,diabetes

etc. These conditions can be effectively managed and prevented through Ayurveda or Integrative approach

Hence a teaching methodology that produces a skilled Ayurveda postgraduate in Obstetrics & Gynaecology is the prerequisite

- **Ideal approach** – Integrated treatment is the need of the hour, the Ayurvedic post graduate should have thorough theoretical knowledge of both the Sciences (Ayurveda and Allopathy), understand the limitation, understand the concepts of Ayurveda in treating the patient and practice the speciality ethically and have a conscience in referring the patients to tertiary care as and when required. Research being the integral part of medical studies, conduction and involvement of research scholars in novel topics of Ayurveda gives a concrete stand as evidence-based approach to the students and boosts their confidence in practicing their own science.

Ashtanga Ayurveda together with fundamental concepts need to be understood in contemporary ways without disturbing traditional Ayurveda's rules and values. Incorporation of innovative teaching techniques like simulation based, problem based, self-directed learning , mock drill based learning in emergency conditions etc along with assessment of measurable outcomes in the curriculum development will enhance the quality of stakeholders. It also yields the practitioners of Ayurveda who can potentially contribute to the society and health care needs of women.

Target need Assessment

- **Choose targeted learners**
 - The Post graduates of Prasuti Evum Striroga Part-I and II).
- **Find out information about the targeted learners**

A post graduate of Ayurveda during his /her UG studies has basic orientation on principles of Prasuti & Striroga, mostly acts as an observer having minimum competency in diagnosing and intervening in various conditions. Student lacks in decision-making skills and referral of patient to tertiary care centre for comprehensive management.

The postgraduates of Ayurveda should be able to treat / perform the various ward /Minor to moderate risk procedures efficiently. Enhance leadership qualities, teamwork, communication skills and attitudes which makes the students competent enough to practice Prasuti Evum Striroga

■ **Determine characteristics of the learning environment**

The scholars are the main stake holders of the learning exercise, so the curriculum should be designed as student centric with flexibility, openness and access to resources. This could be achieved with proper planning in accordance with successive feedback from stake holders (PG scholars), teachers of concerned subject, alumni and external peers periodically and also updates from contemporary science.

Goal, Competencies and objectives

Goals

The goals of postgraduate training course in Prasuti evum Striroga are:

- Practice principles of Prasuti evum Striroga efficiently and effectively, backed by contemporary scientific knowledge and skill as the base.
- Demonstrating decision making skills for treatment and referral to deliver comprehensive management for the patient.
- Exercise empathy and maintain high ethical standards.

- Develop an attitude and communicative skills

Objectives: On the completion of the post-graduate curriculum, the following objectives shall be achieved under the following sub-headings

- Knowledge (Cognitive domain)
- Skills (Psycho motor domain)
- Human values, Ethical practice and Communication abilities

Knowledge:

A list of objectives related to knowledge and higher cognitive abilities that are expected to be achieved during the course is given.

At the end of the training, the candidate must be able to:

- Describe the Nidana-aetiology, Samprapti-pathophysiology, principles of diagnosis and management of common conditions including emergencies by both Ayurveda as well as from contemporary science.
- Describe indications and methods for fluid and electrolyte replacement therapy including blood transfusion.
- Describe common benign and malignancies of women in the country and their Ayurvedic management including prevention.
- Understanding of basic sciences relevant to Obstetrics & Gynaecology
- Identify social, economic, environmental and emotional determinants in a given case and take them into account for planning therapeutic measures.
- Recognize conditions that may be other than the area of his/ her specialty /competence and to refer them to the proper specialist.
- Advice regarding the operative or non-operative management of the case and to carry it out effectively.
- Self update by attending courses, conferences and seminars relevant to speciality

- Teach and guide his team, colleagues and other students.
- Thorough knowledge about laws and acts with their provisions like MTP , PNDT etc
- Acquire Basic knowledge about laparoscopic interventions , diagnostic & therapeutic
- Undertake audit, use information technology tools and carry out research both basic and clinical with the aim of publishing ones work and presenting the work at various scientific forum.

Skills

- Take a proper clinical history, examine the patient, perform essential diagnostic procedures and order relevant tests and interpret them in both in Ayurveda and Modern medicine to come to a reasonable diagnosis
- Perform labor independently and acquire skills of various modes of assistance viz, episiotomy, forceps application , ventose
- Perform operative procedures like LSCS , tubectomy ,D & C and cervical encirclage etc operations independently with help from a senior modern surgeon.
- Provide basic and advanced life saving support services (BLS & ALS) in emergency situations.
- Develop thorough skill to monitor labour and timely appropriate intervention
- Undertake complete patient monitoring including the preoperative and post-operative care.
- Develop the skills to perform independently Uttara vasti and other gynaecological procedures

Human values, Ethical practice and Communication abilities

- Adopt ethical principles in all aspects of practice. Professional honesty and integrity are to be fostered. Surgical care is to be delivered irrespective of the social status, caste, creed or religion of the patient.
- Develop communication skills, in particular the skill to explain various options available in management (Ayurveda & Modern medicine) and to obtain an informed consent from the patient.
- Provide leadership and get the best out of his team in a congenial working atmosphere.
- Apply high moral and ethical standards while carrying out human or animal research.
- Be humble and accept the limitations in knowledge and skill and to ask for help from colleagues when needed.
- Respect patient's rights and privileges including patient's right to information and right to seek a second opinion.

COMPONENTS OF THE PG CURRICULUM

The major components of the PG curriculum shall be:

- a. Theoretical knowledge
- b. Practical/Clinical Skills
- c. Training in Dissertation.
- d. Attitudes, including communication.
- e. Training in Research methodology.

a) Theoretical knowledge

Syllabus of Prasuti evum Striroga include the following:

All the candidates admitted for P.G.Degree (MS Ayurveda) are required to pursue the recommended duration of three academic years as full time candidates out of which:

- (i) Preliminary course for one year -MS Part 1 and
- (ii) Specialty course for two years -MS Part 2.

(i) Syllabus of Preliminary course for one year -MD/MS Part 1(Prasuti evum Stri roga)

Name of the Subject :Prasuti evum Stri roga - Samanya (Obstetrics & Gynaecology)			
Theory-100 Hours		Practical-200 Hours	
Theory- 100 Marks		Practical-100 Marks	
Part- A			
Marks-50 Hours:50			
Unit	Contents (Theory)	Hours	Teaching Methods
1.	Concept of Tridosha, Dhatu, Upadhatu, Agni, Pancha Mahabhuta in relation to Prasuti and Stri Roga.	05	Didactic/Interactive/AV
2.	Concept of Artava and Shukra	02	Didactic/Interactive/AV
3.	Concept of Rasa, Guna, Veerya, Vipaka and Karma of Dravya used in Prasuti and Stri Roga	05	Didactic/Interactive/AV
4.	Action and adverse drug reaction related to commonly used plants and Rasa Aushadhi in Prasuti and Stri Roga	05	Didactic/Interactive/AV
5.	Concept of Pathya- Apathya in relation to Prasuti and Stri Roga	05	Didactic/Interactive/AV
6.	Concept of Garbhadhana and Garbha	10	Didactic/Interactive/AV
7.	Concept of Vrana and Vrana dushti.	05	Didactic/Interactive/AV
8.	Concept of special therapies of Ayurved used in Prasuti and Stri Roga	08	Didactic/Interactive/AV Hands on
9.	Concept of Ashtavidha shastra karma , Yantra & Shastra used in Prasuti and Stri Roga	05	Didactic/Interactive/AV Hands on
PART -B			
1.	Applied anatomy and physiology of Genito-urinary	05	Didactic lecture/ AV

	system, abdomen, pelvis, pelvic floor, anterior abdominal wall, inguinal ligament, inguinal canal, vulva, rectum and anal canal.		Hands on practical anatomy
2.	Abnormal development, structure and function of female and male urogenital systems	03	Didactic/Interactive/AV
3.	Development, structure and function of placenta, umbilical cord and amniotic fluid.	02	Didactic/Interactive/AV
4.	Physiological and neuro-endocrinal changes during puberty, adolescence and menstruation	02	Didactic/Interactive/AV
5.	Introduction of hormones related with gynaecology and obstetrics. Ovulation, fertilization, climacteric and menopause. Biophysical and biochemical changes in uterus and cervix during pregnancy and labour	10	Didactic/Interactive/AV
6.	Pre-natal, Natal and Post natal counseling and examination	05	Didactic/Interactive/AV Demonstration
7.	Pharmacological study of drugs used in Gynaecology and Obstetrics	10	Didactic/Interactive/AV
8.	Knowledge of diagnostic techniques used in Gynaecology and Obstetrics.	05	Didactic/Interactive/AV Hands on
9.	Basic Knowledge of pathological and biochemical investigation used in gynaecology and obstetrics	02	Didactic/Interactive/AV
10.	Ethics, law and Acts Related to gynaecology and obstetrics – laws of abortion and adoption	02	Didactic/Interactive/AV
11.	Knowledge of contraception and sterilization procedure	02	Didactic/Interactive/AV
12.	Pre-operative and post operative care in gynaecology and obstetrics	02	Didactic/Interactive/AV

PRACTICAL

100 MARKS

Content:

1. Hospital duties in OPD, IPD, OT and Casualty.
2. History taking and counseling 25 cases
3. Labor cases – Observation / Performing -10 cases
4. Knowledge of instruments required in Gynaecology & Obstetric practices
5. Ayurvedic diagnostic and therapeutic procedures
6. Fluid therapy and blood transfusion.
7. Contraception and sterilizations.
8. Pre-operative, operative and postoperative procedure
9. Practical knowledge of Gynaecological procedures

DISTRIBUTION OF MARKS (PRACTICAL)

SL.NO.	CONTENT	MARKS
1.	Case records of patients in detail	10
2.	Bedside clinical case taking <ul style="list-style-type: none">• Long case• Short case	20 10
3.	Identification of instruments / Spotters / X-ray	15
4.	Demonstration of Procedure	15
5.	Viva voce	30
	Total	100

REFERENCE BOOKS

sl.no	Name of author / commentator	Title of book	Edition	Name of publisher
1	Chakrapani dutta commentator	Charaka Samhita by Agnivesha	1 st edition 2000	Chaukhambha orientalia
2	Arunadatta Hemadri tika	Ashtanga hridaya	1 st edition 2000	Chaukhambha sanskrit series (Varanasi)
3	Dalhana Author – Yadavji Trikamji	Sushruta Samhita	1 st edition 2019	Chaukhambha orientalia
4	Adhamalla dipika Kasirama`s gudhartha dipika	Sharangadhara samhita	6st edition 2005	Chaukhambha orientalia
5	Srisathyapala Bhisagacharya (vrddha jivaka)	Kashyapa samhita	9 th edition 2004	Chaukhambha Sanskrit samstan
6.	Prof P.V. Tewari	Ayurvediya Prasuti tantra evum Stree Roga	Single edition Reprint January 2016	Chaukhambha Publications
7.	Dr Nirmala .G.Joshi	Ayurvedic concepts in gynaecology	Single edition 2013	Chaukhamba Sanskrit pratishthan
8.	Dr Manjari Dwivedi	Abhinav prasooti tantra	Single edition Reprint 2008	Chaukhambha surbharati prakashan varanasi
9.	Prof Dr V.N.K Usha	Prasooti tantra	Single edition 2013	Chaukhamba Sanskrit pratishthan (delhi)
10.	Prof Dr V.N.K Usha	Streeroga - Vijnan	Single edition 2011	Chaukhamba Sanskrit pratishthan (delhi)
11.	T.W.Sadler	Langman`s medical embrology	13 th edition 2016	Patrick. w . tank phd
12	Narendra Malhotra Jaideep Malhotra Richa saxena Naharika Malhotra	Jeffcoate`s principles of gynaecology	9 th edition 2019	The health sciences publishers

13	Hiralal Konar (D.C.Dutta)	Textbook of gynecology	8 th edition 2020	Jaypee brothers medical publishers
14	Hiralal konar (D.C.Dutta)	Textbook of obstetrics	9 th edition 2018	Jaypee brothers medical publishers
15	F Gary Cunnigham	Williams obstetrics	25 th edition 2018	Mc graw hill educations
16	Steven .g.Gabbe	Obstetrics normal and problem pregnancies	1 st edition 2016	Elsevier
17	Ramveer sharma	Textbook of prasuti tantra (obstetrics)	1 st edition 2020	Chaukhambha orientalia
18	Dr Hemalata Kapoorchand	Streeroga	1 st edition 2019	Chaukhambha vishwa bharati
19	Dr Hemalata Kapoorchand	Prasuti tantra	1 st edition 2019	Chaukhambha vishwa bharati
20	Alok sharma	Third trimester of pregnancy and puerperium	1 st edition 2016	Jaypee (the health science publishers)
21	Mala Arora	Recurrent pregnancy loss	2 nd edition 2007	Jaypee brothers
22	Robert E Svoboda	Ayurveda for Women	2002	Motilal Banarasidas publishers
23	Webster sophia ne: azzawi farook al	CHILDBIRTH & OBSTETRIC TECHNIQUES	3 rd edition 2018	Jaypee brothers
24	Rechald L Sweet;Herald C Wiesenfeld	Pelvic Implimentary Disease	2 nd 2006	Springer
25	Jonathan S Berek	Berek & Novak's Gynecology	16 th edition	Wolters Kluwer India Pvt .Ltd
26	Victoria L Handa M D , Linda Van Le M D	Te Linde's Operative Gynaecology	12 th edition	Wolters Kluwer India Pvt .Ltd

(ii) Specialty course for two years -MD/MS Part 2.

MD/MS Part 2. (AYU) PRASUTI EVUM STRIROGA

- Theory Papers : 04
- Theory Marks : 400 Marks (100 each)
- Practical Marks : 200 Marks
- Duration : 02 Years
- Grand Total : 600 Marks

PAPER	NAME OF PAPER	MARKS	TEACHING HOURS
PAPER I	Garbhagarbhini Vigyan	100 Marks	100 Hours
PAPER II	Prasava Vigyan	100 Marks	100 Hours
PAPER III	Streeroga	100 Marks	100 Hours
PAPER IV	Shalya karma	100 Marks	100 Hours

Name of The Subject : PRASUTI TANTRA STREE ROGA

PAPER – I

Garbhagarbhini Vigyan

Theory- 100 Marks

Hours-100

Unit	Content (Theory)	Hour	Teaching Methods
1.	Applied anatomy of female Genito urinary system, Pelvis and Pelvic floor. Pelvic assesment and foetal skull	10 Hours	Didactic/Interactive/AV Demonstrations
2.	Physiology, neuro endocrinology and pathology of puberty and Neuroendocrine control of menstrual cycle. Artava, Rituchakra, Streebija, Pumbija	10 Hours	Didactic/Interactive/AV
3.	Garbha sambhava samaagri, Garbhadhanam, Pre-conceptional counseling and care, Pumsavana, Garbhasya shad dhatvatmakatva, Garbhavakranti, Matrijadi bhava, Garbha vriddhi, role of panchamahabhutas in the formation and development of foetus. Garbhasya avayavotpatti Fundamentals of reproduction – gametogenesis, Fertilization, Implantation and early development of human embryo.	08Hours	Didactic/Interactive/AV
4.	Apara, Garbhodaka, Jarayu, Nabhinadi. Placenta, amniotic fluid, membranes and umbilical cord -their formation, structure, functions and abnormalities. Garbha-poshana, Garbha sharer kriyavaishishtyam, Garbha lingotpatti, Garbha varnotpatti, Garbhasya masanumasika vriddhi. Foetal physiology, circulation, Foetal growth and development	10Hours	Didactic/Interactive/AV Hands on experience
5.	Bija, Bijabhaga, beeja bhaga avayava janya Garbhanga vikruti Genetics , Birth defects & other teratologic abnormalities	04 Hours	Didactic/Interactive/AV
6.	Garbhini nidana, sapekshanidana, Garbhakaalina matrigata parivartana, lakshana, Dauhrida.	08hours	

	<p>Diagnosis and differential diagnosis of pregnancy</p> <p>Anatomical and physiological changes during pregnancy</p> <p>Endocrinology related to pregnancy</p> <p>Immunology of pregnancy</p>		Didactic/Interactive/AV
7.	<p>Garbhini paricharya</p> <p>Masanumasika pathya apathya evum garbha-upaghatakara bhava.</p> <p>Antenatal care, examination investigations and management</p>	10 hours	Didactic/Interactive/AV Hands on
8.	<p>Garbhasankhya nirnaya,</p> <p>Bahu apatyata -Multiple pregnancy</p>	02 hours	Didactic/Interactive/AV
9.	<p>Garbhavyapad causes, clinical features, complications, management and treatment of Garbhasrava and Garbhapata , Upavishtaka, Nagodara / Upashushka, Lina garbha, Goodagarbha, Jarayu Dosha, Antarmrita garbha , Garbha shosha, Garbha kshaya, Bhutahrta garbha, Raktagulma.</p> <p>Abortions, I.U.G.R, Intrauterine Foetal death Ectopic pregnancy and gestational trophoblastic neoplasia.</p>	15 hours	Didactic/Interactive/AV Case discussion
10.	<p>Garbhini vyapad – nidana panchaka and chikitsa of garbhini vyapad.</p> <p>Early recognition, differential diagnosis and prompt management of pregnancy complications. Emesis and Hyperemesis gravidarium, Anaemia</p>	15 hours	Didactic/Interactive/AV Case discussion

