



B L D E UNIVERSITY

Ordinance Governing MBBS Degree Course (REVISED CURRICULUM-2016)

Phase-I

Published by
B L D E University

[Declared as Deemed to be University u/s 3 of UGC act, 1956, vide notification No.F.9-37/2007-U.3 (A)]

The Constituent College

Shri B.M.Patil Medical College, Hospital and Research Centre

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BLDE UNIVERSITY

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The Constituent College

SHRI B. M. PATIL MEDICAL COLLEGE, HOSPITAL AND RESEARCH CENTRE

BLDEU/REG/GEN/2016-17/1917

September 09, 2016

NOTIFICATION

Sub: Revised Curriculum for the MBBS Degree-2016.

- Ref: 1. Medical Council of India Regulation on Graduate Medical Education, 1997 and subsequent amendments of the same from time-to-time.
2. Minutes of the meeting of the Standing Committee of Academic Council of the University held on September 7, 2016.

On approval of the Standing Committee of Academic Council the Curriculum for MBBS Degree course is approved.

The revised curriculum shall be effective from the Academic Session 2016-17 onwards, for MBBS degree course in the constituent College of the University viz. Shri B. M. Patil Medical College, Hospital and Research Centre.


REGISTRAR
REGISTRAR
BLDE University, Vijayapura.

To,
The Dean, FoM & Principal
Shri B. M. Patil Medical College,
Hospital and Research Centre,
Vijayapura.

Copy to:

- The Secretary UGC New Delhi.
- Controller of Examinations.
- Prof. & HODs of Pre, Para and Clinical Departments.
- P.S. to Hon'ble President.
- P.S. to Hon'ble Vice-Chancellor.

Smt. Bangaramma Sajjan Campus, Sholapur Road, Vijayapura - 586103, Karnataka, India.

Vision & Mission

- Excellence in all our endeavours.
- Committed to provide globally competitive quality medical education.
- Provide the best health care facilities in this backward region, in particular, to socially disadvantaged sections of the society.
- Constantly striving to become a Reputed research University with world-class infrastructure, latest tech-tools for teaching/research and adopting global best practices.

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Phase I

Introduction

The revised M.B.B.S curriculum of The Medical Council of India (MCI) came into effect from May 1997 and it has undergone amendments thereof. The BLDE University has implemented the new regulations for the batches of students admitted to the M.B.B.S course from the academic year 2008-09 and onwards. Later the curriculum was revised in 2012-13. This third revision will be implemented for the batches of students admitted to the M.B.B.S Course from the academic year 2016-17 onwards.

These regulations recommend the following:

- 1) That every medical college should have curriculum committee which would plan curricula and instructional method which would be updated regularly.
- 2) That every medical college establishes a medical education unit for faculty development, preparation of learning resource materials and improved evaluation methods.
- 3) That every medical institution should evolve institutional objectives, which would be in consonance with the national goals (See Section II) and health policy. The institutional objectives should describe the attributes of their product.
- 4) That the medical curriculum should be oriented towards educating students to take up the responsibilities of physicians of first contact. The medical graduate should be capable of functioning independently in both urban and rural environment of our country and internationally.
- 5) That educational experience should emphasise health rather than only disease, and community orientation also instead of only hospital orientation. Population control, national health programs and family planning should also be given due emphasis. The thrust should be on common diseases rather than rare disorders.
- 6) Every effort should be made to provide educational experience that allows hands-on-experience both in hospital as well as in community setting. For this purpose, a comprehensive list of clinical skills that a graduate must acquire at the end of the course including internship has been prepared.

- 7) That there should be Shift in the role of medical teachers from mere imparting knowledge to that of a facilitator and motivator of student learning.
- 8) That every effort should be made to use learner oriented methods which would encourage cultivation of logical thinking, clarity of expression, independence of judgment, scientific habits, problem solving abilities, and self-directed learning.
- 9) Integration of ICT in teaching learning process is required and should be implemented.
- 10) Reduction of “didactic lectures (not more than 1/3 of total teaching hours) and increasing use of active methods of learning such as group discussion seminars, role play, field visits, demonstrations, peer interactions etc. which would enable students to develop personality, communication skills and other qualities which are necessary
- 11) That maximum effort should be made to encourage integrated teaching and every attempt be made to de-emphasise compartmentalization of disciplines so as to achieve horizontal and vertical integration in different phases. This can be planned by encouraging integrated teaching between traditional subject areas using a problem based learning approach starting with clinical or community cases and exploring the relevance of various preclinical disciplines in both understanding and resolution of the problem.
- 12) Areas which need to be addressed with due importance are:
 - Maternal and child health
 - Sanitation and water supply
 - Immunization and revised guidelines
 - Health education
 - IHPS standard of health at various levels
 - Biomedical waste disposal
 - Orientation to Organizational and Institutional arrangements in health care delivery
 - Training in documentation skills and research
 - History of modern medicine
 - Awareness regarding ethical issues and problems, analysis and competency in dealing in an acceptable manner [Medical ethics teaching should be planned at all levels with dedicated time allotment. It should be taught in all phases with appropriate clinical relevance].

- 13) That every effort should be made to use learner oriented methods which would encourage cultivation of logical thinking, clarity of expression, independence of judgment, scientific habits, problem solving abilities, and self-directed learning.
- 14) Regular periodic assessment to be done throughout the course for internal assessment. The assessment need not be limited to written tests. It should relate to other items such as maintenance of records, participation in seminars and group discussions, clinical case study, proficiency in carrying out practical or clinical skill or participation in projects and assignments (even) during vacation. These be evaluated objectively and recorded.
- 15) Examinations be designed with a view to assess not merely the knowledge but also practical and clinical skills, habits and values which are necessary for a graduate to carry out professional day to day work competently

BLDE University endorses these recommendations and strongly desires to implement them while conducting the MBBS course

SECTION - I

Objectives of Medical Education

(As stated in MCI Regulations, 1997 amended up to Feb 2012)

This section contains the goals and general objectives of graduate medical education as stated in MCI Regulations, It is desired that in consonance with these national goals, each medical college should evolve institutional objectives.

1. NATIONAL GOALS:

At the end of undergraduate programme, the medical student should be able to:

- (a) Recognize 'health for all' as a national goal and health right of all citizens and by undergoing training for medical profession fulfill his/her social obligations towards realization of this goal;
- (b) Learn every aspect of National policies on health and devote himself/herself to its practical implementation;
- (c) Achieve competence in practice of holistic medicine, encompassing promotive, preventive, curative and rehabilitative aspects of common diseases.
- (d) Develop scientific temper, acquire educational experience for proficiency in profession and **promote healthy living.**
- (e) Become exemplary citizen by observation of medical ethics and fulfilling social and professional obligations, so as to respond to national aspirations.

2. INSTITUTIONAL GOALS

The undergraduate students coming out of a medical institution should:

- (a) Be competent in diagnosis and management of common health problems of individual and the community, commensurate with his/her position as a member of the health team at the primary, secondary or tertiary levels, using his/her clinical skills based on history, physical examination and relevant investigations;
- (b) Be competent to practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems;

- (c) Appreciate for different therapeutic modalities, be familiar with the administrations of the “essential drugs” and their common side effects;
- (d) Be able to appreciate the social-psychological, cultural, economic and environmental factors affecting health and develop humane attitude towards the discharging one’s professional responsibilities.
- (e) Possess the attitude for continued self learning and to seek further expertise or to pursue research in any chosen area of medicine, action research and documentation skills.
- (f) Be familiar with the basic factors which are essential for the implementation of the National Health Programs including practical aspects of the following:-
 - i) Family Welfare and Maternal and Child Health (MCH)
 - ii) Sanitation and water supply,
 - iii) Prevention and control of communicable and non-communicable diseases,
 - iv) Immunization,
 - v) Health Education;
 - vi) IPHS standard of health at various levels of service delivery and medical waste disposal.
 - vii) Organizational institutional arrangements
 - viii) Basic management skills in managing various aspects of health care delivery, inventory skills
- (g) Acquire basic management skill in the area of human resources, materials and resource management related to health care delivery, general and hospital management, principal inventory skills and counseling.
- (h) Be able to identify community health problems and learn to work to resolve these by designing, instituting corrective steps and evaluating outcome of such measures.
- (i) Be able to work as a leading partner in health care teams and acquire proficiency in communication skills& work in a variety of health care settings.
- (j) Have personal characteristics and attitude required for professional life such as personal integrity, sense of responsibility and dependability and ability to relate to or show concern for other individuals.