	<p>Pregnancy Induced Hypertension, Pre-eclampsia, Eclampsia, Antepartum hemorrhage Rh- incompatibility Management of pregnancies complicated by medical, surgical or Gynecological disorders in consultation with the concerned specialties by team approach a. Pyrexia, Heart disease, Diabetes mellitus, Liver disorders, Respiratory diseases, Renal diseases, Epilepsy, Hypertensive disorders. b. Fibroids, Ovarian tumors, Genital prolapse, Carcinoma Cervix.</p> <p>Infections in pregnancy: Toxoplasmosis, Viral infections, Rubella, CMV, Hepatitis-B, Herpes, Syphilis and other Sexually Transmitted Infections including HIV, Prevention of mother to child transmission of HIV infection (PMTCT).</p>		
11.	Jataharini related to Garbhini avastha	01 hour	Didactic/Interactive/AV
12.	Evaluation of Foetal and maternal health in complicated pregnancies by making use of diagnostic modalities	01hour	Didactic/Interactive/AV
13.	<p>Prenatal diagnosis of fetal abnormalities and appropriate care. PNDT Act and its Implications</p>	01hour	Didactic/Interactive/AV
14.	<p>Vishesh adhyayan of – Ashtanghriday sharira - Adhyay -1st Garbhavkranti Sushrutasamhita sharira Adhyay-3rd Garbhavkranti Charak Samhita sharira - Adhyaya - 8th Jatisutriya</p>	05 hours	Didactic/Interactive/AV

Name Of The Subject : PRASUTI TANTRA STREE ROGA

PAPER – II		Prasava – Vigyan	
Theory- 100 Marks		Hours-100	
Unit	Contents (Theory)	Hours	Teaching Methods
1.	<p><u>Prakrit Prasava</u></p> <p>1. Prasava paribhasha, Prasav kaala, Prasava prarambha karana, Prasava kalina garbha sthiti, Avi, Sutikagara</p> <p>a) Initiation and onset of parturition.</p> <p>b) Examination and evaluation of patient in labour.</p> <p>c) Physiology of labour.</p> <p>d) Mechanism of labour.</p> <p>e) Selection of place of delivery and labour room.</p> <p>2. Prasava avastha evum paricharya</p> <p>a) Stages of normal labour</p> <p>b) Intrapartum maternal and foetal monitoring</p> <p>c) Management of normal labour</p>	30 Hours	<p>Didactic/ Interactive AV</p> <p>Hands on experience</p>
2.	<p><u>Prasava vyapad</u></p> <p>1. Etiopathogenesis, clinical features, prevention and management of Garbhasanga, vilambita prasav, Mudhagarbha and Aparasanga.</p> <p>a) Prolonged labour</p> <p>b) Cephalo pelvic disproportions</p> <p>c) Malpresentation</p> <p>d) Obstructed labour</p> <p>e) Methods of Induction and Augmentation of labour</p> <p>2. Complications of different stages of labour</p> <p>3. Obstetric management of high risk Pregnancies- Pre eclamptic toxemia, Eclampsia, Diabetes, cardiac disease, asthma, Epilepsy, antepartum haemorrhage, preterm premature</p>	25 Hours	<p>Didactic/ Interactive AV</p>

	rupture of membranes, , Preterm, Post term, Multiple pregnancy, IUGR & HIV -AIDS 4. Still birth- diagnosis, complications and management.		
3.	<u>Jatamatra/ Navajata shishu paricharya</u> a) Examination and management of neonate. b) Management of birth asphyxia. c) Detection of congenital malformation in newborn and timely referral for correction.	5 Hours	Didactic/ Interactive AV/demonstration
4.	<u>Sutika vigyana</u> 1. Sutika Paribhasha, kala maryada, paricharya. 2. Sutika vyadhi and their chikitsa. 3. Stana sampat, Stanya utpatti, Stanya sampat, Stanya pariksha, Stanya vriddhi, kshaya and dusti karana, lakshan and chikitsa, stana shotha, stana vidhradhi. 4. Suppression of lactation 5. Normal and abnormal puerperium.	15 Hours	Didactic/ Interactive AV/ demonstration
5.	Obstetric shock and management 1.Raktadhana: blood transfusion and replacement of blood constituents. 2.Management of fluid and electrolyte imbalance in obstetrics.	05 hours	Didactic/ Interactive AV/ demonstration
6.	Drugs used in obstetric practice, indications/contra indications, doses and side effects.	10 hours	Didactic/ Interactive AV
7.	<u>Vishesha Adhyayana of</u> Ashtanga Hridaya Sharira Sthana 2 nd Adhyaya Garbha Vyapad Sushruta samhita Nidana Sthana 8 th Adhyaya Mudhagarbha nidana Sushruta Samhita Chikitsa Sthana 15 th Adhyaya Mudhagarbha Chikitsa	10Hours	Didactic/ Interactive AV

Name Of The Subject : PRASUTI TANTRA STREE ROGA

PAPER – III		Stree Rog vgyan	
Theory- 100 Marks		Hours-100	
Unit	Contents (Theory)	Hours	Teaching Method
1.	<p>Disorders of menstruation and Female reproductive system.</p> <p>A. Congenital malformations of female genital tract</p> <p>B. Artav dushti, artava vriddi, artava kshaya, asrigdara, anartava, and kashtartav.</p> <p>C.Genital infections including sexually transmitted infections.</p> <p>D. Abnormal vaginal discharges.</p> <p>E. Arsha, Yonikanda, Gulma, Granthi, Arbuda.</p> <p>F.Abnormal uterine bleeding, Endometriosis, fibroid uterus, Adenomyosis, Polycystic ovarian syndrome and neoplasia of female genital organs.</p> <p>G. Endocrinological disorders affecting female reproductive system.</p> <p>H. Somarog.</p>	20 hours	Didactic/ Interactive AV Case discussions
2.	Detailed study of yoni vyapad mentioned by different Acharyas with their commentaries and all possible correlations with modern gynecological diseases	20 Hours	Didactic/ Interactive AV Case discussions
3.	<p>Vandhyatva</p> <p>A. Hetu, Bheda, Pariksha, and Chikitsa.</p> <p>B. Detailed study of causative factors, Investigations with recent advances in management of infertility</p> <p>Adoption law</p>	10Hours	Didactic/ Interactive AV

4.	Stanaroga Detailed study of Stanashotha, Stanakilaka and stanavidradhi, stana granthi, stanarbuda. Examination of breast, diagnosis and differential diagnosis of breast lump.	05 Hours	Didactic/ Interactive AV/demonstration
5.	Measures of contraception A. Ayurvedic view of Garbha nirodha and Garbhapatkara yogas. B. Temporary contraception C. Recent studies in the field of contraception. D. National Health programme to improve maternal and Child health, social obstetrics and vital statistics (maternal and perinatal mortality).	05Hours	Didactic/ Interactive AV demonstrations
6.	Sthanik Chikitsa Detailed study of Pichu, Varti, Dhupan, Dhavana, Parisheka, lepa, Kalkadharana, Uttarabasti, agnikarma and kshara karma.	10 hours	Didactic/ Interactive AV demonstrations
7.	Rajo Nirvritti - Climacteric and menopause. Geriatric health care	2Hours	Didactic/ Interactive /AV
8.	Study of modern diagnostic techniques and Investigations.	5 Hours	Didactic/ Interactive /AV
9.	Important drugs used in Stree roga	10 Hours	Didactic/ Interactive /AV
10.	Panchakarma in Streeroga	03 Hours	Didactic/ Interactive/AV
11.	Vishesha Adhyayana of Charaka Samhita Chikitsa Sthana -30 th Adhyaya - Yonivyapad Chikitsa Sushruta Samhita Uttara Tantra - 38th Adhyaya – Yonivyapad Pratishedha Kashyapa Samhita Kalpa Sthana- Shatapushpa Shatavari, Lashuna kalpa Adhyaya	10 Hours	Didactic/ Interactive

Name of the Subject : PRASUTI TANTRA STREE ROGA

PAPER – IV		Prasuti Streerog Shalya Karma	
Theory- 100 Marks		100 hours	
Unit	Contents (Theory)	Hours	Teaching Methods
	General principles of Gynaecological & Obstetric surgeries Analgesia & Anaesthesia in Obstetrics & Gynaec operative procedures	05 hours	Didactic/ Interactive /AV
1.	Operative Obstetrics Decision making, techniques, diagnosis and management of surgical complications.	05 Hours	Didactic/ Interactive /AV
2.	Dilatation and evacuation, Hysterotomy, Provision of safe abortion services -selection of cases, technique and management of complications, septic abortion, criminal abortion, MTP Act	10 Hours	Didactic/ Interactive /AV Demonstartion
3.	Cervical Encirclage. Instrumental delivery (Forceps, vacuum extraction) Caesarean Section Manual removal of Placenta Caesarean Hysterectomy	20 Hours	Didactic/ Interactive/AV
Unit	Operative Gynecology	Hours	Teaching Methods
Selection of cases, technique and management of complications of minor and major gynecological procedures.			
1.	Dilatation and Curretage, Cervical cauterization	05 Hours	Didactic/Interactive /AV
2.	Polypectomy Myomectomy Cystectomy Oophorectomy	10 Hours	Didactic/ Interactive /AV
3.	Surgical sterilization procedures Hysterectomy.	10 hours	Didactic / Interactive /Hands on experience

4.	Surgical procedures for genital prolapse. Surgical management of benign genital neoplasm	05 hours	Didactic/ Interactive /AV
5.	Recent advances in Gynaecology and obstetrics – Diagnostic and therapeutics	10 Hours	Didactic/ Interactive /AV
6.	Shock and its management Blood Transfusion Fluid and electrolyte imbalance Fluid therapy	10 Hours	Didactic/ Interactive /AV
7.	Record keeping, ethical and legal issues involved in obstetrics and gynaecology. Medico-legal aspects – ethics, communication and counselling in obstetrics and Gynecology	05 Hours	Didactic/ Interactive /AV
8.	Intensive care in Obstetrics and Gynecology.	05hours	Didactic/ Interactive /AV

PRACTICAL:

Content:

1. Practical training to conduct
 - Normal and complicated deliveries
 - Assisted / Instrumental deliveries
 - Caesarean section
 - Neonatal resuscitation
2. Practical knowledge of Garbhini paricharya , sutika paricharya and masanumasika garbha vriddhi
3. Practical training to perform Obstetrical and Gynaecological surgery
4. Practical training to provide family welfare / planning services, safe abortion methods along with surgical sterilization
5. Practical knowledge and practice of all relevant equipment , procedures , complications ,emergencies with their management
6. Practical knowledge of yogasanas and Pranayama useful in Stree roga and Prasuti tantra
7. Practical knowledge of Panchakarma and Sthanika chikitsa used in Stree Roga and Prasuti tantra
8. Practical knowledge of recent advances in Gynaecology and Obstetrics
9. Training of Obstetric & Gynaecologic casualties

P.G. Scholars shall develop the skills by observing, assisting and performing independently all procedures including minor and major surgeries related to Obstetrics & Gynaecology

PATTERN OF PRACTICAL EXAMINATION**200 MARKS**

Sl. No	Practical	Marks	Total Marks
1	Long case/ Long Practical as the case may be	40 marks	200 marks
2	Short case/ Short Practical as the case may be	20 marks	
3	Medical Procedure/ Lab Analysis	30 marks	
4	Identification of Specimen/ Model and Instruments	30 marks	
5	Dissertation presentation	20 marks	
6	Micro teaching	20marks	
7	Viva- voce	40 marks	
	TOTAL		200 marks

REFERENCE BOOKS

Sl.no	Name of author / commentator	Title of book	Edition	Name of publisher
1	Chakrapani dutta commentator	Charaka Samhita by Agnivesha	1 st edition 2000	Chaukhambha orientalia
2	Arunadatta Hemadri tika	Ashtanga hridaya	1 st edition 2000	Chaukhambha sanskrit series (Varanasi)
3	Dalhana Author – Yadavji Trikamji	Sushruta Samhita	1 st edition 2019	Chaukhambha orientalia
4	Adhamalla dipika Kasirama`s gudhartha dipika	Sharangadhara samhita	6st edition 2005	Chaukhambha orientalia
5	Srisathyapala Bhisagacharya (vrddha jivaka)	Kashyapa samhita	9nt edition 2004	Chaukhambha Sanskrit samstan
6	Prof P.V. Tewari	Ayurvediya Prasuti tantra evumStreRoga	Single edition	Chaukhambha
7	Dr Nirmala .G.Joshi	Ayurvedic	No edition	Chaukhamba

		concepts in gynaecology	2013	Sanskrit pratishthan
8	Dr Manjari dwivedi	Abhinav Prasooti tantra	No edition 2008	Chaukhambha surbharati prakashan varanasi
9	Prof Dr V.N.K Usha	Prasooti tantra	No edition 2013	Chaukhamba Sanskrit pratishthan (delhi)
10	Prof Dr V.N.K Usha	Streeroga - vijnan	No edition 2011	Chaukhamba Sanskrit pratishthan (delhi)
11	Prof Pooja Bharadwaj	Ayurvedic Streeroga vijyana	1 st edition 2019	Chaukhambha publications
12	T.W.Sadler	Langman`s medical embrology	13 th edition 2016	Patricks. w . tank phd
13	Narendra Malhotra Jaideep Malhotra Richa saxena Naharika Malhotra	Jeffcoate`s principles of gynaecology	9 th edition 2019	The health sciences publishers
14	Hiralol konar (D.C.Dutta)	Textbook of gynecology	8 th edition 2020	Jaypee brothers medical publishers
15	Hiralal konar (D.C.Dutta)	Textbook of obstretics	9 th edition 2018	Jaypee brothers medical publishers
16	F Gary Cunnigham	Williams obstretics	25 th edition 2018	Mc graw hill educations
17	Steven .g.Gabbe	Obstretics normal and problem pregnancies	1 st edition 2016	elsevier
18	Ramveer sharma	Textbook of prasuti tantra (obsetretics)	1 st edition 2020	Chaukhambha orientalia
19	Ashwini gandhi	Contraception past , present and future	2 nd edition 2016	Health science publishers

20	Dr Hemalata Kapoorchand	streeroga	No edition 2019	Chaukhambha vishwa bharati
21	Dr Hemalata Kapoorchand	Prasuti tantra	No edition 2019	Chaukhambha vishwa bharati
22	Alok sharma	Third trimester of pregnancy and puerperium	1 st edition 2016	Jaypee (the health science publishers)
23	Mala Arora	Recument pregnancy loss	2 nd edition 2007	Jaypee brothers
24	David Gardner	Textbook of assisted reproductive techniques	5 th edition 2018	CRC press
25	Baskett Thomas F:Others	Munro Kerr's Operative Obstetrics	2014	Elsevier INDIA
26	Marcus E Setchell	Shaws Text book of Operative Gynaecology	7 th edition 2011	Elsevier INDIA
27	Liselotte Mettler	Manual of New Hysterectomy Techniques	1 st edition 2007	Jaypee brothers
28	Kenneth J Leveno	Williams Manual of Obstetrics Pregnancy Complications	23 rd edition 2012	McGraw Hill/Medical
29	Posner gd;others	Oxorn-foote Human labor & birth	6 th edition 2013	McGraw Hill Education/Medical
30	Victoria L Handa	Te Lindes Operative gynecolgy	12 th edition 2019	Wolters kluwer
31	Leon Speroff;Others	Clinical	6 th edition	Jaypee publisher

		Gynecologic Endocrinology and Infertility	1999	
32	Victoria L Handa M D , Linda Van Le M D	Te Linde's Operative Gynaecology	12 th edition	Wolters Kluwer India Pvt .Ltd
33	Berek & Novak	Text book of Gynaecology	4 th edition	Wolters Kluwer India Pvt .Ltd
34	Cunningham Leveno Bloom Spong Dashe Hoffman Casey Sheffield	Williams Obstetrics	24 th edition	Mcgraw Hill Medical
35	Narendra Malhotra Jaideep Malhotra Richa saxena Neharika Malhotra Bora	Jaffcoat's Principles of Gynaecology	9 th edition	Jaypee Brothers Medical Publishers

Educational strategies

Contents

- A) Cognitive Objectives : Theoretical knowledge (Lecture)
- B) Psychomotor Objectives- Practical/clinical Skills/Competency
- C) Affective Objectives- Reflection, role models

A) Cognitive Objectives : Theoretical knowledge (Lecture, SDL)

Teaching and Learning Activities

A candidate pursuing the course should work in the institution as a fulltime student. No candidate should be permitted to run a clinic/laboratory/nursing home while studying postgraduate course. 80% of attendance is must for 1st year and final year for calculating attendance.