(k) All efforts must be made to equip the medical graduate to acquire the detailed skills as mentioned in the Appendix B of Medical Council of India Regulations on Medical Education, 1997.

[Source: GME Regulations amended up to February 2012]

SECTION - II

REGULATIONS GOVERNING M.B.B.S. DEGREE COURSE

(Eligibility for Admission, Duration, Attendance and Scheme of Examination as per the norms laid down in the Regulations on Graduate Medical Education of Medical Council of India and the amendments thereof (till July 2016); admission to UG course - MBBS)

1. ELIGIBILITY

1.1 **Qualifying Examination**

Student seeking admission to first MBBS course:

- i) shall have passed two year Pre University examination conducted by Department of Pre University Education, Karnataka State, with English as one of the subjects and Physics, Chemistry and Biology as optional subjects. The candidate shall have passed subjects of English, Physics, Chemistry and Biology individually.

OR

- ii) shall have passed any other examination conducted by Boards / Councils / Intermediate examination established by State Governments / Central Government and recognized as equivalent to two year Pre University examination by the BLDE University / Association of Indian Universities (AIU), with English as one of the subjects and Physics, Chemistry and Biology as optional subjects and the candidate shall have passed subjects of English, Physics, Chemistry and Biology individually.

OR

- iii) shall have passed Intermediate examination in Science of an Indian University / Board / council or other recognized examining bodies with Physics, Chemistry and Biology, which shall include a practical test in these subjects and also English as compulsory subject. The candidate shall have passed subjects of English, Physics, Chemistry and Biology individually.

OR

- iv) shall have passed first year of the three year degree course of a recognized University with Physics, Chemistry and Biology including a practical test in these subjects provided the examination is an 'University Examination' provided that the candidate shall have passed subjects of English, Physics, Chemistry and Biology individually in the Pre University or other examinations mentioned in the clauses above.

OR

- v) shall have passed B.Sc. Examination of an Indian University, provided that he/she has passed the B.Sc. examination with not less than two of the following subjects: Physics, Chemistry, Biology (Botany, Zoology) provided that candidate has passed subjects of English, Physics, Chemistry and Biology individually in the qualifying examinations mentioned in clauses (i) (ii) and (iii).

Note: Candidates who have passed "Physical Science" instead of Physics and Chemistry as two separate subjects are not eligible for admission to MBBS course as per Medical Council of India Regulations vide letter MCI-37(2)/2001/Med.922 dated 14.02.2001

1.2 Marks

The selection of students shall be based on merit provided that:

- a) In case of admission on the basis of qualifying examination, a candidate for admission to MBBS course must have passed individually in the subjects of Physics, Chemistry, Biology and English and must have obtained not less than 50% marks for general category, 40% for SC, ST and OBC students taken together in Physics, Chemistry and Biology in the qualifying examination.

The minimum marks shall not be less than 45% taken together in Physics, Chemistry and Biology for physically handicapped candidates with lower limb locomotor disability of 40 to 70%.

- b) The student shall appear for All India National Eligibility cum Entrance Test [NEET] and must qualify securing valid rank.

- 1.3 **Age:** The candidate should have completed 17 years of age on or before 31st day of December of the year of admission.

DURATION OF THE COURSE

- i) Every student shall undergo a period of certified study extending over 4¹/₂ Academic years from the date of commencement of this study for the subject comprising the medical curriculum to the date of completion of the examination followed by one year compulsory rotating Internship.

The 4¹/₂ years course has been divided into three Phases.

1. **Phase – I** – 1 year, consisting of two terms of 6 months each.
 2. **Phase – II** - 1¹/₂ years, consisting of three terms of 6 months each
 3. **Phase – III** - 2 years, consisting of 4 terms of 6 months each.
- ii) The first year shall be occupied in the study of the Phase - I (Pre Clinical) subject of Human Anatomy (650 hours), Physiology including Bio Physics (480 hours), Bio Chemistry (240 hours) and Introduction to Community Medicine (60 hours). A detailed syllabus is given in later Section.
- iii) After passing pre-clinical subjects in Phase – I, the Phase – II shall be 3 terms (1¹/₂ years), devoted to Para clinical and Clinical subjects. Para Clinical subjects shall consist of Pathology, Pharmacology, Microbiology, Forensic Medicine including Toxicology and part of Community Medicine. During this phase the clinical subjects shall be taught concurrently. The clinical subjects taught will be Medicine and its allied specialties, Surgery and its allied specialties and Obstetrics and Gynecology.
- iv) Phase – III Part-I consists of Community Medicine, ENT and Ophthalmology.
- v) Phase – III Part-II consists of Medicine & allied specialties, Pediatrics, Surgery and allied specialties, Obstetrics and Gynecology.

ACADEMIC TERMS

All candidates admitted beyond the last date stipulated by the University shall have to appear for I Professional Examination to be held subsequent to the regular examination after completion of the prescribed duration.

ATTENDANCE

Every candidate should have attendance not less than 75 % of the total classes conducted in theory, practical and clinical jointly in each calendar year calculated from the date of commencement of the term to the last working day as notified by the University in each of the subjects prescribed to be eligible to appear for the University Examination. (vide Medical Council of India Notification on Graduate Medical Education (Amendment) Regulations 2003, published in the Gazette of India Part III, Section 4, Extraordinary issued on 15th October 2003)

The Principal should notify at the college the attendance details at the end of the each term without fail under intimation to this University.

The candidate lacking in the prescribed attendance and progress in any subject(s) in theory or practical/clinical in the first appearance should not be permitted to appear for the examination in that subject(s).

Teaching Hours and Hospital Postings

Number of teaching hours allotted for various subjects are as under:

Table 1:- Theory Lectures, Demonstrations and Seminars etc.

Method	Subject/Number of Hours			
	Anatomy	Physiology	Biochemistry	Community Medicine
Lectures	4 hrs per week	160 hrs	120 hrs	40 hrs
Tutorials	1 hr per week	80 hrs	20 hrs	10 hrs
Group Discussion*	1 hrs per week		20 hrs	4hrs
Practical/Demonstration**	2 hrs per week	240 hrs	80 hrs	6 hrs
Dissection	8 hrs per week	---	---	---
Total	650	480	240	60

* Includes Seminars, Integrated Teaching

** Includes field visits

Scheme of Examination

Internal Assessment

It shall be based on evaluation of assignment, presentation of seminar, clinical a Clinical presentation etc., (see Annex — I for examples).

Regular periodic examinations should be conducted throughout the course. Although the question of number of examinations left to the institution, there should be a minimum of at least three (3) sessional examinations during the course. One of these tests can be in the form of MCQS. One of the practical/clinical examination can be in the form of OSPE/OSCE. Average of best two examination marks should be taken into consideration while calculating the marks of the internal assessment. Day-to-day records should be given importance in the internal assessment.

Proper record of the work should be maintained, which will be the basis of internal assessment of all students and should be available for scrutiny.

Weightage for internal assessment shall be 20% of total marks in the subject.

A student must secure at least 35% of total marks fixed for internal assessment in a particular subject in order to be eligible to appear in the University Examination of that subject. (*Vide Medical Council of India Notification on Graduate Medical Education (Amendment.) Regulations 2003, published in the Gazette of India Part III, Section 4. Extraordinary issued on 15th October 2003.*)

Assistant Professor and above or Lecturer with five years of teaching experience can conduct internal assessment examination.

Theory

Minimum of three examinations is recommended. The examination preceding the University examination may be similar to the University examination. The marks allotted for internal assessment for different subjects is shown in Table 3 and 4. Average marks

of best of two notified internal examinations should be reduced to the marks allotted for internal assessment for each subject and should be sent to the University.

Phase I

Internal Assessment for Anatomy & Physiology

Total Marks: 80 (Theory – 60 and Practical – 20) - for each subject

Theory

For theory internal assessment, Minimum of three examinations is recommended. The sessional examination preceding the University examination may be similar to the pattern of University examination. Average of any two best marks obtained in the notified internal examinations may be taken into consideration for calculating internal assessment. The total marks be reduced to 60 and sent to the University.

Practicals

For practical internal assessment there will be two terminal examinations. Five marks will be for records and 15 marks for terminal examinations. Average marks of the two terminal examinations shall be reduced to 15 marks and added to the marks obtained for records and sum of the two shall be sent to the University.

The internal assessment marks both theory and practical obtained by the candidates should be sent to the University at least fifteen days prior to the commencement of theory examination.

Internal Assessment for Biochemistry

Total Marks: 40 (Theory: 30 and Practical: 10)

Theory and Records

Minimum of three examinations are recommended. The examination preceding the University examination will be similar to the University examination. The total marks would be

30. Average marks secured out of best of two notified internal examinations should be reduced to 30. The sum of the marks obtained in theory and records shall be sent to the University.

Practical / Clinical

A minimum of two practical tests is to be conducted, one at the end of each term. Average of the two tests should be reduced to 10 marks and shall be sent to the University. Out of this 10 marks for practicals, 3 marks can be allotted to records.

Assistant Professor and above or Lecturer with five years of teaching experience can conduct internal assessment examination. The internal assessment marks of both theory and practical obtained by the candidates should be sent to the University at least fifteen days prior to the commencement of theory examination.

University Examination - Subjects and Marks

		Anatomy	Physiology	Biochemistry
A. THEORY				
1. Written Paper No. of Papers & Maximum Marks for each Paper		Two 2 X 100 = 200	Two 2 X 100 = 200	Two 2 X 50 = 100
2. Viva-Voce		40	40	20
3. Internal Assessment (Theory)		60	60	30
Total (Theory)		300	300	150
B. PRACTICAL				
1. Practicals		80	80	40
2. Internal Assessment (Practical)		20	20	10
Total Practicals		100	100	50
GRAND TOTAL		400	400	200

Table V: Type, number of questions and distribution of marks for written paper.

Type of Questions	Number of questions	Marks for each question	Total marks
Essay type questions	2	10	20
Short Essay types questions	10	5	50
Short answer questions	10	3	30
			100

8. SUBMISSION OF LABORATORY RECORD NOTE BOOK

Each candidate shall submit to the Examiners his/her laboratory notebook duly certified by the Head of the Department as a bonafide record of the work done by the candidate at the time of Practical/Clinical Examination.

The candidate may be permitted by the examiners to refer the practical record Book during the Practical Examination in the subject of Biochemistry only. No other material, handwritten, cyclostyled or printed guides are allowed for reference during the practical examination.

9. ELIGIBILITY FOR EXAMINATION:

To be eligible to appear for University examination a candidate:

- a. Shall have undergone satisfactory the approved course of study in the Subject/subjects for the prescribed duration.
- b. Shall have attended at least 75% of the total number of classes in theory and practical/clinical, jointly to become eligible to appear for examination in that subject/subjects.
- c. Shall secure at least 35 % of total marks fixed for internal assessment in a particular subject in order to be eligible to appear in the University Examination of that subject.
- d. Shall fulfill any other requirement that may be prescribed by the University from time to time.

- e. Who fails in any subject/subjects of MBBS Phase -1, has to put one academic term before he/she becomes eligible to appear for the next examination
- f. Shall pass in all the Phase I (Pre-Clinical) subjects, before joining the Phase II (Para Clinical) subjects.

Criteria for Pass

For declaration of pass at the University examination, a candidate shall pass both in Theory and Practical/Clinical Examinations separately in the same examination, and as stipulated below: A candidate must obtain 50% marks in aggregate with a minimum of 50% marks in Theory including viva-voce and minimum of 50% marks in Practical / Clinical, in each of the subjects.

A student has to secure marks as follows to pass in a subject:

- i) 35% in internal assessment (for eligibility to appear for University examination)*
- ii) 50% of the total marks for Theory with Orals (only externals)*
- iii) 50% of the marks of Practical / Clinical (only externals)*
- iv) 50% of the aggregate (total of externals and internals)*

A candidate not securing 50% marks in aggregate in Theory or Practical/Clinical examination in a subject shall be declared to have failed in that subject and is required to appear for both theory and Practical/Clinical again in the subsequent examination in that subject.

10. DECLARATION OF CLASS:

- a) A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 75% of marks or more of grand total marks prescribed will be declared to have passed the examination with distinction.
- b) A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 65% of marks or more but less than 75% of grand total marks prescribed will be declared to have passed the examination in First Class.
- c) A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 50% of marks or more but less than 65% of grand total marks prescribed will be declared to have passed the examination in Second Class.

- d) A candidate passing the 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.

[Please note fraction of marks should not be rounded off for clauses (a), (b) and (c)]

11. MIGRATION

- a) Migration from one medical college another is not a right of a student. However, migration of students from one medical college to another medical college in India may be considered by Medical Council of India, only in exceptional cases on extreme compassionate grounds, provided following criteria are fulfilled. Routine migrations on other grounds shall not be allowed.
- b) Both the colleges, i.e., one at which the student is studying at present and one to which migration is sought, should have been recognized by the Medical Council of India.
- c) The applicant candidate should have passed first professional MBBS examination.
- d) The applicant candidate should submit his/her application for migration complete in all respects, to all authorities concerned within a period of one month of passing (declaration of results) the first professional Bachelor of Medicine and Bachelor of Surgery (MBBS) examination.
- e) The applicant candidate must submit an affidavit stating that he/she will pursue 18 months of prescribed study before appearing for II professional MBBS examination at the transferee medical college, which should be duly certified by the Registrar of the concerned University in which he/she is seeking transfer. The transfer will be applicable only after receipt of the affidavit.

NOTE I:

- i. Migration during clinical course of study shall not be allowed on any ground.
- ii. All applications for migration shall be referred to Medical Council of India by college authorities. No Institution/University shall allow migration directly without the approval of the Council.

- iii. Council reserves the right, not to entertain any application which is not under the prescribed compassionate grounds and also to take independent decision where applicant has been allowed to migrate without referring the same to the Council.

NOTE II: * Compassionate grounds criteria:

- i. Death of a supporting parent or guardian
- ii. Illness of the candidate causing disability
- iii. Disturbed conditions as declared by Government in the Medical College area.

12. ELIGIBILITY TO JOIN PHASE II OF THE COURSE

Only candidates who pass in all the Phase I (Pre Clinical) subjects shall be eligible to join the Phase II of the course.

Section - III

Course contents for MBBS Phase I

Human Anatomy

Goal:

Aims at conveying comprehensive knowledge of the gross and microscopic structure and Development of human body to provide anatomical basis for diseases and clinical conditions.

Objectives:

A. Knowledge:

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

- a) Understand the normal disposition, functional and cross sectional anatomy of various structures of the body and its clinical relevance
- b) Identify the microscopic structure of various organs and tissue and comprehend their functions in order to understand the alterations in various disease processes
- c) Comprehend functional organizations of central nervous system and interpret various signs and Symptoms presented as neurological deficit so that he/she may confidently make a diagnosis.
- d) Demonstrate basic concepts of development of organs and tissues, explain the effect of teratogens, environmental factors and genetic mutations on critical stages of development

B. Skills

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

- a) Identify and locate all the structures of the body and mark the topography of the Living anatomy.
- b) Identify the organs and tissues under the microscope.
- c) Understand the principles of karyotyping and identify the gross congenital anomalies.
- d) Understand principles of newer imaging techniques and interpretation of CT scan. Sonogram USG etc.
- e) Understand clinical basis of some common clinical procedures i.e. intramuscular and intravenous Injection , lumbar puncture and kidney biopsy etc.,

C. Integration:

From the integrated teaching of other basic sciences, student shall be able to correlate the structure and functions of the body in order to provide anatomical basis for various disease process.

List of Topics for Integrated Teaching Programme

During MBBS Phase – I Course

Sl.No.	Topics	Department to organize	Departments to participate
1	Human Genetics: Anatomical considerations(Anat), applied aspects (OBG & Paed.)	Anatomy	Anatomy, OBG & Pediatrics.
2	Acid Peptic disease: Anatomy of stomach(Anat), Functional aspects of stomach (Phy), Pathophysiology of Acid Peptic disease (Path), Medical Management of acid peptic disease (Med), Surgical Management of acid peptic disease (Surg)	Anatomy	Anatomy, Physiology, Pathology, Medicine & Surgery.
3	Liver: Structure of Liver (Anat), functional aspect of liver (Phys), Biochemical aspect of liver (Bioch)	Anatomy	Anatomy, Physiology, Biochemistry.
4	Parkinsonism: Anatomy of Basal Ganglia (anat), Physiology of BG (Phys), clinical features, investigations & treatment (Med)	Anatomy	Anatomy, Physiology, Medicine.
5	Uterus: Anatomy of Uterus(Ana),Physiological changes(Phy),Applied aspects(OBG)	Anatomy	Anatomy, Physiology, OBG
6	Inguinal Hernia: Anatomy of Inguinal canal , Hernia (Ana),Surgical aspects & Management (Sur)	Anatomy	Anatomy, Surgery
7	Thyroid Gland: Anatomy of Thyroid Gland (Ana),Synthesis of thyroid Hormones (Phy.) ,Medical Management of Thyroid disorders(Med),Surgical Management of Thyroid disorders (Sur)	Anatomy	Anatomy, Physiology, Medicine ,Surgery
8	Shoulder Joint. - Anatomy of Shoulder joint.(Ana) Radiological features (Radio.) Applied Aspects and management (ortho)	Anatomy	Anatomy, Radiology, Orthopedics. Physiotherapy
9	Knee Joint - Anatomy of Knee joint.(Ana) Radiological features (Radio.) Applied Aspects and management (ortho)	Anatomy	Anatomy, Orthopedics, Physiotherapy & Radiology,
10	Blood Supply to Heart – Anatomy of Coronary Arteries, Physiology of Blood supply, Medical Management	Anatomy	Anatomy, Physiology, Medicine,
11	Congenital Anomalies of Heart – Development of	Anatomy	Anatomy, Pediatrics.