Every student shall attend teaching and learning activities during each year as prescribed by the department and not absent himself / her from work without valid reasons.

A list of teaching and learning activities is designed to facilitate students to acquire essential knowledge and skills outlined are given below:

- 1) **Lectures:** Lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated.
 - 1) Bio-statistics
 - 2) Research Methods
 - 3) Medical code of Conduct and Medical Ethics
 - 4) GCP and GLP
 - 5) Communication Skills etc.
 - 6) Personality development

These contents will be preferably taken up in the first few weeks of the 1st year(PART-I). The remaining two years (PART-II) the scholars should attend following activities.

- 2) **Integrated Lectures:** These are recommended to be taken by multidisciplinary departments for selected topics, eg. Kamala (Jaundice),Madhumeha (Diabetes mellitus), Thyroid etc.
- 3) **Journal Club:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the e-Log Book,the relevant details.

- 4) **Subject Seminars:** Further, every candidate must make a presentation from the allotted respective topics(both Ayurveda & Modern) , Investigation seminar, selected articles and Clinical case presentations at least four every week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book, the relevant details. The presentations would be evaluated using check lists, containing names of the student and the evaluator etc.
- 5) **Student Symposium:** The scholar must attend minimum 2 National seminars and 2 State level seminars and Recommended to present at least two seminars.
- 6) **Publications:** the scholars must publish at least 2 articles in UGC mandate Journals or Pubmed/Indexed journals, one among them should be from their dissertation.
- 7) **Teaching Skills:** Post graduate students must teach under graduate students (Eg. medical, nursing) by taking demonstrations, bed side clinics, tutorials, lectures etc. Assessment is made using a checklist by ObGyn faculty as well students). Record of their participation be kept in Log book.

3. Research / Dissertation:

Every candidate pursuing MS Ayurveda degree course is required to carry out work on a selected research project under the guidance of a recognized post graduate teacher. The results of such a work shall be submitted in the form of a dissertation. The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions.

Every candidate shall submit to the Registrar (Academic) of the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within six months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel. 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 dissertation should be written under the following headings:

- i. Introduction
- ii. Aims or Objectives of study
- iii. Review of Literature- both Ayurveda and Modern science
- iv. Material and Methods

- v. Results
- vi. Discussion
- vii. Conclusion
- viii. Summary
- ix. References
- x. Tables
- xi. Annexures

The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexures. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the Institution.

Four copies of dissertation thus prepared shall be submitted to the Registrar (Evaluation), six months before final examination on or before the dates notified by the University.

The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the University examination

B) Psychomotor Objectives- Practical/clinical Skills/Essential Surgical Skills

Prasuti evum Striroga speciality is a skill and experience based discipline in Ayurveda which after necessary training is able to provide proper care in Obstetrics & Gynaecology. One can obtain such skill & training by posting PG scholars to deferrent units of the hospital (OPD,IPD,OT Causality and postings and also there is provisioin to post modern hospital for minimum period of 4 months when the scholars come to second phase (it could be optional) by then they have knowledge to assess the patient and to understand the limitation in managing the patients. The whole skill-based training for 3-year curriculum is specified as year wise distribution of the learning skills.

Ward Rounds: Ward rounds may be service or teaching rounds.

- a) Service Rounds: Postgraduate students and Interns should do service rounds twice a day for the care of the patients. Newly admitted patients should be worked up by the PGs and inform to the seniors the following day.

b) Teaching Rounds: Every unit should have at least weekly one 'Grand rounds' for teaching purpose wherein all consultants/teachers, PG scholars along with interns interact and discuss about patient care.

c) Rotation and posting in other departments:

The scholar successfully completes the PART I exams and enters into PART-II curriculum the scholars will be sent compulsory (Mandatory) and Optional postings (Interdepartmental). The Prasuti Evum Striroga PG will be sent to Modern hospital (Any tertiary care hospital) for the Period of least of 4 months and maximum for the period of 5 months in order to have modern surgical skills. In the course of the posting the scholar is supposed to record all the cases in the Log Book relevant details and get signed from the modern consultant.

Skills may be considered under the following headings

- a) Ward procedures
- b) To conduct normal labor , LSCS , Tubectomy
- c) Preoperative workup procedures
- d) Postoperative procedures
- e) Minor procedures – D & C Therapeutic & Diagnostic
- f) Gynaecological procedures
- g) Sthanika chikitsa including Uttara vasti

a) Ward procedures

Ward work forms an important part of the clinical training of the Ayurvedic postgraduate. In addition to the routine examination of the patient with proper recording of findings, diligent practice of the following is recommended.

The procedures listed within the tables, indicates the surgical procedures that the scholars should, by the end of the course, be able to perform independently (PI) by himself/herself or should perform under guidance (UG) of senior postgraduate during the course. The other categories of surgical procedures mentioned form a general guide for the procedures that the student should either have observed (O) or have assisted the operating surgeon (A). Note, for all categories, the student washes up in the operating room. The total number of procedures of each category should be accomplished in the 3 years and noted in the log book.

a)Ward procedures

S.No	Procedure	Part -I	Part-II	Minimum Number
1.	Insertion of I.V. lines	PI (under guidance of PG II)	Guide (I st Year)	25
2.	Wound dressing	PI (under guidance of PG II)	Guide (I st Year)	25
3.	Catheterization	PI (under guidance of PG II)	Guide (I st Year)	25
4.	Blood sampling & cross matching	PI (under guidance of PG II)	Guide (I st Year)	25
5.	Per vaginal examination	PI (under guidance of PG II)	Guide (I st Year)	25
6.	Fetal monitoring / N S T operation	PI (under guidance of PG II)	Guide (I st Year)	25
1.	Ability to teach UG's and Interns	-	PI	Minimum 10
2.	Ordering of the requisite laboratory and U S G and Interpretation of the reports in light of the clinical picture	PI (under guidance of PG II)	Guide (I st Year)	NA
3.	Communication skills with patients, relatives, colleagues and paramedical staff	PI (under guidance of PG II)	Guide (I st Year)	NA

b. Major Operating room techniques

S.No	Procedure	Part-I	Part-II	Minimum Number
1.	Instrument arrangement and trolley layout	O	PI	NA
2.	Skills in Sterilization techniques, O.T.Layout and Asepsis	PI (under guidance of PG II)	Guide (I st Year)	NA
3.	Skin preparation – painting and draping	PI (under guidance of PG II)	Guide (I st Year)	NA

4.	Techniques of scrubbing ,donning	PI (under guidance of PG II)	Guide (I st Year)	NA
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c. Emergency room procedures

S.No	Procedure	Part-I	Part-II
1.	Securing Venous Lines	O	PI
2.	Assessment and initial management of Emergency obstetric conditions	PI (under guidance of PG II)	-
3.	Cardiopulmonary Resuscitation	O	PI
4.	Management of Airway Obstruction	PI (under guidance of PG II)	PI
5.	Preliminary Management of Shock and Cardiac / Respiratory failure	O	PI
6.	Recognition, Initial management of Surgical Emergencies and Assessment for referrals	O	PI
7.	Suturing Techniques	O	PI

d)Minor O.T. procedures

S.No	Procedure	I st Year	II nd Year	Minimum Number
1.	D & C	O	PI	05
2.	Cervical encirclage	O	PI	05
3.	Uttara vasti	PI (under guidance of PG II)	O&G	10
4.	Copper –T insertion	O	PI	05

e) General Surgical Operative Procedures- Done Under the guidance of Teacher/Modern Surgeon

S.No	Procedure	Part-I	Part-II	Minimum Number
1.	Opening and closing the abdomen	O	PI	10
2.	LSCS	O	PI	05

3.	Tubectomy	O	PI	03
4.	Hysterectomy -Abdominal	O	PI	01
5.	Hysterectomy - Vaginal	O	PI	01

Skill or Competency Objectives- simulations

At the completion of each Phase the assessments will be conducted in the form of essay questions to assess the cognitive knowledge and practical examinations to assess psychomotor skills.

C) Affective Objectives-

- Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
- Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
- Develop communication skills to word reports, obtain a proper relevant history and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.
- Obtain informed consent for any examination/procedure and explain to the patient and attendants the disease and its prognosis with a humane approach.
- Provide appropriate care that is ethical, compassionate, responsive and cost effective and in conformation with statutory rules

Implementation

Planning-

Essential Knowledge

Include anatomy, physiology, endocrinology and pathology as found in current text books as well as classical Ayurvedic knowledge concerned to Prasuti Evum Striroga. These standard topics are recommended to be studies in as much as they are applicable to the practice of ObGyn.

Method of training

The training of postgraduate for degree shall be residency pattern with graded responsibilities in the management and treatment of patients entrusted to his/her care. The participation of the students in all facets of educational process is essential. Every candidate should take part in seminars, group discussions, grand rounds, case demonstration, clinics, journal review meetings, CCP and clinical meetings. Every candidate should participate in the teaching and training program of undergraduate students. Training should include involvement in laboratory and experimental work and research studies

5. Attendance, Progress and Conduct

1. A candidate pursuing degree course should work in the concerned department of the institution for the full period as a full time student. No candidate is permitted to run a clinic/laboratory/nursing home while studying postgraduate course.
2. Each year shall be taken as a unit for the purpose of calculating attendance.
3. Every student shall attend symposia, seminars, conferences, journal review meetings, grand rounds, Clinical case presentation, clinics and lectures during each year as prescribed by the department and not absent himself / herself from work without valid reasons.
4. Every candidate is required to attend a minimum of 80% of the training during each academic year of the post graduate course. Provided further, leave of any kind shall not be counted as part of academic term without prejudice to minimum 80% attendance of training period every year.
5. Any student who fails to complete the course in the manner stated above shall not be permitted to appear for the University Examinations.

Monitoring Progress of Studies:

Work diary / Log Book - Every candidate shall maintain a work diary and record of his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. (please see Annexures for model checklists). Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate. The work diary shall be scrutinized and certified by the Head of the Department in the form of Half yearly assessment.

Periodic tests: In case of degree courses of three years duration (MS), the concerned departments may conduct five tests, two of them be annual tests, one at the end of first year and the other in the second year. The third, and fifth test may be held one months before the

final examination. fourth test will be conducted when PG scholar has completes one year of IInd Phase of MS course. The tests may include written papers, practicals / clinicals and viva voce. Records and marks obtained in such tests will be maintained by the Head of the Department and sent to the University, when called for.

Records: Records and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University.

Dissertation

Every candidate pursuing MS degree course is required to carry out work on a selected research project under the guidance of a recognized post graduate teacher. The results of such a work shall be submitted in the form of a dissertation.

The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions.

Every candidate shall submit to the Registrar (Academic) of the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within eight months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.

Such synopses will be reviewed by Institutional research committee and will be processed to Institutional Ethical clearance committee(IEC) and Institutional Animal Ethical clearance committee(IAEC) for the approval, then the dissertation topic will be registered by the University.

The dissertation should be written under the following headings:

- i. Introduction
- ii. Aims or Objectives of study
- iii. Review of Literature
- iv. Material and Methods
- v. Results
- vi. Discussion
- vii. Conclusion
- viii. Summary
- ix. References
- x. Tables
- xi. Annexures

Typing instructions: Fonts type Times New Roman and font size of 12. The size of the titles should be 14 and Bold, the size of subtitles should be 12 and bold. Print should be letter quality or laser (not dot matrix) printing with dark black characters that are consistently clear and dense. Use the same type of print and print size throughout the document.

Pagination: All the pages of the thesis to be numbered including the principal text and also all the plates, tables, diagrams, maps, and so on. Roman numerals are used on the preliminary pages (pages up to the first page of text) and Arabic numerals are used on the text pages. The numbers should be placed on the bottom center of the page and they should be consistent.

Spacing: The text matter should be double spaced and single spaced for the long quotations, footnotes, and endnotes.

Margins: For binding purpose, the left-hand margin must be 1.5". Other margins should be 1.0". Diagrams; photographs, or facsimiles in any form should be of a standard page size, or if larger, folded so that a free left-hand margin of 1.5" remains and the folded sheet is not larger than the standard page.

Photographs: Professional quality color photographs are allowed and should indicate the arrows for changes in the photograph.

7.7 Followings documents are to be submitted by the scholar, Dissertation hard copy

- a. One soft copy of dissertation as per the university instructions (without mentioning the name of the scholar, guide, co-guide) and one soft copy with all credentials are to be submitted to the university for evaluation and approval.
- b. One soft copy of original article drawn out of dissertation and other articles published/Accepted.
- c. Candidates should strictly adhere to the timelines in submitting the dissertations to the college office.
- d. Candidates are informed not to lock the documents with any passwords; it shall be in open access form.
- e. The soft copy should contain Thesis copy in chapter wise, word documents. Photographs shall be in JPEG format only.
- f. All annexure and images shall be labeled and kept in one separate folder. Along with Thesis, Copy of the Plagiarism report is to be submitted.
- g. As per the University notification, acknowledgement copy of online article submitted copy is to be attached.

The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the University examination.

Guide: The academic qualification and teaching experience required for recognition by this University as a guide for dissertation work is as per National Council for Indian system of medicine Minimum Qualifications for Teachers in Medical Institutions Regulations. Teachers in a medical college/institution having a total of five years teaching experience out of which at least five years teaching experience as Lecturer or Assistant Professor gained after obtaining post graduate degree shall be recognized as post graduate teachers.

A **Co-guide** may be included provided the work requires substantial contribution from a sister department of the institution.

Change of guide: In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the university.

Checklist for submission of Dissertation by the PG scholar

Name of the Scholar:

University Reg no:

Dept:

Particular	Remarks by the Guide (ensured that as per guidelines/not ensuredthat as per guidelines)	Remarks by PG-coordinator(Submitt ed/ Not submitted as per instructions
<p>1. Evaluation Copy: folder is labeled with only Registration Number and not contained any Identity of the Candidate in all the certificates and only registration number is mentioned. Any certificates issued by the other Departments, the Identity of the Candidate is masked and scanned copy is attached.</p>		
<p>2. Office Copy folder is labeled with Name and Registration Number and Contained the Following : <i>Certificate.s of Undertaking I Copyright declaration, Declaration by-the candidate, Certificate of Guide, Co Guide, Endorsement by HOD & Head of the Institution</i></p>		

3. The documents are not locked with any passwords; they are in open access form and not enabled 'copy protect' in PDF files.		
4. One soft copy of original article drawn out of dissertation and other articles published/Accepted is Submitted		
5. Adherence of the scholar to the timelines in submitting the dissertations to the college office.		
6. Contents are in PDF documents.		
7. Photographs are in JPGE format only.		
8. Copy of the Plagiarism report is attached		
9. Acknowledgement copy of online article submitted copy is attached.		
Remarks of HOD-		
Remarks of PG Coordinator:		

Step 6:Evaluation

6.1. Schedule of Examination

The examination for M.S courses shall be held at the end of Phase I and Phase II academic years.

6.2. Scheme of Examination

M.S. Degree

M.S. Degree examinations in any subject shall consist of written paper (Theory), Practical/Clinical , Viva voce and evaluation of the dissertation,.

6.2.1 Dissertation: Every candidate shall carryout work and submit a dissertation as indicated in Sl.NO.9. Acceptance of dissertation shall be a precondition for the candidate to appear for the final examination.

6.2.2 Written Examination (Theory): A written examination shall consist of **four** question papers, each of **three** hours duration. Each paper shall carry 100 marks.

6.2.3 Practical / Clinical Examination:

In case of practical examination, it should be aimed at assessing competence and skills of techniques and procedures as well as testing students ability to make relevant and valid observations, interpretations and inference of laboratory or experimental work relating to his/her subject.

In case of clinical examination, it should aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate should examine at least one long case and **one** short cases.

The total marks for practical / clinical examination shall be 200.

*6.2.4 Viva Voce:*Viva Voce Examination shall aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills

Viva voce - 40 marks

6.2.5 Examiners: There shall be at least four examiners in each subject. Out of them two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the National commission for Indian Medicine.

6.2.6 Criteria for declaring as pass in University Examination: A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical including clinical and viva voce examination.

A candidate securing less than 50% of marks as described above shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Registrar (Evaluation).

6.2.7 Declaration of distinction: A successful candidate passing the University examination in first attempt will be declared to have passed the examination with distinction, if the grand total aggregate marks is 75 percent and above. Distinction will not be awarded for candidates passing the examination in more than one attempt.

Annexures for evaluation

Section VII

LOG BOOK:

Every student must maintain Log Book in which every activities of teaching training evaluation programes recorded.