	Heart,(Ana) Applied Aspect (Paed.)		
12	Lungs – Bronchopulmonary segments Anatomy of BPS(Ana) Physiological Aspects of Respiration (Phy) Medical Management (Med)	Anatomy	Anatomy, Physiology, Medicine,
13	Mediastinum – Anatomy of mediastinum (Ana) Applied Aspects and management (Med.)	Anatomy	Anatomy, Medicine

5) One of the formative practical examination to be conducted in the form of OSPE/OSCE (partially or totally)

(iii) Detail syllabus of Human Anatomy is given under following headings:

A) General Anatomy

B) Regional Anatomy

- I. - Upper limb
- II. - Lower Limb
- III. - Abdomen
- IV. - Thorax
- V. - Head Face Neck
- VI. - Spinal Cord & Brain

C) Micro-Anatomy

- I. - General Histology
- II. - Systemic Histology

D) Developmental Anatomy

- I. - General Embryology
- II. - Systemic Embryology

E) Genetics

F) Radiological Anatomy, USG, CT, MRI

G) Surface Anatomy, Living & Marking

H) University Exam pattern, Theory & Practical

Books recommended

A) GENERAL ANATOMY

I) DESCRIPTIVE TERMS

Terms used for describing the position of the body, Anatomical planes, Commonly used terms in Gross Anatomy, Terms used in Embryology, Terms related to limbs, for hollow organs, for solid organs, to indicate the side, for describing muscle, for describing movements.

II) General Osteology:

Definition, Nutrition and Morphological Classification, Distribution and Functions of bone, Appendicular, Axial.

Diaphysis, Metaphysis, Epiphysis, Types of epiphysis

Primary centres, Secondary centers, Law of ossification, Epiphy seal plate, Blood supply of long bone.

CARTILAGE

Definition, Types structure, Distribution, Nutrition

III) General Arthrology

Classification, Synarthrosis, Amphiarthrosis, Diarthrosis joints

Cartilaginous joints Primary, Secondary

Synovial- Axis of movement, Structure of typical synovial joints

Classification of synovial joints, according to the shape axes of movement and morphology.

Simple, Compound, Complex joints, Blood supply and nerve supply.

IV) General Mycology

Definition, Types: Origin, Insertion, Morphological classification

Actions of muscles, nerve supply

Functional classification, Prime movers, Fixators, Antagonists, Synergists

BURSA, Structure, Functions, types:

LIGAMENTS, Types and functions, Sprains

RETINACULA AND APONEUROSES

V) INTEGUMENT

a) Skin – Introduction: Surface area

Types: Thin, Thick, hairy, Functions, innervations

Structure:

Epidermis, Dermis, Appendages

b) SUPERFICIAL FASCIA

Distribution of fat, functions

c) DEEP FASCIA

Features, Modifications, Functions

VI) General Angiology

Arteries: Muscular, Elastic; Arterioles: Capillaries: Sinusoids, Veins – Anastomosis: End arterial: Vasa Vasorum, Nerve supply of blood vessels.

Lymphatic system

Lymph vessels, Central lymphoid tissue, Peripheral lymphoid organs, Circulating lymphocytes – T and B lymphocytes.

VII) General Neurology

Structure of nervous tissue

Neurons: Synapses: Structural- type, Functional types

Classification of neurons: According to polarity and According to relative lengths of Axons and dendrites:

Neuraglia: Nerves: Cranial- Spinal, Structure of typical spinal nerve

Autonomic nervous system: Sympathetic: Sympathetic ganglia, postganglionic fibres

Parasympathetic: Cranial outflow, sacral outflow.

Desirable to know - Mechanical properties of bones.

Synthesis, histogenesis, growth of Cartilage, Factors limiting range of movement.

Kinesiologically: Sellar, Ovoid, Joint position:: Loose-packed, Close-packed

Number and diameter of fibres, Range of contraction. Active insufficiency, Passive insufficiency, shunts. Swing, spin

Adventitious bursae- Housemaid's knee, Clergyman's knee, Student's elbow, Weaver's bottom, Porter's shoulder

Clinical correlation, significance of Langer's lines, Tension lines, flexure lines

Transplant

Collateral circulation, Functional end arteries. Arteriosclerosis.

Nice to know: Effect of hormones on bony growth. Wolff's law, Surface topology of articular surface. Spin, Swing, Cartilage Grafts, Kinesiology, Body lever system, Skin grafts. Ischemia, Infarct, Bursitis.

B) Regional Anatomy

I. UPPER LIMB

REGIONS: Mammary gland. Axilla, Cubital fossa, Facial spaces of the hand

Relations and functional importance of individual structures, Dupuytren's

Contracture: Hand as a functional unit – grips, Nerve injury, carpal tunnel syndrome, Clavipectoral fascia: Salient features about carpals;

ARTHROLOGY

Shoulder girdle: Shoulder joint: Elbow; Radioulnar joints; Wrist; Carp metacarpal joint of Thumb; Bones taking part.

Classification of joints, Movement with muscles causing movement, midcarpal joint, Metacarpophalangeal joints, interphalangeal joints.

Fall on the outstretched hand

Desirable to know- Axilla: Collaterals Lymph nodes (breast) Axillary sheath cervico axillary

Canal, Abscess drainage, Palm: comparative Anatomy (thumb, Palmaris brevis),

Position of rest and of function, collaterals,

Facial spaces: Surgical significance

OSTEOLOGY

Identification: Anatomical position, Parts; Joints formed; Development; identification

Clavicle: Line of force transmission, commonest site of fracture

Humerus: fractures-

Colles' fracture Smith's fracture

Carpals, Metacarpals, Phalanges: Carpal tunnel syndrome, fracture scaphoid surgical

Approaches, Subluxation of head of radius carrying angle.

MYOLOGY:

Muscles of upper limb, attachment, Nerve supply, Actions

Applied aspects: Volkmann's ischemic contracture

Quadrangular and Triangular spaces, Triangle of auscultation.

ANGIOLOGY:

Axillary, Brachial, Radial, Ulnar Arteries, Veins, Lymphatic's

Commencement, Termination, Main area of distribution and drainage, Anastomosis

Applied aspects, Artery: Damage of vessels, Reynaud's disease, Veins: Thrombosis.

Lymphatic's: Lymphangitis (red streaks), lymphadenitis,

NEUROLOGY:

a) Nerves

Axillary, median, ulnar, musculocutaneous, radial, Origin, course, distribution, Root value

b) Plexus: Brachial

Applied aspects: Nerve injury at various sites – Tendon reflex – Winging of scapula

Erb's palsy, Klumpke's palsy, Crutch palsy, ulnar paradox

II. LOWER LIMB

REGION: boundaries, major contents; Gluteal, femoral triangle; Adductor canal, compartments of thigh, leg; popliteal fossa, Adductor canal, Sole, Arches of foot;

Gluteal IM injections

Femoral hernia

Blood supply to head of femur; Fracture neck of femur, mechanics movement of joints hip and knee, Trendelenburg test; Knee joint derangement injuries to cruciate ligaments, menisci; (tear-bucket handle type); Ankle: Sprain mechanism of venous return, varicose veins. Applied aspects of Adductor canal popliteal aneurysms.

OSTEOLOGY: - **Must to know** Identification, region, anatomical position; parts joints formed For tarsals - identification of individual tarsal's in an articulated foot.

Desirable to know

Applied aspects: Bony specialization for bipeds, walking and transmission of weight Fracture. Femoral torsion, neck shaft angle, bone grafts.

ARTHROLOGY

Hip. Knee, ankle, subtalar, Tibiofibular

Hip joint: dislocation, congenital, traumatic, surgical approaches to joints (anatomical basis), traumatic effusion, bursitis.

MYOLOGY

Attachments, nerve supply, actions of: Muscles of lower limb calf pump, antigravity muscles.

ANGIOLOGY

Artery: Femoral profunda femoris, popliteal, dorsalis pedis, Commencement, termination, main area of supply, course, relations and applied.

Vein: Venous drainage of lower limb, long and short saphenous veins, Communication and valves. Varicose

Lymphatics: Inguinal group of lymph nodes

Desirable to know: intermittent claudication, clinical significance of anastomosis: around knee, Venous thrombosis.

NEUROLOGY

a) Plexus: Lumbar and sacral, Location, Formation, Distribution

b) Nerves: Root value of sciatic, femoral, obturator, tibial, common peroneal nerves:

Origin, course, distribution, sciatica, foot drop.

Desirable to know: Pes cavus, equinovarus, clawing of toes.

III. ABDOMEN

ANTERIOR ABDOMINAL WALL

Rectus sheath, quadrants and regions, Testes, Epididymis, spermatic cord, scrotum

Desirable to know: Surgical incisions of abdomen types of inguinal hernia

Peritoneum, Lesser Omentum, Omental Bursa, Epiploic Foramen, Testes

Morphology, blood supply, lymphatic drainage

25. SPERMATIC CORD

Definition - beginning. End, course and contents, coverings, vasectomy

Abdominal organs: Morphology, relations, blood supply, lymphatics, nerve supply and applied

Anatomy of following organs

STOMACH, SPLEEN, LIVER: BILIARY APPARATUS, PANCREAS, SMALL INTESTINE, LARGE INTESTINE AND VERMIFORM APPENDIX, KIDNEYS, URETERS, SUPRARENAL GLANDS.

Desirable to know: peptic ulcer Splenic circulation, splenic vascular segments, liver, biopsy, Support of liver, Gall stones, Duct system of pancreas, Surgical approach to kidney stones (Renal), Ureter, Site of constructions, Hydronephrosis, pheochromocytoma

Nice to know: Gastroscopy, Achlorhydria, Splenectomy Liver transplant Pancreatitis, diabetes, Renal transplant, Stones in ureter, Cushing's disease.

Pelvic Viscera: Morphology, relations, blood supply, nerve supply and applied anatomy

URINARY BLADDER AND URETHRA, UTERUS, OVARIES AND UTERINE TUBES, PROSTATE, RECTUM AND ANAL CANAL, UROGENITAL DIAPHRAGM (UGD)

Desirable to know: Supports and micturition, stones in bladder ovarian cyst, enlargement complications, Fistula, Fissure piles.

Nice to know: Cystoscopy Hysterectomy cancer Supports of rectum.

Perineum - Ischiorectal fossa, pudendal canal, perianal spaces Urogenital diaphragm, male urethra, penis – perineal pouches: Ischiorectal Hernia

MYOLOGY

Must to know

Anterior abdominal wall. Rectus sheath, Psoas major, Quadratus lumborum, Thoracoabdominal diaphragm, pelvic diaphragm, thoracolumbar fascia perineal spaces and muscles.

Nice to know: Psoas abscess

OSTEOLOGY

Desirable to know: Pelvis – types

(Various diameters), lumbar vertebrae, anatomical basis of disc prolapse, nerve compression.

Nice to know: Sacralization, Lumbarization

ARTHROLOGY

Movements of lumbar vertebrae, lumbosacral, sacroiliac, sacrococcygeal joints.

ANGIOLOGY: Must to know Origin, course, termination, relations, branches and applied anatomy of PORTAL VEIN

Desirable to know: port systemic communications

Nice to know: Port systemic communications in detail: Development

INFERIOR VENA CAVA, ABDOMINAL AORTA, INTERNAL ILIAC ARTERY

IV. THORAX

Must to know

THORACIC WALL, THORACIC INLET

Boundaries and contents

THORACIC OUTLET, Boundaries and contents, muscles Atypical intercostal space.

Movement of respiration.

Desirable to know: importance and minor openings in outlet, Accessory muscles of respiration.

Nice to know: Applied aspects: Barrel chest, pectus excavatum, rickety rosary.

Divisions and major contents

Desirable to know: Mediastinitis, mediastinoscopy

SUPERIOR AND POSTERIOR MEDIASTINA LIST OF STRUCTURES

Boundaries and contents

Desirable to know: Superior mediastinal Syndrome, Course, relation and branches/ area of drainage

Nice to know: Coarctation of aorta, aneurysm, developmental anomalies.

PLEURA

Pleural reflections, recesses, innervation

Desirable to know: relations, blood supply, nerve supply

Nice to know: pleural effusion.

LUNGS

Gross description including lobes, fissures and bronchopulmonary segments.

Desirable to know : relations, blood supply, nerve supply.

Nice to know: Postural drainage, surgical importance, of bronchopulmonary segments,
Foreign body inhalation.

PERICARDIUM AND HEART

Must to know

Divisions of pericardium and sinuses

Desirable to know: referred pain

Nice to know: Pericardial effusion

HEART

Must to know

Anatomical position, location, surfaces and borders, interior of all chambers, conducting system of heart: vessels of heart.

Desirable to know: Relations, nerve supply – foramen ovale, patent IV septum, over-riding aorta, referred pain, functional end arteries – coronaries.

Nice to know: Fracture ribs, flail chest, compression fracture of vertebra.

HEAD FACE NECK

REGIONS AND ORGANS, FASCIAE OF THE NECK TRIANGLES OF NECK

Desirable to know: Spaces and spread of infections, axillary sheath, Relations of contents, Damage to accessory nerve, sialogram, approach to gland, bidigital palpation of submandibular gland and Dangerous area of face, squint.

Nice to know: surgical neck incisions, external jugular vein – air embolism. LN biopsy JVP.
Pulse, Frey's syndrome.

GLANDS

Thyroid, Parathyroid, Parotid, Submandibular, Sublingual, Pituitary

Morphology, capsule, relations, nerve supply, blood supply.

FACE

Muscles, nerve supply – blood supply.

SCALP, PALATE, TONGUE, LARYNX, PHARYNX, ORBIT, EYEBALL, STYLOID APPARATUS, NASAL CAVITY, EAR, INTERNAL EAR, MIDDLE EAR, EXTERNAL EAR, MENINGES.

OSTEOLOGY

Must to know

Identification, anatomical position, parts, foramina in the skull, structures passing through them, norma basalis, verticalis, frontalis, Lateralis, occipitalis and interior of cranial cavity.

Foetal skull: Mandible: age changes

Desirable to know: Fontanelles, Dental formula

Nice to know: Fractures of the skull, Age of dentition, cervical rib. Disc herniation

ARTHROLOGY

Must to know

TM JOINT

Desirable to know: Dislocation

MYOLOGY

Must to know

Sternomastoid, Digastric, Mylohyoid, Hyoglossus, Muscles of facial expression, mastication, larynx. pharynx, tongue, palate and Extra-ocular muscles.

Desirable to know : Relations, development.

Nice to know: facial nerve palsy.

ANGIOLOGY

ARTERIES

Must to know

Origin, parts, course, relations, branches of:

Subclavian, Internal carotid, External Carotid, Vertebral, Lingual, Facial, Maxillary artery

Desirable to know: Sub-branches distributions.

Nice to know: Subclavian steal syndrome, Subclavian-axillary anastomosis

VEINS

External and internal Jugular veins, venous drainage of face.

VENOUS SINUSES

Names, locations, drainage, classification.

EMISSARY VEINS, CAVERNOUS SINUS, LYMPHATIC DRAINAGE OF HEAD, FACE, NECK.

NEUROLOGY

Cranial nerves, Nucleus, course, relations, branches, distribution. Reflex pathways and applied anatomy, PLEXUS: Cervical, Brachial, PARASYMPATHETIC GANGLIA CERVICAL SYMPATHETIC CHAIN.

V. NEUROANATOMY

SPINAL CORD

Must to know

Gross features: Extent (child adult), enlargements, conus medullaris, filum terminale, spinal meninges Tracts Ascending and Descending.