The log book is a record of the all the activities of the candidates during his training. Internal assessment is based on the evaluation of log book. Totally, logbooks are a tool for the evaluation of the training programme of Institution by external agencies. The record includes academic activities as well as the presentations and procedures, etc., carried out by candidate.

CONTENT OF THE LOG BOOK:

1. Subject Seminar Presented
2. Analysis Seminar Attended.
3. Analysis Seminar Presented.
4. Animal Module Seminar Attended.
5. Animal Module Seminar Presented.
6. Classical Text Review Seminar Attended.
7. Classical Text Review Seminar Presented.
8. Clinical Case Presentation Attended.
9. Clinical Case presented.
10. Clinical Seminar Attended.
11. Clinical Seminar presented.
12. Synopsis/Dissertation Activities.
13. Formulation Seminar Attended.
14. Formulation Seminar Presented.
15. General Seminar Attended.
16. General Seminar Presented.
17. Guest Lectures Attended.
18. Instrument Seminar Attended.
19. Instrument Seminar Presented.
20. Interdepartmental seminars Attended.
21. Investigation Seminar Attended.

1. SUBJECT SEMINAR

NAME OF THE PRESENTER

TOPIC:

No.	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES of the Topic			
2	Understanding of the subject & content			
3	Organizing the matter in Logical sequences			
4	Use of specific cross references, examples to explain subject			
5	Incorporation of own Research Views			
6	Presentation skill (Body language, Language fluency, , change of pace etc)			
7	Answering skill to the question			
8	A/V aid use			
9	Critical analysis of the subject			
10	Summarized the matter at the end			
	TOTAL			

Suggestions:

Date:

Sign & Name

2. SHLOKA

NAME OF THE PRESENTER:

Sloka:

Reference:

No.	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES of Topic			
2	Breakup of shloka			
3	Use of specific cross references, examples to explain subject			
4	Collection & explanation skill of the Matter			
5	Understanding of the subject			
6	Incorporation of own research views			
7	Presentation skill (body language, A/V aid use, change of pace, language fluency etc)			
8	Organizing matter in logical sequence			
9	Answering skill to the question			
10	Summarizing the matter at the end			
	TOTAL			

Suggestions:

Date:

Sign & Name

3. ANALYSIS

NAME OF THE PRESENTER

NAME OF THE TECHNIQUE:

NO	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES			
2	Narration of History, types of technique			
3	Description of the technique			
4	Narration of Method of use, unit & applied aspects			
5	Narration of its limitations, precautionary measures			
6	Collection of the Matter			
7	Organizing matter in logical sequence			
8	Presentation skill (body language, A/V aid use, change of pace, Language fluency etc)			
9	Answering skill to the question			
10	Summarizing the matter at the end			
	TOTAL			

Suggestions:

Date-

Sign & name .

4. FORMULATION

NAME OF THE PRESENTER:

Formulation:

Reference:

NO	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES of Topic			
2	Assessment of ingredients using cross references			
3	Assessment of Pharmacodynamics of ingredients			
4	Explanation of applied aspects			
5	Explanation of quality tests (Shastric/Lab)			
6	Explanation of related recent Research Works			
7	Incorporation of own research views			
8	Presentation skill (body language, A/V aid use, change of pace, language fluency etc)			
9	Answering skill to the question			
10	Summarizing the matter at the end			
	TOTAL			

5 INSTRUMENT

NAME OF THE PRESENTER:

NAME OF THE INSTRUMENT:

	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES			
2	Narration of History, types of instruments			
3	Description of the Instrument			
4	Narration of Method of use, unit & applied aspects			
5	Narration of its limitations, precautionary measures			
6	Collection of the Matter			
7	Organizing matter in logical sequence			
8	Presentation skill (body language, A/V aid use, change of pace, Language fluency etc)			
9	Answering skill to the question			
10	Summarizing the matter at the end			
	TOTAL			

Suggestions:

Date-

Sign & name.

6 INVESTIGATION

NAME OF THE PRESENTER:

TITLE:

	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES of topic			
2	Narration of History, types of investigation & instruments /equipments used			
3	Narration of method of Investigation			
4	Narration of method of calibration & possible errors			
5	Narration of its application & Incorporation of own research views			
6	Presentation skill (body language, A/V aid use, change of pace Language fluency etc)			
7	Organizing matter in logical sequence			
8	Answering skill to the question			
9	Understanding of the subject			
10	Summarizing the matter at the end			
	TOTAL			

with name.

7. CLASSICAL TEXT REVIEW

NAME OF THE PRESENTER:

CLASSICAL TEXT TITLE:

NO	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES			
2	About Author, commentators, publication,			
3	About content, volume, chapters,			
4	Uniqueness of the text			
5	Incorporation of own views			
6	Presentation skill (body language, A/V aid use, change of pace etc)			
7	Language fluency			
8	Organizing matter in logical sequence			
9	Answering skill to the question			
10	Summarizing the matter at the end			
	TOTAL			

Suggestions:

Date-

Sign & Name.

8. ARTICLE PUBLISHED IN JOURNAL / PERIODICAL

NAME OF THE PRESENTER:

TITLE:

JOURNAL/PERIODICAL:

NO	OBSERVATIONS	Good	Average	Poor
1	Article & Journal/Text selected			
2	Narration of the OBJECTIVES of Article			
3	Understanding of the subject			
4	Use of specific cross references, examples to explain subject			
5	Incorporation of own research views			
6	Presentation skill (body language, A/V aid use, change of pace etc)			
7	Language fluency			
8	Organizing matter in logical sequence			
9	Answering skill to the question			
10	Summarizing the matter at the end			
	TOTAL			

& Name.

9. CLINICAL PRESENTATION

NAME OF THE PRESENTER:

NO	OBSERVATIONS	Good	Average	Poor
1	Narration of the OBJECTIVES			
2	Completeness of the History			
3	Accuracy of general physical examination			
4	Incorporation of own research views			
5	Diagnosis-whether it follows logically from History & findings			
6	Organizing matter in logical sequence			
7	Investigation required, interpretation of investigations			
8	Ability to defend diagnosis & to justify differential diagnosis			
9	Justification of Line of treatment			
10	Presentation skill (body language, A/V aid use, change of pace, Language fluency etc)			
11	Answering skill to the question			
	TOTAL			

Suggestions:

Date-

Sign & Name.

10. UG TEACHING SKILLS

Date-

Sign & Name.

NAME OF THE TEACHER:

SUBJECT:

NO	SKILLS PRACTICED	YES	TO SOME EXTENT	NO
1	Raised interest in the beginning relating to topic by questing or by throwing new idea			
2	Specified the OBJECTIVES of presentation			
3	Teaching material organized in a logical sequence			
4	Used relevant content matter			
5	Changed pace of presentation			
6	Used specific examples to explain subject			
7	Used non-verbal clues, eye contact, etc,			
8	Used teaching aids effectively			
9	Allowed questions from students			
10	Asked questions to students			
11	Rewarded students answers/questions			
12	Summarized the matter at the end			

& Name.

LOG BOOK

Table 3 : Diagnostic and Operative procedures performed

Name:

Admission Year:

College:

Date	Name	ID No.	Procedure	Category O, A, PA, PI*

- * Key:**
- O - Scrubbed up and observed
 - A - Assisted
 - PA - Performed procedure under the direct supervision of a senior faculty
 - PI - Performed independently

**Ordinance governing
Regulations & Syllabus
Of
FELLOWSHIP COURSE IN STHOULYA
(OBESITY SOLUTIONS IN AYURVEDA)**

Syllabus / Curriculum 2020-21



KAHER's

Accredited 'A' Grade by NAAC (2nd Cycle)|| Placed under Category 'A' byMHRD (GoI) & UGC

**SHRI.B.M.KANKANAWADI AYURVEDA MAHAVIDHYALAYA
SHAHAPUR, BELAGAVI, KARNATAKA.**

CONTENTS

Sl. No	Topics
1.	Section- I Preamble
2.	Section- II Goal of the Course
3.	Section- III Aims and Objectives of this Course
4.	Section- IV Regulations Governing the course
5.	1. Eligibility
6.	2. Intake of the Student
7.	3. Medium of instructions
8.	4. Duration and Course of study
9.	5. Attendance and Progress
10.	6. Course/ Curriculum
11.	7. Schedule of course
12.	8. Subjects taught, Number of lectures/practical's and demonstrations for various subjects
13.	9. Scheme of Examinations a) Subjects taught, number of theory papers and marks b) University Question paper pattern c) University Practical Examination and marks division d) Criteria for Passing Course e) Declaration of Class
14.	10. Syllabus
15.	11. Bibliography

Preamble

Obesity is a dreadful disorder getting pandemic, threatening the society all over the globe. Till date common man and medical community were not considering obesity as a disease, but were considering it as the status of the body. Unfortunately this dreadful disorder is the hands of non-professional people where different types of unscientific managements and therapies have popped up misleading the common man. Ayurveda since antiquity has mentioned and considered *Sthoulya* (Obesity) as a disease. Ayurveda has a treasure-trove of scientific information, managements and treatments regarding obesity. It is a high need to develop expert practitioners from the stream of Ayurveda to practice obesity in a scientific manner. Looking towards the prevalence of obesity, it is demand of expertise from the society; it's a great need to develop experts in the branch of obesity through Ayurveda management. In the coming days Ayurveda Obesity management will emerge as a first line management in the society.

KLE Ayurveda Hospital is working in the area of obesity disorders since last 22 years. The organization has developed highly scientific management which has a multi-dimensional approach. The organization is working for Obesity and its co-morbidities at a cellular level where pathology is targeted to manage these diseases. Organisation has also developed a drug development and standardization labs, Hormonal, bio chemistry and microbiology labs for the research purpose in Obesity exclusively through Ayurveda management. It aims to create professionals to manage obesity disorders in a highly scientific manner. Protocols, SOPs, trainings, Laboratory work, counselling and on hand training for doctors will be delivered to the students seeking expertise in the above said area.

Jeevanrekha Obesity Solutions is working in the area of obesity since last 22 years. The organization has developed highly scientific management which has a multi-dimensional approach. The organization is working for Obesity at a cellular level where pathology is targeted to manage obesity as a disease. Till date nearly 45000 plus obese people have undergone the management successfully, and the management is now getting practised all over India and abroad from nearly 85 centres. Organization has developed cloud based software for data management and analysis.

KLE Ayurveda Hospital had MoU with Dr Sabnis's Jeevanrekha Obesity solutions research organisation in terms of academic, clinical and research activities and is running SUMEDA (SU (optimal/good) 'medas' emphasising maintenance of samadhatuavasta in specific to Medodhatu), as the specialty wing is aimed to address the issues of medoja disorders, it is named as SUMEDA.

Unit is working in collaboration with *Dr. Sabnis's Jeevanrekha obesity specialty research hospital, Aurangabad*, the well-known centre which is working in the area of obesity and hyperlipidemic disorders since last 22 years. Sumeda unit managements look for the world class treatment and supervision in the context of Obesity and its co morbidities. Hence during the academic year on par with the taskforce acted rigorously to

meet the needs of the society and originated the Fellowship Course in Sthoulya for Ayurveda Post-graduates. The aim of it is to propagate the strength of Ayurveda and to combat the devastating health issues of the society related to obesity. Accordingly the Institution also carving a future of Ayurveda, by starting "Sumeda" –Obesity solutions in Ayurveda unit wherein various obesity pathologies are treated successfully with structured treatment protocols.

Aim – To create expertise in the area of Obesity through Ayurved faculty and develop and cater Obesity treatment and management as a first line Obesity treatment in society.

Course Learning Objectives:

Upon completion of the course, the student will be able to:

- 1) Define how an individual's genetic make-up and environment contribute to the development of overweight and obesity.
- 2) Explain the metabolic consequences of overweight and obesity in adults and children.
- 3) Describe evidence-based interventions for the prevention and treatment of overweight and obesity in adults and children.
- 4) Translate evidence-based interventions for the prevention and treatment of overweight.
- 5) Diagnose, treat and bring obesity into effective practices in clinical and community settings through Ayurved effectively.

KNOWLEDGE

- Interpretation of Ayurveda concepts regarding obesity and metabolic disorders in the light of contemporary medicines.
- Diagnosis of obesity by various parameters.
- Elucidations of diagnostics test in perspective of Obesity.
- Understanding Ayurveda as well as modern pathophysiology of Obesity.
- To apprehend the principles of Obesity treatment
- Identify the cause and pathology in Individual Patient of obesity and metabolic Syndrome.
- Identify the co morbidities of obesity.
- Classify etiology, patho-physiology, principles of diagnosis and management of obesity and its co morbidities.
- Recognise socio-economic, environmental and emotional determinants regarding childhood and adultsobesity.
- Upgrade the knowledge in the area of Dravyaguna, Phyto- chemistry and
- Pharmacology of Ayurved drugs helpful in treating Obesity.

SKILLS

- 1) To develop skills in examining the patient, taking a proper clinical history, perform essential diagnostic procedures and prescribe relevant tests and interpret them so as to conduct diagnosis & staging of disease.
- 2) Identify customized protocols as per the status of Individual health and disease.
- 3) Counselling techniques regarding disease process.
- 4) Effective and strong Dietary counselling
- 5) Online data management of the patients.
- 6) Skills regarding prevention of Obesity.
- 7) Effective treatment protocols for the patients bringing best of the outputs.

ATTITUDE AND COMMUNICATION ABILITIES

- Develop communication skills with patient and his relatives, especially to provide unbiased opinion and to explain various options available in management of the disease.
- Develop doctor patient relationship for better counselling of patients, relatives and friends.
- Develop communication and leadership for mass counselling regarding obesity and metabolic disorder

Syllabus

Regulations of Governing fellowship course in Sthoulya (Obesity solutions in Ayurveda)

1. Eligibility:

A person having post graduate degree in Ayurveda of a recognised University is eligible for admission in fellowship course in Obesity.

2. Intake of the Student:

Four students per year

3. Medium of instructions:

Medium of Instruction shall be English (with a working knowledge of Sanskrit to serve the study)

4. Duration of the Course Study:

The Course of study shall be for a period of 01 year in Hybrid mode.

5. Attendance and Progress:

A minimum of 75% of the attendance in theory and practical separately is required to be eligible for examination, subject to the condition that his/her progress and conduct are counted to be satisfactory by the principal.

Each student shall attend lectures, practicals, clinics, seminars, case presentations, journal review meetings etc. The students shall have to attend the hospital duties as may be assigned to them during the course of study. The students must attend special lectures/demonstrations; seminars and such other activities as may be arranged by the department. Also, the students will have to attend clinics and lectures in Jeevanrekha Ayurved Chikitsalaya, Aurangabad or any other branch of Jeevanrekha Ayurved Chikitsalaya in India.

Student shall maintain a Log Book on a day to day basis of his Clinical, Academic and Research work.

6. Course Content / Curriculum

Ayurveda Syllabus points will be covered by departments of Swasthavritta, RogaNidan, Kayachikthsa, Panchakarma, Rasashastra, Dravyagunaetc in accordance to Conventional understanding. Expert lectures regarding obesity will be delivered from Obesity experts time to time through online lecture series and in person as per

the mutual understanding between the two organisation regarding convenient dates and timings. Two months on hand trainings will be organised at Aurangabad for every batch.

Syllabus related to laboratory work, drug development, blood analysis will be conducted during the two months training at Jeevanrekha Obesity solutions Research Centre at Aurangabad.

7. Schedule: A total 30 working hours per week which will be distributed as follows

Sl. no	Duration	Mode	Particular	Site	Hours	Total working hour / week	Total hours
1.	2 month	Offline Mode	Clinical Outpatient and Inpatient Department	KLE Ayurveda Hospital Sumeda OPD	4 hours /day	24 hr/week	30x 8week [2months]
				KLE Ayurveda Hospital IPD	Regular Rounds 1 hour/ day	6hr/week	
	2 month	Offline Mode	Outpatient Department	Jeevanrekha Obesity Solution centre, Aurangabad	6 hours /day	36 hr/wk	
2.	6 months	Online Mode	Academic	Seminar	1 hour/ week	8 hours	8 hrs x 24 week [6 months]
				Journal club	1 hour /week		
				Theory classes	2 hours / week		
				Case discussion	2 hours / week		
				Online lectures	2 hour/week		
3.	2months* *	Examination and Related Particulars					

- Total duration of 10 months – Hybrid Course
- **Last 2 months for Examination and other related activities

8. Subjects taught, Number of lectures/ practical's and demonstrations for various subjects:

No.	Subject	Code	Lectures (hrs.)	Clinics, Practical and Demonstrations(hrs.)
1	MaulikaSiddhaant in Sthulata and SantarpanjanyaVyadhiParichaya. Diagnosis, Co morbidities Interpretation, Diet and Prevention of Obesity	CODE-1	100	200
2	Chikitsa and BheshajaSiddhaant in obesity, Phytochemistry and pharmacology of related Ayurved drugs	CODE-2	100	200

9. Scheme of University Examinations:

a) Subjects taught, number of theory papers and marks:

No.	Title of the paper	Code	Marks
1	MaulikaSiddhaant in Sthulata and SantarpanjanyaVyadhiParichaya. Diagnosis, Co-morbidities Interpretation, Diet and Prevention of Obesity	CODE-1	100
2	Chikitsa and BheshajaSiddhaant in obesity, Phytochemistry and pharmacology of related Ayurved drugs	CODE -2	100

b) University practical examination and marks division:

No.	Title of the paper	Code	Marks	Total
1	CODE -3	Practical - a. Long case – 35 marks b. Short case – 15 marks	50	100
		Viva voce	50	

c) University Theory Question Paper Pattern Practical Pattern:

Will comprise of two papers of 100 marks each.

- 1) The First paper will include MaulikaSiddhaant and VyadhiParichaya (Basic principles and Introduction to childhood and adult obesity with Etiopathogenesis) Diagnosis, Co morbidities Interpretation, Diet and Prevention of Obesity
- 2) Second Paper will include Chikitsa and BsheshajaSiddhaant, Phytochemistry and pharmacology of related Ayurved drugs (1 Paper Part A and B)

Question papers in English language and of 3-hour duration only

	Subject	Long essay questions			Short essay Questions			Grand total
		No	Marks/ Q's	Total	No	Marks / Q's	Total	
01	MaulikaSiddhaant, SantarpanjanyaVyadhiParichaya Diagnosis, Co morbidities Interpretation Diet and Prevention of Obesity - CODE 01	2	20	40	6	10	60	100
02	Chikitsa and BsheshajaSiddhaant in Obesity Management, Phytochemistry and pharmacology of related Ayurved and modern drugs in Obesity management - CODE 2	2	20	40	6	10	60	100
Total								200

Practical Examination: Case Presentation and Viva Voce.

Particulars	Distribution	Total marks
Case Presentation	LONG CASE (1*25)	50
	SHORT CASE (1*10)	
	SPOTTING (5*3=15)	
Viva Voce		50
Total		100

d) Criteria for Pass:

- a) Minimum marks to be secured in each theory paper and practical paper are 50% separately.
- b) A candidate failed in or more than one subject in examination shall be eligible to appear in supplementary examination.
- c) In case of student fails to appear in regular examination for cognitive reasons he/she will appear in supplementary exam as a regular student.

e) Declaration of Class:

- a. A candidate obtaining 50% and more but less than 60% of the marks in the grand total aggregate in the first attempt shall be declared to have passed the examination in Second Class.
- b. A successful candidate obtaining 60% marks or more but less than 75% of marks in the aggregate of all the subjects in the first attempt will be declared to have passed the examination in First Class.
- c. Successful candidates obtaining 75% of marks or more in the aggregate of all the subjects in first attempt will be declared to have passed the examination in distinction.
- d. A candidate passing a university examination in more than one attempt shall be placed in Pass class irrespective of the percentage of marks secured by him / her in the examination

10.Syllabus

Name of the course: Fellowship in Sthoulya (Obesitysolutions in Ayurveda)	
Name of the paper: MaulikaSiddhaant, SantarpanjanyaVyadhiParichayaDiagnosis, Co morbidities Interpretation Diet and Prevention of Obesity - CODE-1	
Duration: Theory: 100 hrs.	Maximum marks: Theory - 100
Part A Contents (Theory) MaulikaSiddhaant (conceptual and basics)	
Marks – 50	Duration: 50 hrs.
<p>MaulikaSiddhaant</p> <ol style="list-style-type: none"> 1. Vedic literature regarding obesity and life style. 2. Classification and types of obesity, General causes of obesity and metabolic disorders, Methods of Diagnosis. 3. Concept of AMA and its perspective through contemporary science. 4. Concept of Agni, Importance of Bhutagni and Dhatwagni in disease process. 5. Understanding Agni in the light of Molecular biology. 6. Understanding Gunas, Understanding stulatainAshtoninditvyadhi.Recognise Santarpanjanyahetus in modern era.SantarpanjanyaVyadhis and its manifestation. 7. SantarpanjanyaVyadhi and its co relation with metabolic disorders.StulataHetus, types, Samprapti, Syntomatology, co morbidities and complications. 8. Metabolism of Proteins, Carbohydrates and Fats. 9. Evolutionary theories in Obesity, Genetic obesity, Classification of Genetic obesity 10. Disorders and syndromes of Genetic obesity.Impact of Weight on Quality of Life, Moorehead–Ardelt Quality of Life Questionnaire, Weight Related Symptom Measure (WRSM) and Obesity andWeight Loss Quality of Life (OWLQOL). 11. Obesity Related Well-Being, Introduction to hunger assessment.Three Factor Eating Questionnaire.Visual Analog Scales (VAS), Impact of Weight on Quality of Life 12. Patho physiology of obesity and metabolic syndrome <p>SantarpanjanyaVyadhiParichaya</p> <ol style="list-style-type: none"> 1. Hormones involved in obesity, Free radical theory and lipid peroxidation in obesity, Inflammation in obesity and metabolic disorders. 2. Hypo thyroidism and its relation with obesity and metabolic syndrome. 3. Obesity and its relation with poly cystic ovarian disorder. 4. Theories with hormonal resistance in Obesity. 5. Gut Microbiota in Obesity. 6. Obesity demographics—income, race, gender 7. Psychological disorders leading to Obesity 8. Drugs inducing obesity. 9. Anatomy and Physiology of Adipocytes.Adipogenesis.White and Brown Adipose tissue.Pathophysiology of adipose tissues in obesity, and how it contributes to the metabolic effects of obesity. 10. Identify, assess, and analyze considerations and factors that contribute to the development of overweight and obesity. 	

Part B: Diagnosis, Co- morbidities, Diet and Prevention of Obesity

Marks – 50

Duration: 50hrs.

Diagnosis, Co-morbidities

1. Eating disorders in obesity. Effects of Obesity and its relation with Prameha, Hrudroga, Kushtha and SantarpanjanyaVyadhis.
2. Non-Alcohol fatty liver disease, Obesity induced arthritis, Impact of Obesity on Cardio vascular system. Theories with hormonal resistance in Obesity.
3. Inflammation in obesity and metabolic disorders.
4. Hypo thyroidism and its relation with obesity and metabolic syndrome.
5. Infertility in Obesity. Obesity and its relation with poly cystic ovarian disorder. Obesity and its relation with Diabetes mellitus. Dermatological complications in Obesity. Obesity related Psychological disorders. Sleep Apnoea in Obesity.
6. Anthropometric Tools used for Diagnosing Obesity and their Significance.
7. Body Composition, BMI, Abdominal circumference, Hip Circumference, Skin fold thickness, Bioelectrical impedance analysis (BIA), Bio impedance spectroscopy (BIS), Dilution technique, Total body potassium (TBP), Hydrostatic weighing, Air Displacement Plethysmography (ADP), Dual Energy X-ray Absorptiometry (DEXA), Computerized Tomography (CT) scan, Magnetic Resonance Imaging (MRI), Near-Infrared Interactance (NII), Three-Dimensional Photonic Scanning (3DPS), Quantitative Magnetic Resonance (QMR), Bio chemical and hormonal tests in Obesity.
8. Interpretation of Physical, radiological, bio chemical and hormonal test for the prognosis and treatment of Obesity.

Diet and Prevention of Obesity

1. Identification and understanding of Guru and laghudravya
2. Satiety and Hunger related to Dietetics. Elaboration of Adhyashan, Atiashan.
3. Explore Virudha Ahara and Abhishyandi Ahara in modern era
4. Calorie restriction theory and its effects on weight and metabolic disorder.
5. Fasting and intermittent fasting.
6. Daily Nutritional requirements.
7. Types of diets in Obesity and weight reduction.
8. Functional diets in obesity.
9. Role of food on reward centre and limbic system of brain.
10. Hormones responding to various diets.
11. Effect of food on Gut microbiota and gut hormones.
12. Inflammatory and non-inflammatory diets.
13. Macronutrient composition of the diet
14. Obesity and the Supplemental Nutrition Assistance Program
15. Global trends in diet, physical activity, obesity, and obesity-related comorbidities
16. Effect of physical activity, sedentary behaviour, dietary intake, and eating behaviours contribute to energy balance, weight gain, and obesity
17. Role of nutrigenome and gut microbiome in obesity
18. Prevalence of overweight and obesity and cultural attitudes and biases toward obese persons.

19. Effect of environmental factors influences food intake.
20. Factors that influence the choice of different types of diet for weight loss and how obesity drugs affect either energy intake or energy expenditure.
21. .Develop intervention strategies for the prevention of overweight and obesity.
22. Common myths related to the prevention and/or management of overweight and obesity.
23. Explore and evaluate the dietary, exercise and behavioural interventions for the management of overweight and obesity.
24. Recipes for weight reduction program.
25. Role of Yoga and Nature cure techniques in preventing pathology

Name of the course: Fellowship in Sthoulya (Obesity solutions in Ayurveda)

Name of the paper: Chikitsa and Bheshaja Siddhaant in Obesity Management , Phytochemistry and pharmacology of related Ayurved and modern drugs in Obesity management CODE 2

Duration: Theory: 100

Maximum marks: Theory - 100

Part A Chikitsa and Bheshaja Siddhantain Obesity Management

Marks – 50

Duration: 50 hrs.

1. Chikitsa sutra and Management of Santarpan Vyadhi and status of Dosha, Dhatu and Mala.
2. Basic principles of Obesity Management in Ayurved.
3. Principles in Obesity Management in Modern medicine.
4. Importance of Dosha, Dushya , Bala, Kaala, Agni, Prakriti, Vaya, Sattva Satmya, Desha, Ahara and stage of diseases in treating Obesity.
5. Classification and types of obesity, General causes of obesity and metabolic disorders, Methods of Diagnosis.
6. Doshapratyanika, Vyadhipratyanika, Ubhayapratyanika management in Obesity. Doshopakrama, Chikitsa sutra and Management of Sthanantara Dosha (Ashayapakarsha, Anuloma/Pratilomagati of Dosha, Vimargagamana of Dosha)
7. Knowledge of Lina Dosha & its management in obesity and metabolic disorders.
8. Chikitsa sutra and Management of Sama-Nirama states in obesity and metabolic disorders..
9. Medasaratva and Medaasaratva and its bio chemical correlation..
10. Roga-Anutpattikara Chikitsa, Roga Prashamana Chikitsa in obesity and Metabolic disorders. Understanding Gunas.
11. Detailed description of Dvividhopakrama (Santarpana and Apatarpana)
12. Shadavidhopakrama (Rookshana, Snehana, Swedana, Sthambhana, Langhana and Brimhana).
13. Detailed description of Shodhana, Shamana and Nidana Parivarjana.
14. Management of Obesity along with its co morbidities.
15. Long term persistence in hormonal adaptations in weight loss.
16. The defence of body weight
17. Account for various types of obesity treatment and when these can be suitable to use.
18. Determining the level of health care for children and adolescents with obesity in different ages account for side effects of obesity treatment.

Part B: Phytochemistry and pharmacology of related Ayurved and modern drugs in Obesity management

Marks – 50

Duration: 50 hrs.

1. DravyaGuna Karma of herbs, minerals and herbo mineral formulations used for Obesity and metabolic disorders in Ayurved.
2. Pharmacology and Pharmacotherapy with Phyto chemistry of Ayurved drugs used in Management of Obesity and metabolic disorders.
3. Pharmacology and its therapeutics of modern medicine drugs used in Obesity and metabolic syndrome.
4. Pharmacotherapy of anti diabetic drugs used in Obesity and metabolic syndrome.
5. Pharmacotherapy of drugs used in co morbidities of Obesity.
6. Drug interactions of medicines used for metabolic syndrome from modern medicines with Ayurved drugs.
7. Principle of Drug administrations in metabolic syndromes and obesity.
8. Pharmacology and possible mode of actions of Panchakarma Procedures like Snehan, Swedan, Vaman ,Virechan ,Basti etc.
9. Indications and Contraindications of Ayurved as well as modern drugs.
10. Management of resistant weight loss and obesity.
11. Pharmacotherapy of Obesity and its co morbidities.
12. Tools used for Pre and Post management counselling's.
13. Various formulations used in Management of Obesity.
14. Indication and contraindications of Exercise in Obesity and metabolic syndrome.
15. Importance of Endurance, Flexibility, Yog, and strengthening exercise in Obesity.
16. On-going weight maintenance programs.
17. Prevention of Weight gain after weight loss.
18. Surgical interventions in massive obesity.
19. Merits and demerits of surgical interventions over medical interventions in obesity.
20. Post weight loss individual and family counselling.
21. Data analysis of outcome of the results with obesity management.

Reference books:

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- 2) Sushruthakrita, **Sushruthasamhita** with Dalhanavirachita Nibandha Sangraha vyakhya, published by Choukhambhaorientalia, Varanasi, 6th edition 1997, sutrasthana 15/14 page 70, chikitsasthana 24/51
- 3) Vagbhatakrita **AshtangaHridaya** with Arunadattavirachita Sarvangasundaravyakhya and Hemadrivirachita Ayurveda Rasayanavyakhya, published by Krishnadasacademy, Varanasi, 1995, sutrasthana 2/15
- 4) Vriddha Vagbhatakrita **AshtangaSangraha** with Induvirachita shashilekhavyakhya, published by Krishnadas academy, Varanasi, 1995, sutrasthana 15/
- 5) Madhavakarakrita **MadhavaNidana** with Vijayarakshita & Srikantadattavirachita Madhu kosavyakhya, published by ChoukhambhasamskritaSamsthana, Varanasi, 20th edition 1993, vol II medoroganidana
- 6) Chakrapanidattakrita **Chakradatta** (Chikitsasarasangraha) with Shivadassenvirachita Tatwachandrikavyakhya, Published by Choukhambhaorientalia, Varanasi,
- 7) **Vangasenasamhita** edited by Shankarlal Harishankar, Published by Kaviraj Srikrishnadas, Bombay,.
- 8) **Yogaratnakara** with Vidyotini Hindi vyakhya, Published by ChoukhambhasamskritaSamsthana, Varanasi, 6th edition 1997, Medorogachikitsadhikara, uttarardha,
- 9) Bhavamishrakrita **Bhavaprakashanighantu** edited by Panditsri Bramha Shankar Mishra, published by ChoukhambhasamskritaSamsthana, Varanasi
- 10) **Raja nighantu** edited by Giridayala Shukla, Published by ChoukhambhasamskritaSamsthana, Varanasi.
- 11) **Basavarajeeyamuttarardha** –Shivakaran Sharma, 1954, Rasayana Pharmacy Bhavan, Chennai.
- 12) **Rasa Ratna Samucchaya** Ambikadatta shastri, 1978, Choukhambha samskrita series, Varanasi.
- 13) **Introduction to Kaya chikitsa** by K. Dwarakanath, Published by Choukhambhaorientalia, Varanasi.

- 14) **Digestion and Metabolism in Ayurveda** by C. Dwarakanath Published by Baidyanath Publication, Calcutta.
- 15) **Concept of Agni in Ayurveda** by C. Dwarakanath Published by Baidyanath Publication, Calcutta.
- 16) **NidanaChikitsaHastamalaka** by Ranajith Roy Desai, Published by Baidyanath Ayurveda Bhavan, Nagapur.
- 17) **DravyaGunaVignana** by P.V.Sharma Published by Choukhambhaorientalia, Varanasi.
- 18) **Manier-williamsA Sanskrit English Dictionary**, Published by Sundarlal Jain,
- 19) **Researches in Ayurveda** by M.S.Beghal, Published by MriduAyurvedic publication and sales, Jamnagar.
- 20) **Indian MateriaMedica** by K.M.Nadakarni, Published by Popular Prakashan, Bombay, 2nd edition.
- 21) **Ayurveda Encyclopedia** by Swami SadashivaThirtha, Published by Indian book center, Delhi.
- 22) **Kaya chikitsa** by ShivacharanaDhyani Published by Ayurveda and Tibba academy, vol II.
- 23) **VaidyaPanditaHariprapanajivirachitaRasayogasara** Published by Krishanadas academy, Varanasi.
- 24) **Park's Text Book of Preventive and Social Medicine** by K.Park, 16th edition, 2000, Published by BanarsidasBhanot, Jabalpur,.
- 25) **Text Book of Preventive and Social Medicine** by MC Gupta & BK Mahajan, 3rd edition, 2003, Published by Jaypee Bros New Delhi.
- 26) **Review in Community Medicine** by V.V.R.SeshuBabu, 2nd edition 1996, Paras Medical Books, Hyderabad.
- 27) **Principles of Community Medicine** by Dr.B.SridharRao, 3rd edition, 2002, Published by AITBS publishers and distributors, Delhi.
- 28) **Social and Preventive Medicine** by Yash Pal Bedi, 15th edition, published by Atma Ram and sons, Delhi.
- 29) **Principles of anatomy and Physiology** by GJ Tortora and SR Grabowski, 9th edition, 2000, published by John wiley and Sons INC..
- 30) **Physiology** by Berne, Levy, Koeppen& Stanton, 5th edition, 2004, published by Missouri, page 946.