Desirable to know: Spinal segments, vertebral correlation significance of enlargements nuclei of grey matter at upper and lower cervical mid-thoracic, Lumbar and sacral levels Clinical correlation of lesions.

Nice to know: anomalies, lamination, syringomyelia, PID. Tumours, TB, trauma, dislocation, myelography.

MEDULLA OBLONGATA

Must to know

Gross features: Motor decussation: Sensory decussation: Inferior olivary nucleus Cranial nerve nuclei.

Desirable to know: Tuber cinereum. Pontobulbar body. Order of neurons. Details of nuclei and organization of white matter.

Nice to know: medullary syndromes- Bulbar palsy, increased ICT, Arnold-Chiari malformation.

PONS

Must to know

Cross sections at the level of:

* Facial colliculus, Trigeminal nucleus

General features: Peduncles, Floor of the fourth ventricle

Desirable to know : Relations

Nice to know : Tumours, pontine haemorrhage

CEREBELLUM

Must to know

Gross features: Division, Lobes, relations, internal structure-

Desirable to know : connections of cerebellar cortex and intracerebellar nuclei, white matter classification, Purkinje neuron.

Nice to know: dysfunction-dysequilibrium ataxia hypotonia

Nuclei: Names of nuclei and important connections

Peduncles: Important tracts in the peduncles

Functions: Of archicerebellum, paleocerebellum and neocerebellum

MIDBRAIN

Must to know

General features:

Relations, contents of interpeduncular cistern connections of red nucleus

Desirable to know : T.S. at inferior colliculus, TS at superior colliculus.

Nice to know: Weber's syndrome Benedikt's syndrome

CEREBRUM

Must to know

CORTEX, WHITE MATTER, BASAL NUCLEL, LIMBIC LOBE

Surfaces, borders, major sulci, gyri, poles, lobes, major functional areas, interior gray and white matter.

Gray – cortex – granular granular./striate, Basal nuclei – names, White matter classification with examples : Components of limbic lobe

Desirable to know : handedness, Connections of limbic lobe

DIENCEPHALON

Must to know

Dorsal thalamus Epithalamus Metathalamus Hypothalamus Subthalamus Boundaries, parts, relations (gross), cavity, major nuclei, gross connections.

VENTRICULAR SYSTEM

Must to know

Parts, boundaries, foramina, correlation with parts of brain

Desirable to know: Choroid fissure, recesses, Queckenstedt's test

Nice to know: Hydrocephalus, VA shunt

BLOOD SUPPLY OF BRAIN

Must to know

Circle of Willis, subarachnoid space, arteries, veins

Desirable to know: blood brain barrier, Hemiplegia

Nice to know: End arteries, CSF formation.

MENINGES

Must to know

Cerebral and spinal meninges, folds of dura, contents of subarachnoid spaces. Arachnoid villi and granulations, direction of flow of CSF, lumbar puncture Cisterns, Definition, terminology, cisterna magna: cisternal puncture, Queckenstedt's test, vertebral venous plexus, choroids plexus, Extracerebral and intracerebral communication, CSF block puncture, Cisterns - Definition, terminology, cisterna magna

Desirable to know: cisternal puncture, Queckenstedt's test, vertebral venous plexus, choroids plexus, Extracerebral and intracerebral communication, CSF block,

Nice to know: Epidural space.

C) MICROANATOMY

GENERAL HISTOLOGY

Must to know

MICROSCOPE

Light microscope: parts, magnification, resolution, Electron microscope

Desirable to know: Micro techniques, H and E staining

Nice to know: Polarizing microscope, phase contrast, scanning EM

CYTOLOGY

Must to know

Cell, Cytoplasm and nucleus, Cytomembranes, Unit membrane, Cell organelles

Mitochondrial DNA, mitochondrial myopathy

Desirable to know: Specialisations of cell surface, Sarcoplasmic reticulum of muscle, Primary and secondary lysosomes, residual bodies, Effect of colchicines and anticytotic drugs on spindles preventing mitosis, Endocytosis, exocytosis, movement of microvilli: Cell mitotic activity.

Nice to know: Lysosomal storage disease

Nucleus – Structure, nuclear envelope, chromatin, Barr body, nucleolus

Epithelial

Must to know

Definition, Classification, Structure of various types & subtypes of epithelia

Desirable to know: Nutrition, Renewal, Innervation

Nice to know: Metaplasia

Surface modifications, Cilia; Microvilli: Stereocilia; Cell junction and junctional complexes.

Glands, Must to know Classification; Unicellular and Multicellular; Exocrine, Endocrine
Amphicrine. Exocrine: Simple, Compound Apocrine, Merocrine, Holocrine; Tubular, alveolar, tubuloalveolar; Serous; Mucous; Mixed.

Connective tissue

Must to know Classification, structure, fibres, ground substance, loose areolar tissue, adipose tissue.

Desirable to know: Glycosaminoglycans

Nice to know: Scurvy, oedema, inflammation.

Bone & Cartilage

Must to know

Bone, Compact, Cancellous, Developing bone; ossification, Woven, lamellar bone Cartilage, Classification, types, Perichondrium functions.

Desirable to know: Growth: Interstitial, Appositional: Bone callus, Osteomalacia, Osteoporosis
Osteoma

Nice to know: Chondroma

Muscle

Must to know

Skeletal muscle Plain muscle Cardiac muscle Intercalated disc, syncytium; Sarcomere, I and A bands, myofibrils, myofilaments: Sarcoplasmic reticulum

Desirable to know: Innervation, Red fibres, white fibres

Nice to know: Hypertrophy, Hyperplasia, Rigor mortis, Myasthenia gravis.

Nervous

Must to know

Neurons, types: Neuroglia, types: Myelinated nerve fibre LS: Non-myelinated nerve fibre; Peripheral nerve: Nodes of Ranvier: Synapses:

Vessels

Must to know

Large sized artery Medium sized artery, Arteriole: Capillary, Sinusoid: Medium sized vein;

Desirable to know : Atherosclerosis, Aneurysm, Infarcts, clotting

Lymphoid tissue, T cells, B cells; Mucosa Associated Lymphoid Tissue; Humoral immunity, Cell mediated immunity; Lymph node *section*; Thymus, Spleen, Tonsil. Blood-thymus barrier, Open and closed circulation in the spleen

Nice to know: Organ transplantation, Graft rejection Autoimmune disease.

SYSTEMIC HISTOLOGY

Must to know

Basic organization, salient features, Identification

Structure and function correlation, individual features.

Integumentary system

Skin Types: Epidermis and dermis; various cells, Appendages of skin

Desirable to know : Renewal of epidermis.

Nice to know; Albinism, melanoma, Acne.

Alimentary system

Must to know

Oral tissues

Lip, Tongue, taste buds, Papillae; Tooth, Developing tooth, Salivary glands

Desirable to know: Striated duct, ion transport

GI Tract

Must to know

Basic organization – 4 layers: Oesophagus with glands Stomach – Fundus, Chief cells, Parietal cells, intrinsic factor; Stomach – Pylorus Duodenum Brunner's glands; Small intestine – with Peyer's patch, Appendix, Large intestine.

Nice to know: Pernicious anaemia, ulcer, gastritis, Hirschsprung's disease or megacolon

Must to know

Pancreas: Exocrine, islets of Langerhans; Liver, Hepatic lobule, portal lobule; portal acinus; Gall bladder: Liver as an endocrine gland

Nice to know: Diabetes mellitus, Cirrhosis of liver, liver regeneration, Chalcones.

Respiratory system

Must to know

Olfactory mucosa; Epiglottis; Trachea, Lung, Bronchus, bronchiole, alveolar duct, sac, Alveoli, pulmonary type I and II cells.

Desirable to know: Double spirally arranged bronchial smooth muscle.

Nice to know: Bronchial asthma, Hyaline membrane disease, Heart failure cells

Urinary system

Must to know

Basic organization; Nephron – Parts podocytes, Collecting system, Kidney – Cortex , Medulla
Ureter; Urinary bladder, Urethra

Desirable to know: Juxtaglomerular apparatus.

Male reproductive system

Must to know

Basic organization; Gonads, Tract, Accessory glands; Testis; Epididymis; Vas deferens: Prostate:
Penis; Seminal vesicle.