- 31) **API Text Book of Medicine** edited by G S Sainani & co. 6th edition 1999. Published by Association of Physicians of India, Bombay,.
- 32) Harrison's **Principles of Internal Medicine**, edited by Braunwald, 15th edition, 2001, published by McGrawhill Medical publishing division New Delhi, page.
- 33) Davidson's **Principles and Practice of Medicine**, edited by Christopher R W Edwards 17th edition, 1995, published by ELBS with Churchill livingstone,
- 34) Robbins **Pathologic Basis of Disease**, by Cotran, Kumar & Robins, 5th edition, 1994, Published by W.B. Saunders & co. Bangalore,
- 35) **Clinical Medicine** by Praveen Kumar & Clark, 4th edition, 1999, Published by W.B. Saunders,
- 36) Oxford **Clinical Dietetics & Nutrition** by F.P. Antia & Philip Abraham, 4th edition, 2002, published by oxford university press, .
- 37) **Nutrition- A health promotion approach** Geoffrey P webb, 2nd edition, London.
- 38) **Grey's Anatomy** edited by Henry Gray, Peter L Williams, Laurence Bannister, 38th edition, 1995, Churchill livingstone, New York.
- 39) **Advanced Textbook on Food and Nutrition** by Swaminathan M, The Bangalore Printing and Publications.

**Ordinance governing
Regulations & Syllabus
Of
Diploma of Ayurveda Pharmacy**

Syllabus / Curriculum 2022-23



KAHER's

Re-Accredited 'A+' Grade by NAAC (3rd Cycle) || Placed under Category 'A' by MHRD (GoI) & UGC

KLE Academy of Higher Education & Research
Deemed to be University
JNMC Campus, Nehru Nagar, Belagavi - 590 010. Karnataka - India
Email : info@kledeemeduniversity.edu.in Ph.No. +918312444444



KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH

(Formerly known as KLE University)

(Deemed-to-be-University established u/s 3 of the UGC Act, 1956)

Accredited 'A' Grade by NAAC (3rd Cycle) Placed in Category 'A' by MHRD (Govt)

JNMC Campus, Nehru Nagar, Belagavi-590 010, Karnataka State, India

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Ref. No. KAHER/AC/22-23/D- 1 / 12.2.2022

10th November, 2022

NOTIFICATION

Sub : Ordinance governing curriculum for the Diploma in Ayurveda Pharmacy.

Ref : Minutes of the meeting of the Academic Council of the KAHER held on 18th October, 2022.

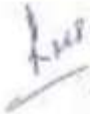
In exercise of the powers conferred under Rule A-04 (i) of the Memorandum of Association of the KAHER, the Academic Council of the KAHER in its meeting held on 18th October, 2022 has approved the Ordinance governing the curriculum of Diploma in Ayurveda Pharmacy.

The Ordinance shall be effective for the students admitted to Diploma in Ayurveda Pharmacy under the Faculty of AYUSH in the Constituent College of the KAHER viz KLE Shri B.M. Kankanwadi Ayurveda Mahavidyalaya, Belagavi from the academic session 2023-24 onwards.

By Order,




REGISTRAR



To,
The Dean,
Faculty of AYUSH,
KAHER,
Belagavi.

CC to:

1. The PA to Hon. Chancellor, KAHER, Belagavi.
2. The Special Officer to Hon. Vice-Chancellor, KAHER, Belagavi.
3. The Principal, KLE Shri B.M. Kankanwadi Ayurveda Mahavidyalaya, Belagavi.
4. The Controller of Examinations, KAHER, Belagavi.
5. The Director, Academic Affairs, KAHER, Belagavi.
6. The Secretary, University Grants Commission, New Delhi

CONTENTS

Sl. No	Topics
1.	Section- I Preamble
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6.	2. Intake of the Student
7.	3. Medium of instructions
8.	4. Duration and Course of study
9.	5. Attendance and Progress
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12.	8. Subjects taught, Number of lectures/practical's and demonstrations for various subjects
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14.	10. Syllabus
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Section: I **Preamble**

Ayurveda medicine field is growing in prominence from past few years. Ayurveda as an emerging field lays out a plethora of opportunity for young aspirants who wish to pursue their career in the field of Ayurveda. Diploma in Ayurvedic Pharmacy lays across a platform for candidates to learn in depth about the different medicines and techniques used to cure ailments. The program is an integrated study of Ayurveda as a field combining it with the pharmacy.

Diploma in Ayurvedic Pharmacy course enables candidates to know about the chemical properties of ayurvedic medicines, the proportion, composition and the amount in which it should be taken by patients. They are instilled with the fundamental principles of Ayurveda and its uses in treating different ailments. It builds a strong base for those who wish to pursue a higher qualification in the field such as Bachelors and Masters.

Diploma in Ayurved Pharmacy [D.Pharm. Ayu] course provides pharmacy qualification for practicing pharmacy profession. Ayurved Pharmacists are the key person to dispense the medication to the patient. D. Pharm course graduates are eligible to open an online Ayurved pharmacy which is a demanding business in India in the field of Ayurved pharmacy.

The course aims to provides skills to enter patient's information, identify prescriptions, and process paperwork for orders, understand and apply drug and medical terminology, as well as basic pharmacology. The curriculum of the diploma course is designed to teach students to understand drug dosage calculations, regularly used pharmacy computer systems, compounding, pharmacy practices and procedures.

Karnataka state around 500 Govt. Ayurveda dispensaries, 400 ayurved drug manufacturing units, 70 Ayurveda college, 200 ayurveda wellness centers, 500 plus private ayurveda hospitals are available where there is lack of qualified ayurved pharmacist. This course fulfill these requirement of ayurveda pharmacist

KLE Ayurved college is working in the area of Ayurved since 1933 to Provide Ayurveda education, healthcare services and medicines to public. Institution has well established department & staffs required conducting for this course, Institution is also has Drug Manufacturing Unit since 1938, presently producing 300 classical & 26 proprietary medicines under GMP certification and exclusive outlet of products. KLE ayurved hospital has well established Aushadalaya with around 60 plus medicines of different ayurveda companies are available.

Section -II

Goal of the course– To create expertise in the area of Dispensing /Hospital Pharmacy of Ayurveda medicine in ayurveda healthcare services.

Section –III

Aim & objectives of course:

Ayurveda Pharmacy diploma graduates are required to learn and acquire adequate knowledge, necessary skills to practice the profession of pharmacy including thorough and exhaustive knowledge of ayurveda medicines dispensing, patient counseling and professional information exchange with physicians and other health professionals. They are required to acquire an in-depth knowledge of compounding, dispensing, storage of various ayurvedic pharmaceutical dosage forms They should understand the concept of Community Pharmacy and be able to participate in rural and urban health care projects of State and Central government. The ayurveda pharmacist should act as bridge between ayurveda Physicians and Patients and strive for better healthcare.

The objectives are covered under three headings namely:

- (a) Knowledge and understanding
- (b) Skills and
- (c) Attitude

(a) Knowledge & Understanding: The diploma graduate should acquire the following during their two-year D.Pharm course.

1. Adequate knowledge and scientific information regarding ayurveda medicines
2. Adequate knowledge of practical aspects of compounding, dispensing & storage of ayurveda medicines.
3. Adequate knowledge of Rules & regulations pertaining to Ayurveda medicines.
4. Adequate knowledge of patient counseling leading to physical and social well-being of patients.
5. Adequate knowledge of practical aspects of product detailing and marketing of Pharmaceutical products

(B) Skills A graduate should be able to demonstrate the following skills necessary for practice of a pharmacy.

1. Able to formulate, store, dispense, analyze the prescriptions and/or manufacture the medicinal agents at commercial level.
2. Able to learn and apply legal and ethical aspects involving drugs.

(c) Attitudes The diploma graduate should develop the following attitudes during their two-year D.Pharm ayurveda course.

1. Willing to apply the current knowledge of Ayurveda Pharmacy in the best interest of patients and the community.
2. Maintain a high standard of professional ethics in discharging professional obligations.
3. Continuously upgrade professional information and be conversant with latest Advances in ayurveda Pharmacy and ayurveda healthcare services.
4. Willing to participate in various programmes of related field to upgrade knowledge and professional skills.
5. To help and to participate in the implementation of NATIONAL AYUSH MISSION.

Section-IV
Regulation
Eligibility:

Candidate shall have passed 10+2 of science examination conducted by the respective state/central government authorities recognized.

Intake of the Student:

Thirty students per year

Medium of instructions:

Medium of Instruction shall be English

Duration of the Course Study:

The Course of study shall be for a period of 02 year.

Attendance and Progress:

A minimum of 75% of the attendance in theory and practical separately is required to be eligible for examination, subject to the condition that his/her progress and conduct are counted to be satisfactory by the principal.

Course Content / Curriculum

Theory Syllabus points will be covered by departments of Rasashastra, Dravyaguna, Swasthavritta, Roga Nidan, Sharir and fundamentals of ayurveda etc in accordance to Conventional understanding. Expert lectures regarding subject wise will be delivered by the respective experts time to time.

Practical related contents conducted at established laboratories of ayurveda college, Ayurveda pharmacy Aushadhalaya etc.

Schedule: **Subjects taught, Number of lectures/ practical's and demonstrations for various subjects**

1st Year Syllabus

SN	Subject	Code	Teaching hours per week	Marks
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			Total	Theory	Practicals	Theory	Practicals
1	Rasashastra And Bhaishajya Kalpana – Paper I (Ayurvedic Pharmaceutics)	DAPRSBK-I	155	80 Hrs 4	75 Hrs 2	100	100
2	Dravyaguna – Paper I (Ayurvedic Pharmacology)	DAPDG-I	155	80 Hrs 4	75 Hrs 2	100	50
3	Sharira (Anatomy & Physiology)	DAPS-I	145	80 Hrs 4	75 Hrs 2	100	100
4	Fundamentals of Ayurveda And Swasthavritta	DAPFA-I	70	70 Hrs 4	—	100	---

Final Year Syllabus

SN	Subject	Code	Teaching hours per week			Marks	
			Total	Theory	Practicals	Theory	Practical
1	Rasashastra And Bhaishajya Kalpana – Paper II (Ayurvedic Pharmaceutics)	DAPRSBK-II	145	80 Hrs 3	75 Hrs 2	100	100
2	Dravyaguna – Paper II (Ayurvedic Pharmacology)	DAPDG-II	160	80 Hrs 3	75 Hrs 2	100	50
3	Dispensing, Community pharmacy and Hospital pharmacy (DCH)	DAPDCP-I	140	80 Hrs 2	75 Hrs 2	100	100
4	Fundamentals of Roga Nidana Evam Chikitsa (Ayurvedic Pathology)	DAPRN-I	060	60 Hrs 4	—	100	---
5	Pharmaceutical Jurisprudence and Drug House Management	DAPPJ-I	080	80 Hrs 4			

Scheme of University Examinations:

University Theory Question Paper Pattern Practical Pattern:

Question papers in English language and of 3-hour duration only.

1st Year

Subject	Long essay questions			Short essay Questions			Grand total
	No	Marks/ Q's	Total	No	Marks / Q's	Total	
Rasashastra And Bhaishajya Kalpana – Paper- I (Ayurvedic Pharmaceutics)	2	20	40	6	10	60	100
Dravyaguna – Paper- I (Ayurvedic Pharmacology)	2	20	40	6	10	60	100
Sharira (Anatomy & Physiology)	2	20	40	6	10	60	100
Fundamentals of Ayurveda And Swasthavritta	2	20	40	6	10	60	100

Final Year

Subject	Long essay questions			Short essay Questions			Grand total
	No	Marks/ Q's	Total	No	Marks / Q's	Total	
Rasashastra And Bhaishajya Kalpana – Paper- II (Ayurvedic Pharmaceutics)	2	20	40	6	10	60	100
Dravyaguna – Paper- II (Ayurvedic Pharmacology)	2	20	40	6	10	60	100
Dispensing, Community pharmacy and Hospital pharmacy (DCH)	2	20	40	6	10	60	100
Fundamentals of Roga Nidana Evam Chikitsa (Ayurvedic Pathology)	2	20	40	6	10	60	100

Pharmaceutical Jurisprudence and Drug House Management	2	20	40	6	10	60	100
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*SEQ's Having optional mandatory Six question out of Eight

Practical Examination: Demonstration /Short question, Spotting and Viva Voce.

For 100 marks subject

Particulars	Distribution	Total marks
Demonstration of Practical	(1*30)	30
SPOTTING	(10*2=20)	20
Viva Voce		50
	Total	100

For 50 marks subject

Particulars	Distribution	Total marks
Short question	(1*25)	25
Viva Voce		25
	Total	50

Criteria for Pass:

Minimum marks to be secured in each theory paper and practical paper are 50% separately.

A candidate failed in or more than one subject in examination shall be eligible to appear in supplementary examination.

In case of student fails to appear in regular examination for cognitive reasons he/she will appear in supplementary exam as a regular student.

Declaration of Class:

A candidate obtaining 50% and more but less than 60% of the marks in the grand total aggregate in the first attempt shall be declared to have passed the examination in Second Class.

A successful candidate obtaining 60% marks or more but less than 75% of marks in the aggregate of all the subjects in the first attempt will be declared to have passed the examination in First Class.

Successful candidates obtaining 75% of marks or more in the aggregate of all the subjects in first attempt will be declared to have passed the examination in distinction.

A candidate passing a university examination in more than one attempt shall be placed in Pass class irrespective of the percentage of marks secured by him / her in the examination

1st Year Syllabus

Subject: Rasashastra and Bhaishajya Kalpana-Paper-I (Ayurvedic Pharmaceutics)

Teaching hours: 155 Examination: Theory: 100 marks Weekly classes: (4T+2P)

Practical: 100 marks

SECTION-A

Sr. No.	Topic	No. of Hrs
1	Definition of Bhaishajya kalpana.	02
2	Manaparibhasha (Introduction, measurements according to AFI-I).	03
3	Collection, storage and preservation of raw material.	03
4	Saveeryataavadhi.	04
5	Panchvidhakashayakalpana (Introduction, definition, method, dose and uses), Kshirapaka, Pramathya and Mantha.	10
6	Introduction of Churnakalpana (Definition, types, method, dose, packaging, storage and current trends).	03

7	Introduction of Vatikalpna, Guggulokalpna (Definition, synonym, method, types, dose, packaging, storage and current trends).	07
8	Introduction of Lavan and Ksharakalpna (Method, packing and storage).	02
9	Udakakalpna (Tandulodaka, Aushadhasiddhapaniya, Ushnodaka) Churnodaka.	03

SECTION-B

10	Definition of Rasashastra.	02
11	History of Nagarjuna.	03
12	Terminology- Shodhana, Maran, Bhavana, Avapa, Nirvapa, Panchamrita, Pancgavya, Panchmritika, Kajjali, Dravakagana, Mitrapanchaka.	06
13	Introduction of Puta (Gajaputa, Mahaputa, Varahaputa) and Yantra (Dolayantra, Damruyantra, Svedaniyantra, Valukayantra, Trividhapatanyantra).	5
14	Classification of Rasadravyas.	05
15	Introduction of Shodhana and Maran.	02
16	Introduction of Parada, Dosh, Samanya Shodhana.	04
17	Introduction, shodhana, maran, dose, formulations of- Maharasa- Introduction, Abharaka, Makshika and Shilajita. Uparasa- Introduction, Gandhaka, Gairika, Kasis, Kankshi, Hartala and Manashila. Sadharan rasa- Introduction, Kampillaka, Hingula, Kapardika and Navsar.	06 07 03

Total: 80hrs. (Per Lecture 1Hr)

Practical:25

Sl No.	Form	Examples
1	Swarasa	Adrakasvarasa&Tulasisvarasa
2	Kalka	Nimbapatrakalka
3	Kwath	Dashmulakvatha
4	Hima	Dhanyakadihima
5	Phanta	Sudarshanphanta
6	PutapakSwarsa	Vasa Putapak
7	Kshirapak	ArjunaKshirpak
8	Kanji	Tandulodaka
9	Shodhana	Parada
10	Do	Tuttha
11	Do	Gandhak
12	Do	Gairik
13	Do	Saphtik
14	Do	Hartala
15	Do	Navasadar
16	Do	Godanti
17	Do	Tankan
18	Maran	Abhrak
19	Do	Sphtik
20	Do	Hartal
21	Do	Sphtik
22	Do	Godanti
23	Do	Kasis
24	Do	Makshik
25	Do	Tankan

Total:25x3hrs.(75hrs.)

Identificationofdravyasusedin thepracticals(Tray).

Reference books:

Sl No.	Name of Book	Author	Publisher
1	Ayurvediya rasashatra Sachitra	Dr. C. B. Jha	Chaukambha Prakashan
2	Ayurvediya rasashatra	Badinarayan Pandey	Chaukambha Prakashan
3	Bhaishajyakalpana Vijananam	K.Ramchandra Reddy	Chaukambha Orientals

Subject: Dravyaguna – Paper-I (Ayurvedic Pharmacology)

Teaching hours: 155

Examination: Theory: 100 marks

Weekly classes: (4T+2P)

Practical: 50 marks

SECTION–A

Sr. No.	Topics	No. of hrs.
1	Definition of <i>Dravya</i> and <i>Dravyagunashastra</i> and its importance <i>Dravya Vargikarna & Dravya Pradhanyata</i>	05
2	Concept of <i>Rasapanchak</i> , <i>Rasa</i> - Definition, Types of <i>Rasa</i> , <i>Anurasa</i> . <i>Guna</i> - Definition, classification, Total No. of <i>Guna</i> , Description of <i>Gurvdi Guna</i> and action on <i>Dosha</i> , <i>Dhatu</i> and <i>Mala</i> . <i>Vipak</i> - Definition, Types, Properties and action on <i>Dosha</i> , <i>Dhatu</i> and <i>Mala</i> . <i>Veerya</i> – Definition, Types, Properties, Action on <i>Dosha</i> , <i>Dhatu</i> and <i>Mala</i> . <i>Prabhav</i> – Definition, Introduction to the concept of <i>Prabhav</i> with examples.	20
3	Brief about the Classification of <i>Dravya</i> according to Ayurvedic Principles (a) <i>Karya-Karan bheda</i> (b) <i>Chetan- Achetan bheda</i> (c) <i>Panchbhautik composition</i> (d) <i>Yoni bheda</i> (e) <i>Prayogabheda</i> (f) <i>Rasabheda</i> (g) <i>Veeryabheda</i> (h) <i>Vipakbheda</i> (i) <i>Doshkarmabheda</i> (j) <i>Karmatmak</i> .	12

SECTION-B

4	Study of given <i>Karma</i> with definition and examples. (Total 51 <i>Karmas</i>)									17
	No	<i>Karma</i>	No	<i>Karma</i>	No	<i>Karma</i>	No	<i>Karma</i>	No	<i>Karma</i>
	1	<i>Abhishyandi</i>	12	<i>Deepana</i>	23	<i>Medhya</i>	34	<i>Shramahara</i>	45	<i>Varnya</i>
	2	<i>Angamarda-prashamana</i>	13	<i>Grahi</i>	24	<i>Mutra- viranjaniya</i>	35	<i>Shukrajana</i>	46	<i>Vidahi</i>
	3	<i>Arshoghna</i>	14	<i>Hikka- nigrahana</i>	25	<i>Mutra- virechaniya</i>	36	<i>Shukra- shodhana</i>	47	<i>Virechana</i>
	4	<i>Ashmari bhedana</i>	15	<i>Hridya</i>	26	<i>Paachana</i>	37	<i>Shwasahara</i>	48	<i>Vishaghna</i>
	5	<i>Balya</i>	16	<i>Jeevaniya</i>	27	<i>Purisha- viranjaniya</i>	38	<i>Stambhana</i>	49	<i>Vithambhi</i>
	6	<i>Brimhaniya</i>	17	<i>Jwararaha</i>	28	<i>Rasayana</i>	39	<i>Stanyajana</i>	50	<i>Vranaropana</i>
	7	<i>Chakshushya</i>	18	<i>Kandughna</i>	29	<i>Sandhaniya</i>	40	<i>Stanya- shodhana</i>	51	<i>Vrana- shodhana</i>
	8	<i>Chhardi- nigrahana</i>	19	<i>Kanthya</i>	30	<i>Shiro- virechana</i>	41	<i>Trishna- nigrahana</i>		
	9	<i>Chhedana</i>	20	<i>Kasahara</i>	31	<i>Shonita- sthapana</i>	42	<i>Truptighna</i>		
	10	<i>Daha- prashamana</i>	21	<i>Keshya</i>	32	<i>Shoola- prashama na</i>	43	<i>Vajikarana</i>		
	11	<i>Dantya</i>	22	<i>Kushthagh Na</i>	33	<i>Shothahara</i>	44	<i>Vamana</i>		
5	Method of drug collection, storage, preservations, <i>Aushadha sevana kala</i> and knowledge of combination and incompatibility.									04
6	Introduction, types and properties of below mentioned <i>vargas</i> : <i>Jala, madhu, taila, aaharopayogi, dugdha, dadhi, takra, ghrita, mutra, dhanya, shaka</i> and <i>phala</i> .									23

Total: 80 hrs. (Per Lecture 1Hr)

Note: Students will be trained in practical classes for *viva & voce*.

Total: 25 x 3 hrs. (75 hrs.)

Reference books:

Sl No.	Name of Book	Author	Publisher
1	Dravyaguna Vijananam	Gyanendra Pandey	Chaukambha Orientals
2	Bhavapraksha Nighantu	Vaidya Krishna Chandra Chunekar Commentary	Chaukhambha Bharati Academy

Subject: Sharira (Anatomy & Physiology)

Teaching hours: 145

Examination: Theory: 100 marks

Weekly classes: (4T+2P) Practical: 100 marks

SECTION–A (Rachana Sharira)

Sr. No.	Topics	No. of Lect.
1	Structure of cell and its function.	3
2	Definition and Terminology with concept of Shadang Sharira.	2
3	Bones: Numbers, Types according to Ayurveda and Modern science.	2
4	General introduction of the systems of body with special emphasis to location, measurement and external features of the viscera of Digestive, Respiratory, Urinary and Cardiovascular system.	11
5	Sharira, Shaarira, Koshta, Aashaya, Sira, Dhamani & Srotasa.	12
6	Brief introduction to Gyanendriya and Names of the Parts of Brain.	7

SECTION–B (Kriya Sharira)

7	Concept of Dosha. Classification, characteristics and importance for physiological function.	7
8	General introduction of Dhatu, Updhatu and Ojus. Nourishment of Dhatu with different Nyaya.	12
9	Concept of three principal Mala, Their characteristic and function.	3
10	Names of Dhatu Mala.	1
11	Concept of Agni. Classification and importance. Ayurvedic and modern concept of digestion and metabolism.	7
12	Introduction of blood and its components like WBC, RBC, Platelets, Haemoglobin and Plasma.	6

Total: 73 hrs. (Per Lecture 1 Hr)

Practical:24

1	Identification of Bones.
2	Nine regions of abdomen.
3	Organs of the digestive system.
4	Organs of respiratory system.
5	Heart and its parts
6	Organs of the urinary system.
7	Organs of male and female reproductive system.
8	Brain and its parts.
9	Cell and its organelle.
10	Identification of Microscope, Haemocytometer, Haemoglobinometer.
11	Identification of contents of prepared slides. Different types of WBC, RBC and Platelets.
12	Method of estimation of Haemoglobin.
13	Method of examination of Urine & Its parameters.

Total: 24x3hrs. (72hrs.)

Reference books:

Sl No.	Name of Book	Author	Publisher
1	Human Anatomy In Ayurveda (Shareera Rachana Vijnana)	Dr. U. Govind Raju	Chaukhambha Orientalia
2	Human Anatomy	B D Chaurasia	CBS Publishers & Distributors
3	Kriya sharer Vijnanaam	Dr. Pandey	Chaukhambha Orientalia
4	Essential of physiology	Dr. Sambhuligam	JP Publisher

Subject: Fundamentals of Ayurveda and Swasthivritta

Teaching hours: 70 Hrs

Examination: Theory: 100 marks

Weekly classes: (4T)

SECTION-A

Sr. No.	Topics	No. of Hrs
1	Definition of Ayu and Ayurveda with introduction to Ashtanga Ayurveda.	3
2	Name, definition and importance of Shat Padarth and introduction to Karanand Karya Dravyas.	10
3	Concept of Panch Mahabhuta and brief introduction of Disha, Kala, Atmaand Mana.	9
4	Introduction and utility of Pramana - Pratyaksha, Anuman, Aaptopadeshand Yukti.	8
5	Introduction to Brihatrayi, Laghutrayi, Rasa Ratna, Sammuchaya, Rasatarangini, Ayurveda Prakash, Bhaishajya Ratnavali and Rasamrita.	8

Fundamentals of Swasthivritta

SECTION-B

Sl No	Topic	No. of Hrs
6	Health in Ayurveda and Importance of Swasthivritta Subtopics (Each class 01 hr) Concept of Health Different aspects of Health Importance of Swastha and Swaasthya Concept of wellness	03
7	Concept of Healthy regimen in classics. Subtopics (Each class 01 hour) Basic principles of Healthy regimen in Ayurveda Seasonal regimen in Ayurveda Seasonal detoxification therapies Seasonal prophylaxis Prophylaxis during seasonal change Drugs during different seasons Codes of conduct as per classics	07
8	Health promotion Health Promotion measures in Ayurveda	02

	Wellness drugs in Ayurveda	
9	Food and Nutrition in Ayurveda Concept of Food and its classification as per classics Concept of Nutrition Sources and functions of nutrients Nutritional deficiency disorders Concept of Nutrition in Ayurveda Classics	10
10	Rasayana Concept of Rasayana Classification of Rasayana drugs Application of Rasayana drugs	03
10	Occupational Health Introduction of industries Occupational health and Occupation Health hazards. Prevention and control of Occupational hazards	04
11	Legislation Introduction of Factory act. Introduction to ESI act	03

Reference books:

Sl No.	Name of Book	Author	Publisher
1	Charaka Samhita	Yadavaji Trikamji	Chaukhambha Orientale
2	Sushrut Samhita	Yadavaji Trikamji	Chaukhambha Orientale
3	A text book Swasthavritta	Sushant baragale	Chaukhambha Orientale
4	A text book Swasthavritta	Sudhakar reddy	Chaukhambha Orientalia

Syllabus for Final Year

Subject: Rasashastra and BhaishajyaKalpana- Paper-II (Ayurvedic Pharmaceutics)

Teaching hours: 145

Examination: Theory: 100 marks

Weekly classes: (3T + 2P)

Practical: 100 marks

SECTION–A

Sr. No.	Topics	No. of Lect.
1	Introduction of Avalehakalpana (Definition, method, pakapariksha, dose, shelf- life, use, packing, storage and current trends).	07
2	Introduction of Snehakalpana (Definition of murchhan, sneha preparation method, avartan, paka, siddhi lakshana, dose, shelf- life, use, packing, storage and current trends).	07
3	Introduction of Sandhankalpana [Definition, types-names (description of Asava-Arishta only), method, parikshavidhi, dose, anupan, shelf- life, use, packing and storage].	07
4	Introduction of Pathyakalpana (Introduction, Manda, Peya, Vilepi, Yusha, Takra, Katvar, Udashvita and Mathita)	05
5	Introduction of Basti [Definition, types (definition only) and nirmana].	05
6	Introduction of Lepa and Malaharakalpana.	04

SECTION–B

7	Introduction of Ashtasamskar of Parada, Kajjali, Parpati, Kupipakva, Pottali and Kharaliyarasayan.	16
8	Introduction , shodhana, maran, dose and formulations of- Dhatu- Svarna, Tamra, Loha, Vanga Ratna-Manikya, Pravala, Upratna-Introduction Visha and Upvisha- Vatsnabha, Bhallataka, Kupilu, Jaypal. Sudhavarga-Sudha, Godanti, Shankha, Shukti, Samudrafena.	05 04 05 05

Total: 70hrs. (Per Lecture 1Hr).

Practical: 25

Sl No.	Form	Examples
1	Churna	Triphala
2	Kwathchoorna	Dashmuuka
3	Arka	Gulabarka
4	Avaleha	Haridrakhana
5	Ghrita	TriphalaGhrita
6	Guti-Vati	EladiGutika
7	Guuggulu	Vidangadiguggulu
8	Taila	NorgundiTaila
9	Asava-Arishta	Arjunarishta
10	Bhasma	ShankhaBhasma
11	LavanKashara	NarikelLavan
12	Lepa	Dashanglep
13	Anjana	Rasanja
14	Satva	GuduchiSatva
15	Kupipakwa	Rasasindur
16	Parparti	Rasaparpati
17	Pisti	ManikyaPisti
18	Rasayoga	Loknath Rasa
19	Lauha	SaptamrutaLauha
20	Capsule	With suitable dugs
21	Syrup	With suitable dugs
22	Ointment	With suitable dugs
23	Emulsion	With suitable dugs
24	Suspension	With suitable dugs
25	Cream	With suitable dugs

Total: 25 x 3 hrs. (75 hrs.)

Identification of dravyas used in the practicals. (Tray).

Reference books:

Sl No.	Name of Book	Author	Publisher
1	Bhiashjya Guna Vijananm	Dr Alakh Narayan Singh	Chaukhambha Prakashan
2	Test book Rasashtra	Dr. S. N. Mishra	Chaukhambha Prakashan
3	Text book of Bhaishjya Kalpana	Dr. Shobhji Hiremath	Chaukhambha Prakashan

Subject: Dravyaguna – Paper-II (Ayurvedic Pharmacology)

Teaching hours: 160 hrs

Examination: Theory: 100 marks

Weekly classes: (3T + 2P)

Practical: 100 marks SECTION–A

Sr. No.	Topics	No. of Lect.
1	<p>Detailed knowledge of following <i>dravyas</i> with respect to main synonyms, regional names, botanical name, family, habit & habitat, external morphology, part used, <i>rasa panchaka</i>, pharmacological actions, therapeutic indications, dose and formulations. (Total 80 Dravyas)</p> <p><i>Agnimantha</i> 31 <i>Jatiphala</i> 60 <i>Sariva</i> <i>Amalaki</i> 32 <i>Kalamegha</i> 61 <i>Sarpagandha</i> <i>Apamarga</i> 33 <i>Kanchanara</i> 62 <i>Shalaparni</i> <i>Arjuna</i> 34 <i>Kantakari</i> 63 <i>Shallaki</i> <i>Arka dwayam</i> 64 <i>Shalmali</i> <i>Ashoka</i> 35 <i>Kapikacchhu</i> 65 <i>Shankhapushpi</i> <i>Ashwagandha</i> 36 <i>Kapoorra</i> 66 <i>Shatavari</i> <i>Ativisha</i> 37 <i>Karanja</i> 67 <i>Shigru</i> <i>Baboola</i> 38 <i>Karkatshringi</i> 68 <i>Shirisha</i> <i>Bakuchi</i> 39 <i>Ketaki</i> 69 <i>Shyonaka</i> <i>Bala</i> 40 <i>Khadira</i> 70 <i>Sunthi</i> <i>Bhallataka</i> 41 <i>Kiratatikta</i> 71 <i>Trivrutta</i> <i>Bhringaraja</i> 42 <i>Kumara</i> 72 <i>Tulasi</i> <i>Bilwa</i> 43 <i>Kutaja</i> 73 <i>Twak</i> <i>Bramhi</i> 44 <i>Lavanga</i> 74 <i>Vacha</i> <i>Chandana dwayam</i> 45 <i>Madanaphala</i> 75 <i>Varuna</i> <i>Chitraka</i> 46 <i>Mamejaka</i> 76 <i>Vasa</i> <i>Dhatura</i> 47 <i>Mandookaparni</i> 77 <i>Vatsanabha</i> <i>Draksha</i> 48 <i>Manjishtha</i> 78 <i>Vibhitaki</i> <i>Durva</i> 49 <i>Maricha</i> 79 <i>Vidanga</i> <i>Ela dwaya</i> 50 <i>Methika</i> 80 <i>Yashtimadhu</i> <i>Eranda</i> 51 <i>Musta</i> <i>Gambhari</i> 52 <i>Nagakeshara</i> <i>Gokshura</i> 53 <i>Nimbu</i> <i>Guduchi</i> 54 <i>Nirgundi</i> <i>Guggulu</i> 55 <i>Palasha</i> <i>Haridra</i> 56 <i>Patala</i> <i>Haritaki</i> 57 <i>Pippali</i> <i>Hingu</i> 58 <i>Punarnava</i> <i>Jatamamsi</i> 59 <i>Rasona</i></p>	40