Desirable to know : Stages of spermatogenesis

Nice to know: Immotile sperm

Female reproductive system

Must to know

Basic organization: Gonads, Tracts, Accessory glands; Ovary – with corpus luteum; Fallopian
tube; Uterus;; Cervix, Vagina, Mammary gland Active, Passive

Desirable to know: Stages of maturation of ovarian follicle, Phases of menstruation Colostrum,
IgA, Placenta: Maternal unit, Foetal unit, Umbilical cord; Wharton's jelly

Endocrine system: Pituitary: Adenohypophysis, Neurohypophysis;

Must to know

Thyroid; Follicular, parafollicular cells; Parathyroid; Chief cells, oxyphil cells; Adrenal;
Pancreas: Testis: Ovary

Desirable to know: Hypothalamo-pituitary Portal system

Nice to know: Pheochromocytoma

Nervous system

Must to know

a) Central

Basic organization; Cerebrum; Cerebellum; Spinal cord: Cervical; Thoracic; Lumbar, Sacral;

b) Peripheral

Sensory ganglia; Autonomic ganglia (sympathetic ganglion): Peripheral nerve

Special senses

Visual: Eyeball Cornea: Sclerocorneal junction: Canal of Schlemm; Lens: Retina; Optic nerve
Nice to know: Keratoplasty eye donation, glaucoma, retinal detachment

Auditory:

Must to know

Internal ear: Cochlea; Semicircular canals; Vestibule:

Olfactory

Must to know

Nasal cavity

Gustatory

Must to know

Tongue with taste buds.

D) DEVELOPMENT ANATOMY

Must to know

GENERAL EMBRYOLOGY

Introduction: Stages of human life phylogeny

Ontogeny, Trimester, Viability,

Terms of reference: e.g. Cranial, Rostral, Caudal, Dorsal, Ventral, Lateral, Medial Median,
Planes of Section

Nice to know: The law of recapitulation, “Critical period” malformations, USG, Amniocentesis
Chorionic Villus Biopsy, Fetoscopy, etc., Teratology History of Embryology.

Gametogenesis: Menstrual cycle other reproductive cycles, Germ cell Transport and
Fertilisation, Sperm capacitation, Methods of contraception. Sex determination.

Nice to know: Teratogenic influences; Fertility and Sterility, Surrogate motherhood; Social
significance of “Sex-ratio”

Must to know

Cleavage, Blastocyst, Cytotrophoblast, Syncytiotrophoblast

Implantation: Normal sites, Abnormal sites; Placenta praevia, Extra-embryonic Mesoderm and Coelom; Bilaminar disc – Prochordal plate.

Desirable to know: “abortion” Decidual reaction, Chorionic Gonadotropins – Pregnancy test.

Must to know

Primitive streak Notochord, Neural tube and its fate Neural crest cells their fate, Development of somites, Intra-embryonic coelom, Foetal membranes: Chorionic villi. Amnion, Yolk sac, Allantois.

Desirable to know: Congenital malformations, Nucleus pulposus, Sacrococcygeal teratomas Neural tube defects, Anencephaly

Nice to know: Signs of pregnancy in the first trimester, Role of teratogens, Alpha-fetoprotein level

Must to know

Folding of the embryo: Derivatives of germ layers, Pharyngeal arches

Desirable to know : Thalidomide tragedy, Estimation of Embryonic Age – Superfoetation and Superfoecundation.

Fetal membranes: Formation Functions, fate of Chorion; Amnion: Yolk sac: Allantois, Decidua; Umbilical cord; Placenta – Physiological function Foetomaternal circulation, Placental barrier, Twinning; Monozygotic, dizygotic.

Desirable to know: Placental hormones, Uterine growth, Parturition, Estimation of fetal age.

Nice to know: Types of cord attachments, Chorion villus biopsy and Amniocentesis; Uses of amniotic membranes, Trophoblastic tumours – Rh incompatibility, Haemolytic disease of newborn.

Systemic Embryology

Must to know

Cardiovascular System – Venous System: Heart – Chambers – Septa – Truncus – Aortic arches – Fetal circulation – Changes at birth, ASDs, VSDs, PDA, Fallot’s Tetralogy.

Desirable to know: Veins, abnormalities, Surgical corrections.

The Respiratory System:

Must to know

Development of Larynx, Trachea, Bronchi, Lungs: Tracheo-oesophageal Fistula

Desirable to know : malformations

Nice to know: Respiratory Distress Syndrome: Premature births.

Must to know

The Alimentary System: Foregut: Oesophagus, Stomach, (Lesser sac) Duodenum-Hepatobiliary apparatus, Pancreas, Spleen, Portal vein; Midgut: Rotation and Fixation Caecum and Appendix, Meckel's Diverticulum; Hindgut: Cloaca: Rectum and Anal Canal.

Desirable to know: Malformation – Tracheo-oesophageal fistulae; Congenital Hypertrophic Pyloric Stenosis; Atresia; Omphalocele; Hernia; Malformations – Fistulae, Situs Inversus; Nonrotation; Mixed rotation of gut.

Must to know

The Urogenital System, Development of Kidneys and Ureters; Cloaca – Urinary Bladder and Urethra; Suprarenal gland; Genital System – Testis and Ovary; Ducts and associated glands; External genital organs, Mesonephric and paramesonephric Ducts. Uterine tube, Uterus and vagina.

Desirable to know: congenital malformations; Ambiguous genitalia and Hermaphroditism; Remnants and Vestiges of Ducts and Tubules.

Must to know

Integument: Development of mammary gland. Skin and appendages.

Pharyngeal arches, nerves, muscles, cartilage development of face, palate.

Endocrine: Glands, Adrenal, Thyroid, Parathyroid, Pituitary

The Nervous System: Neural Tube: Spinal Cord and Brain i.e. Forebrain, Midbrain and Hindbrain, Hypophysis cerebri; Neural Crest, Peripheral Nervous System.

Desirable to know: correlation Spina bifida: Anencephaly, Hydrocephalus, Retinal detachment; glaucoma; Coloboma iris.

Nice to know: Myelination of tracts, shortening of spinal cord, Neural Tube Defects

Must to know

Organs of the special senses – Eye and ear

Ear – Internal ear – External and middle ear – anomalies of the Ear

E. GENETICS

Must to know

Introduction- Mendelism, Laws Genetic code

Desirable to know: Evolution, Eugenics and Polygenic inheritance, Radiation and mutation, Sex chromatin, Population genetics.

Cytogenetics Structure and function of chromosomes, Cell cycle, Cell divisions, Spermatogenesis, Oogenesis

Molecular genetics (Normal): Gene, Genetic code, Structure and types of DNA. Structure of RNA

Inheritance: Single gene inheritance, Multifactorial inheritance, Polygenic inheritance, Mitochondrial inheritance, Pedigree charts with symbols.

Genetic basis of variation: Mutation, Polymorphism, Multiple allelism

Desirable to know: Types, Factors influencing mutational load

Developmental genetics: Chromosomes; Lyon's hypothesis, Hermaphroditism and pseudohermaphroditism; Teratogenesis Gonadal dysgenesis, Adrenogenital syndrome Androgen insensitivity

Nice to know: Counselling

Pedigree charting, Chromosomal basis of disease: Numerical, Structural abnormalities Down's, Cri-du-chat, Turner's, Klinefelter's

Desirable to know : Dermatographics

Nice to know: Counselling

Prenatal diagnosis: Maternal Serum Sampling; Fetal USG; Fetal Amniocentesis; Fetal Chorion Villus Sampling

Desirable to know: (cordocentesis); Foetoscopy

Nice to know: Eugenics.

F. RADIOLOGICAL ANATOMY

Must to know

Introduction

Principles of plain radiograms and CT scan

Identification of gross anatomical features in plain and contrast radiographs

Identification of gross anatomical features in normal CT scan especially of the Abdomen and Head-Face-Neck-Brain regions.

Diagnostic procedures. Technical details (e.g. dye) are not necessary.

Desirable to know: Estimation of age if epiphyseal line seen.

I. UPPER LIMB – X-Ray of

Shoulder region

Arm

Elbow region

Fore arm

Wrist and hand

II. LOWER LIMB must to know

Hip region

Thigh

Knee region

Leg

Ankle region

Foot

III. ABDOMEN

Plain X-ray

Barium meal

Barium meal follows through Bronchogram

Barium enema

Oral cholecystogram

Intravenous urogram

Cystogram

Ascending pyelogram

Abdominal Aortogram

Hystero-salpingogram

Myelogram

CT abdomen

IV. THORAX must to know

Plain X-ray

Barium swallow

CT mediastinum

High resolution CT lung

V. HEAD-FACE

X-ray skull plain

Carotid angiogram

Vertebral arteriogram

CT scan Brain

VI) NECK Must to know

Plain X-ray cervical region

G. SURFACE ANATOMY

Must to know

I. SURFACE MARKING:

Upper Limb

NERVES: Radial nerve, Median nerve, Ulnar nerve, Axillary nerve, Musculocutaneous nerve

VESSELS: Axillary artery, Brachial artery, Radial artery, Ulnar artery, Superficial and deep palmar arches.