SECTION-B

2	Botanical name, family, part used, <i>veerya</i> , single main action of the following drugs. (Total 60 Dravyas)	20
	<i>Aavartaki</i> 21 <i>Kokilaksha</i> 41 <i>Saireyaka</i> <i>Aavartani</i> 22 <i>Kushmanda</i> 42 <i>Saptaparna</i> <i>Ashvattha</i> 23 <i>Kushtha</i> 43 <i>Sarpunkha</i> <i>Bharangi</i> 24 <i>Latakaranja</i> 44 <i>Shalparni</i> <i>Bhunyaamlaki</i> 25 <i>Lodhra</i> 45 <i>Shatapushpa</i> <i>Chakramarda</i> 26 <i>Majuphala</i> 46 <i>Shati</i> <i>Changeri</i> 27 <i>Markandika</i> 47 <i>Snuhi</i> <i>Chavya</i> 28 <i>Meshashringi</i> 48 <i>Surpunnaga</i> <i>Dadima</i> 29 <i>Mishreya</i> 49 <i>Tagara</i> <i>Danti</i> 30 <i>Musali</i> 50 <i>Talisapatra</i> <i>Daruharidra</i> 31 <i>Narikela</i> 51 <i>Tamalapatra</i> <i>Devadaru</i> 32 <i>Palandu</i> 52 <i>Tila</i> <i>Dhanyaka</i> 33 <i>Parisha</i> 53 <i>Udumbara</i> <i>Dhataki</i> 34 <i>Patola</i> 54 <i>Ushira</i> <i>Gunja</i> 35 <i>Plaksha</i> 55 <i>Vansha</i> <i>Jivanti</i> 36 <i>Priyangu</i> 56 <i>Vata</i> <i>Kampillaka</i> 37 <i>Prushnaparni</i> 57 <i>Vidari</i> <i>Kankola</i> 38 <i>Pushkaramoola</i> 58 <i>Vijayasara</i> <i>Karchura</i> 39 <i>Rasna</i> 59 <i>Vrukshamla</i> <i>Karvellaka</i> 40 <i>Rohitaka</i> 60 <i>Yavani</i>	
3	Ingredients and collective action of following <i>Mishraka varga</i> . (Total 30 <i>Mishrak varga</i>)	25
	<i>Ashtavarga</i> 11 <i>Madhura triphala</i> 21 <i>Shadushna</i> <i>Aushadhi</i> 12 <i>Madhuratraya</i> 22 <i>Sugandhatriphala</i> <i>Chaturbeeja</i> 13 <i>Madhyama</i> 23 <i>Swalpatriphalapanchamoola</i> <i>Chaturbhadra</i> 14 <i>Panchagavya</i> 24 <i>Trijata</i> <i>Chaturjata</i> 15 <i>Panchakola</i> 25 <i>Trikantaka</i> <i>Chaturushna</i> 16 <i>Panchapallava</i> 26 <i>Trikarshika</i> <i>Chatusama</i> 17 <i>Panchasugandhika</i> 27 <i>Trikatu</i> <i>Dashamoola</i> 18 <i>Panchatikta</i> 28 <i>Trimada</i> <i>Kantaka</i> 19 <i>Panchavalkala</i> 29 <i>Triphala</i> <i>Katu chaturjata</i> 20 <i>Samatritaya</i> 30 <i>Truna</i> <i>panchanmoola</i>	

Total: 85 hrs. (Per Lecture 1Hr).

Practical: 25

1	Market survey of Ayurvedic drugs.
2	Description and identification of drugs mentioned in theory & Preparation of any 40 herbarium sheets of any drugs mentioned in theory syllabus.
3	Genuineness test of following substances. Gaudugdha, ghrita, hingu, madhu and guda.

Total: 25 x 3 hrs. (75 hrs.)

Reference books:

Sl No.	Name of Book	Author	Publisher
1	Dravyaguna Vigyana (Vol. 1-2)	Yadavji Tikram Ji	Chaukhambha

			Prakashan
2	Dravyagunavijnana basic Principles	Prof.D.S.Lucas	Chaukhambha Prakashan

Subject: Fundamentals of Roga Nidana Evam Chikitsa (Ayurvedic Pathology)
Teaching hours: 60 **Examination: Theory: 100 marks**
Weekly classes: (4T)
SECTION–A

Sr. No.	Topics	No. of Lect.
1	Causes and symptoms of increased and decreased Dosha, Dhatu, and Mala.	3

2	Definition and classification of Roga and Roga Pariksha according to Ayurved.	5
3	Classification of Roga – Sharirika, Manasika, Svabhavika, Agantuja, Adhyatmika, Adhibhautika and Adhidaivika.	3
4	Classification of Roga Priksha – Darshan, Sparshan and Prashna. Pratyaksha, Anuamana, Aptopadesh	4
5	Concept of Nidan Panchaka.	06
6	Concept of Shatkriyakala and its importance.	05
7	Concept of Ama – Definition, Symptoms and its importance.	05

SECTION-B

8	Definition and classification of Chikitsa. Daivavyapasharya, Yuktivyapashraya and Sattvavajay.	03
9	Concept of Chikitsa Chatushpada.	01
10	Brief introduction to Chikitsa Upakrama – Dwividha, Shadvidha. Name of Ashthavidha Shastrakarma and Saptavidha Vranopkrama.	07
11	Brief introduction to Panch Karma	05
12	Brief introduction to Rasayana, Vajikarana, Yoga Chikitsa and its importance.	4
13	Management principles of Dosha, Dhatu and Mala chikitsa. Srotos wise chikitsa.	06
14	Clinical application of Pathya apathya, Anupana, Bheshaja kala.	3

Total: 60hrs. (Per Lecture 1Hr)

Reference books:

Sl No.	Name of Book	Author	Publisher
1	Madhav Nidanam	Sri Sudarshan Shastri	Chaukhambha Prakashan
2	Kayachikta	Kasturi	Chaukhambha Prakashan

Subject: Pharmaceutical Jurisprudence & Drug House Management Teaching hours: 80

Examination: Theory: 100 marks

Weekly classes: (4T)

SECTION-A (Pharmaceutical Jurisprudence)

Sr. No.	Topics	No. of Lect
1	A brief review of Pharmaceutical Legislations in India -- An overview.	02
2	Brief study of : The Pharmacy Act – Objectives, constitution & Functions of PCI,	06

	SPC, JSPC; Offences and Penalty. Drugs & Cosmetics Act – Definition, Importance, Manufacture, sale of drug; Labelling & packaging of Drug, Administration of Act; Provisions for Ayurvedic products, Offences and Penalty, Schedules – an overview. Shops & Establishment Act – Registration, Working hours, working condition, Appointment letter, Wages, Offences and Penalty. Poisonous Drug Act – Handling and sale of Poison, Storage of Poison, Offences and Penalty. Drug & Magic remedies – Prohibited Advertisement, Prohibition on import and export of Advertisement, Offences and Penalty. (Air) Pollution act – Definitions – Pollutant, Pollutant, Etc., Pollution control area.	18 02 02 03 03 02
3	Brief Introduction of Patents Act and IPR – Patent, An overview, Types of Patent / IPR., Patent filling procedure, Things can be / cannot be patented, rights of patentee.	02
4	GMP for ASU medicines: Schedule T Quality Assurance Machineries and equipments of Ayurvedic Pharmacy.	04
5	Ayurvedic Pharmacopeia of India and Ayurvedic Formulary of India.	02

SECTION–B (Drug House Management)

6	Trade & commerce - Introduction to Trade, Industry & Commerce- Meaning, characteristics, importance, auxiliary services.	7
7	Drug house Management: Legal requirements, formalities, site selection, Finance availability.	7
8	Purchases Management in Pharmaceutical Industry-Importance and objectives of Purchasing, selection of suppliers, purchase procedures, good purchase factors.	7
9	Inventory controls (Materials Management)- Definition, types of inventory, Techniques of inventory control, objectives of inventory control.	6
10	Marketing Pharmaceutical products, Advertisements, sales promotion, Training, compensation plans and salesmen.	7

Total: 80 hrs. (Per Lecture 1Hr)

Reference books:

Sl No.	Name of Book	Author	Publisher
1	Pharmaceutical Jurisprudence	Dr.B.S.Kuchekar	Nirali Prakashan
2	Text book forensic Pharmacy	Dr. C. K. Kokate	Pharma Med Press

Subject: Dispensing, Community pharmacy and Hospital Pharmacy
Teaching hours: 140 hrs Examination: Theory: 100 marks
Weekly classes: (2T+2P) Practical: 100 marks

SECTION-A

Sr. No.	Topics	No. of Lect.
1	Dispensing Pharmacy. Definition and introduction of Posology and Dispensing Pharmacy. factors affecting posology	2
2	Introduction to Prescription and dispensing techniques – Reading, understanding and handling of prescriptions.	4
3	Introduction to various dosage forms with Principles and procedures in mixtures, solutions, Emulsions, Churnas, Kwath churnas, Powders (Bhasmas etc.), external preparations, suppositories, basti, asavarishta, vati, gutika etc	5
4	Care required in dispensing procedures, labeling, storage, stability, maintenance and practice of Good hygienic conditions.	8
5	Community pharmacy- Define and introduction of Community Pharmacy	05
6	Role and contribution of pharmacist in community health care and education.	03

SECTION-B

7	Hospital and Hospital pharmacy : Introduction Drug distribution system in hospitals. (OPD-IPD). Drug information services, records and reports. Drug information services, records and reports. Brief introduction to processing of tablets, capsules, syrups, tinctures Surgical dressings, sterilization equipments and procedures	10
8	Patient counseling and Pharmacovigilance.	04
9	Introduction of first aid and introduction of national health programmes.	9

Total: 50 hrs. (Per Lecture 1Hr).

Practical: 30

1	Dispensing pharmacy in OPD-IPD for two days in a week.
2	To write Prescription and dispense Ayurvedic drugs and formulations for at least 15
3	Different diseases Etiology, Diagnosis & Treatment.
4	To identify and note the organoleptic characters and uses of at least 50 Drugs and formulations.

Total: 30 x 3 hrs. (90 hrs.)

Reference books:

Sl No.	Name of Book	Author	Publisher
1	Dispensing And Community Pharmacy	Dr. S. B. Gokhale	Nirali Prakashan
2	A Text Book Of Hospital and Pharmacy	Dr. A. R. Paradkar	Pharma Med Press

Ordinance Governing Fellowship in Aquatic Therapy

Syllabus / Curriculum 2022



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VISION

To be an outstanding University 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 and 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 stake holders for vision oriented growth.

To fulfil the national obligation through rural health missions

OBJECTIVES

The objectives are to realize the following at university 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 & personal counseling are in-built into the system of curriculum delivery.
- ✦ To strengthen, develop and implement staff and student welfare programs.

INSIGNIA



The Emblem of the University is a Philosophical statement in Symbolic.

The Emblem...

A close look at the emblem unveils a pillar, a symbol of the “University 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 University 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

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Section I
PREAMBLE

Health and fitness as identified by many health agencies like world health organization (WHO) is the major concern of the world. With change in lifestyle as well as the advancement in science has led to more of machines replacing the human beings, it is more of mental skill and work than that of physical work, leading to many health hazards.

Aquatic Exercises are planned and structured physical activities for the purpose of recovery for any part of the body. Aquatic Exercises are to improve health and fitness and is important as a means of physical rehabilitation. The scarcity of trained professionals leads to amplification of the problems faced by the community

The present course is initiated with an intention to enable the Physiotherapist or health professionals to gain knowledge and skill to train for health and illness and to address the global problem of health and fitness.

Section-II

Goals of Aquatic Therapy

Goals of Aquatic Therapy courses are as follows:

- ✦ Teach common problems of health and disease using water and its properties for bringing Therapeutic changes
- ✦ Provide educational experience that allows hands on experience both in hospital, Physiotherapy centers as well as in community setting for health benefit of community members/ individuals.
- ✦ Make maximum efforts to encourage integrated teaching methods.
- ✦ Use learner-oriented methods which encourage clarity of expression, independence of judgment, scientific habits, problem solving abilities, self-initiated and self-directed learning.
- ✦ Use of active methods of learning such as group discussions, role play, demonstrations, peer interaction, etc which would enable to develop personality, communication skills and other qualities which are necessary.
- ✦ Establish an Aquatic therapy education unit for faculty development, preparation of learning resource materials and for imparting evaluation methods.
- ✦ Creating Newer Evidences in Aquatic Therapy by Active Participation in Research and its Publications

Section-III

AIMS AND OBJECTIVES

- To provide knowledge of global standard in theory and hands -on skill to the certified students
- To provide detailed knowledge of Aquatic Therapy Concepts and to create new evidences which leads to Evidence Based Practice.
- To provide professional Certification.
- To enable physiotherapists to qualify and create opportunities to work as Aquatic therapy professionals.
- To apply theoretical concepts of Aquatic Therapy into clinical settings.
- To encourage involvement in research and publication.

Section-IV

REGULATIONS FELLOWSHIP IN AQUATIC THERAPY

Eligibility: A candidate seeking admission to Aquatic therapy courses should have completed MPT/MOT.

Duration of the Course: Every student shall undergo a period of certified study extending over 12 months from the date of commencement.

Intake: 5 students per Year.

Attendance: Every candidate should have attendance not less than 80% of total classes conducted in theory and practical.

Examination system: Theory as well as Practical examination will be conducted at the end of the course.

Criteria for Pass: 80% attendance in theory and practical classes and 50 percent passing marks in theory and practical. Written submission of 20 cases and minimum one publication in an indexed journal. To present minimum 2 Journals and 2 Seminars over the duration of the course.

Section- V

SUBJECTS AND TEACHING SCHEDULE

Table V: FELLOWSHIP IN AQUATIC THERAPY

SUBJECT CODE	NAME OF THE SUBJECT	TEACHING HOURS		
		Theory	Practical	Total
	Paper 1- Basic Aquatic Therapy	100	-	100
	Paper 2- Assessment and techniques of Aquatic Therapy	100	670	770
	Paper 3- Aquatic Rehabilitation	100	670	770
	TOTAL	300	1340	1640

Section- VI

Scheme of Examination

Sl. No.	Subject	Theory		Practical		Grand Total
		Written		Practical	Viva Voce	
		Time	Maximum Marks	Maximum marks	Maximum marks	
1	Paper 1 Basic Aquatic Therapy	1.5 hours	50	-	-	50
2	Paper 2 Assessment and techniques of Aquatic Therapy	1.5 hours	50	75	25	150
3	Paper 3 Aquatic Rehabilitation	1.5 hours	50	75	25	150

Guidelines for Theory Examinations

Type of Questions	Marks
Long Essay Question = 2x10	20
Short Essay Question = 6 x 5	30
Total	50
Duration	1.5 Hours

Guidelines for University Practical Examinations

Type of Questions	Marks
One Long Case	30
Two Short Cases	45
Total	75
Students Allotted	5/day

Valuation system	Double valuation system.
Examiner for Practical.	1 External Examiner & 1 Internal Examiner

SUBJECTS AND TEACHING SCHEDULE

FELLOWSHIP IN AQUATIC THERAPY

This is a specially designed course for physiotherapy graduates to enable them to deal with Neurological, Musculoskeletal and Cardiorespiratory diseases more efficiently with Aquatic Therapy. This course will enable them to understand the requirement and the prerequisites for the enhancement of the individual's rehabilitation. Prevention of further complications and faster recovery to maintain ICF model with special emphasis on scientifically designed aquatic therapy program.

CONTENTS:

Paper 1 Basic in aquatic therapy

Basics

- History of Aquatic Therapy
- Properties of water
- Benefits of Aquatic Therapy
- Physiological Effects of Immersion
- Therapeutic Effects
- Precautions
- Clinical Decision Making: Land vs. Water

Paper 2 Assessment and techniques of Aquatic Therapy

Assessment of various conditions in Aquatic Therapy:

- Pediatrics- Cerebral Palsy, Muscular Dystrophies, Spina Bifida, Developmental Delay.
- Adult Neuro- Stroke, TBI, Parkinson's, SCI
- Musculoskeletal- Post fracture, Joint Replacement Surgeries and Inflammatory Conditions, soft tissue injuries
- Women's Health- Antenatal and Postnatal care,
- Geriatrics Health
- Sports and Athletic Conditions

Principles and techniques of various concepts of Aquatic Therapy

- Bad Ragaz ,
- Aqua T-Relax,
- Water Specific Therapy,
- Ai Chi ,
- Hallwick

Assessment and recording of various conditions using WOTA scale and ICF Model

Paper III: Aquatic Rehabilitation

Application of various techniques in Aquatic Therapy

in terms of Shallow and Deep -Water Techniques Including ,Trunk Stabilization ,Proximal Stability & Extremity Strengthening, Balance and Coordination ,Gait Training and Functional Skill Training :

- Bad Ragaz ,
- Aqua T-Relax,
- Water Specific Therapy,
- Ai Chi ,
- Hallwick

Application of various concepts of Aquatic Therapy in various conditions:

- Pediatrics- Cerebral Palsy, Muscular Dystrophies, Spina Bifida, Developmental Delay.
- Adult Neuro- Stroke, TBI, Parkinson's, SCI
- Musculoskeletal-Post fracture, Joint Replacement Surgeries and Inflammatory Conditions , soft tissue injuries
- Women's Health- Antenatal and Postnatal care,
- Geriatrics Health
- Sports and Athletic Conditions

Aquatic Therapy in Covid Rehab

- Application of Aquatic Therapy techniques in post Covid Rehabilitation

Application of techniques in research

Clinical Decision Making: Which is best Aquatic Therapy Techniques

Blending of Aquatic Therapy Techniques.

Best Intervention used for optimal recovery

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