Lower Limb

NERVES: Femoral, Sciatic, Common peroneal nerves

VESSELS: Great saphenous and Small saphenous veins; Femoral, Popliteal and Dorsalis pedis arteries.

ABDOMEN

ORGANS: 9 regions and projection of organs in them; Stomach, Duodenum, Caecum. Appendix. Ascending, transverse and descending colon. Pancreas, Liver, Gall bladder, Spleen, Kidneys (ventral and dorsal) Abdominal aorta

THORAX

Heart and valves, Lungs, fissures and hilum; Pleurae, Trachea

HEAD FACE NECK

ORGANS: Parotid gland and duct Middle meningeal artery, Facial artery Pterion, Bregma, Reid's base line, Suprameatal triangle, Thyroid gland, Common carotid artery, External carotid artery, Internal carotid artery, Internal Jugular vein, Trachea

Brain Lateral sulcus, Central sulcus, Median longitudinal fissure, Superior sagittal sinus, Sigmoid sinus, transverse sinus.

Deleted

II. LIVING ANATOMY

Upper Limb

PALPATION OF BONY LANDMARKS

Clavicle, Spine of scapula, Inferior angle, Coracoid process, Epicondyles of humerus, Olecranon process of ulna: Head and styloid processes of radius and ulna, Heads of Metacarpals (knuckles), Pisiform, Hook of Hamate

JOINTS (DEMONSTRATION OF MOVEMENTS)

Shoulder girdle, Shoulder joint, Elbow joint, Radio-ulnar joints, Wrist joint, 1st Carpo-metacarpal joint, MP and IP joints.

MUSCLES (DEMONSTRATION OF ACTION)

Principle of testing: Trapezius, Serratus anterior, Latissimus dorsi, Pectoralis major Deltoid, Biceps Brachii, Brachioradialis, Brachialis, Extensors at the elbow, Supinators, Wrist extensors, Wrist flexors, Small muscles of the hand

NERVES: Dermatomes, Ulnar, Ulnar nerve thickening in Leprosy

VESSELS (PALPATION): Axillary artery, Brachial artery, Radial artery

OTHERS: Axillary groups of lymph nodes; Anatomical snuff-box (boundaries)

Lower Limb

PALPATION OF BONY LANDMARKS Anterior superior iliac spine, Iliac crest, Tubercle of the iliac crest, Ischial tuberosity. Greater trochanter, Adductor tubercle, Head and neck of fibula, Lateral and medial malleoli, Tibial tuberosity, Subcutaneous surface of tibia, Patella

JOINTS (DEMONSTRATION OF MOVEMENTS): Hip, Knee, Ankle, Subtalar Joint

JOINTS (DEMONSTRATION OF ACTION): Hip-Flexors, Extensors, Abductors, Adductors

Knee: Flexors, Extensors,

Ankle: Dorsiflexors, Plantar flexors

Subtalar: Invertors, Evertors

NERVES: Dermatomes, Sciatic, Tibial, Common peroneal Femoral, Obturator

Thickening of common peroneal nerve in Leprosy

VESSELS (PALPATION OF) Femoral, Popliteal, Dorsalis pedis, Posterior tibial

OTHERS: Ligamentum patellae, Inguinal lymph nodes

TENDONS: Semitendinosus, Semimembranosus, Biceps femoris, Iliotibial tract.

ABDOMEN

(BONY) LANDMARKS (PALPATION OF): Anterior superior iliac spine, Pubic tubercle.

JOINTS (DEMONSTRATION OF MOVEMENTS): Intervertebral

MUSCLES (DEMONSTRATION OF ACTION): Obliques, Transversus abdominis, Rectus abdominis

NERVES: Dermatomes

OTHERS: Enlarged liver, spleen, kidneys Abdominal quadrants and regions:

Position of superficial and deep inguinal rings: Renal angle: McBurney's point:

Desirable to know: Murphy's sign

THORAX (BONY) LANDMARKS (PALPATION OF):

Sternal angle, counting of rib spaces, locating thoracic spines.

JOINTS (DEMONSTRATION OF MOVEMENTS): Intervertebral

MUSCLES (DEMONSTRATION OF ACTION): Respiratory movements

NERVES: Dermatomes

OTHERS: Apex beat, Apices of the lungs, Triangle of auscultation.

HEAD FACE NECK – (BONY) LANDMARKS (PALPATION OF): Nasion, Glabella, Inion, Mastoid process, Supraorbital triangle, Zygoma, Zygomatic arch, Angle of mandible Head of mandible.

JOINTS (DEMONSTRATION OF MOVEMENTS): Temporomandibular joint

MUSCLES (DEMONSTRATION OF ACTION): of Mastication, of Facial Expression,

Cranial nerves (I to XII) testing

(PALPATION OF) Superficial temporal artery, Facial artery

(PALPATION OF): Symphysis menti, Hyoid bone, Thyroid cartilage, Cricoid Cartilage, Tracheal rings, Suprasternal notch, Transverse process of atlas, Spine of C7

DEMONSTRATION OF MOVEMENTS): Atlanto-occipital joint, Cervical joints

(DEMONSTRATION OF ACTION): Sternocleidomastoid, Neck flexors and Extensors

(PALPATION OF) Common carotid artery, External carotid artery

OTHERS: Thyroid gland, Cervical lymph nodes,(Horizontal and vertical), Midline Structures in the neck.

NOTE: Level 2 and 3 mentioned in the above syllabus includes the topics “desirable to Know” (level-2) and “Nice to know” (level-3). The remaining topics fall under the group “Must know” (level-1).

1. TRAINING PERIOD AND TIME DURATION

The period of 4 ½ years is divided into three phases as follows

Phase 1-two semesters (each semester of 6 months) consisting of pre clinical subjects, human anatomy, physiology including bio physics, bio chemistry and introduction to community medicine including humanities.

Besides 60 hours for introduction to community medicine including humanities rest of the time shall be some what equally divided between anatomy and physiology plus bio chemistry combined.(physiology 2/3 and bio chemistry 1/3).

Each semester will consist of 120 teaching days of 8 hours working time including 1 hour of lunch break.

2. ACADEMIC TERMS

All the candidate admitted beyond the last date stipulated by the university shall have to appear for the first professional examination to be held subsequent to the regular examination after completion of the prescribed duration.

3. ATTENDANCE

Every candidate should have attendance minimum of 75% of the total classes conducted in theory and practical's jointly in each calendar year calculating from the date of commencement of the term to the last working day as notified by the university in each of the subjects prescribed to be eligible to appear for the university examination[vide medical council of India notification on gazette medical education(amendment)regulations 2003 published in the gazette of India part 3, section-4 extraordinary issued on 15 the October 2003].

The attendance details at the end of each term should be submitted to the principal without fail for onward intimation to the university.

The candidate lacking in prescribed attendance and progress in the subject in theory or practical for the first attempt should not be permitted to appear for the examination in that subject.

Distribution of Teaching hours for Phase-1

Total number of working days	-	240 days
Total working hours per day	-	07 hours
Total working hours for phase-1	-	1680 hours
Total working hours for community medicine	-	60 hours
Total working hours for pre clinical	-	1620 hours
Total working hours for anatomy	-	810 hours

Details of working hours for Anatomy

Lectures	-	5 hours/week
Tutorials	-	1 hour/week
Demonstration/Short lecture	-	1 hour/week
Practical	-	2 hours/week
Dissection/group discussion	-	10 hours/week
Total working hours per week	-	19 hours

Distribution of number of hours for Theory & Practical Classes

I) A. Theory Classes:

1. General Anatomy	-	10 hours
2. Upper limb	-	20 hours
3. Lower limb	-	25 hours
4. Head and Neck	-	25 hours
5. Brain	-	15 hours
6. Thorax	-	15 hours
7. Abdomen and Pelvis	-	30 hours
8. Histology	-	40 hours
9. Embryology	-	40 hours
Total hours of Theory Classes	-	220 hours

B. Tutorial Classes: 80 hours

II) Practical Classes:

A) Dissection

- | | | |
|--|---|------------------|
| 1. Upper limb | - | 60 hours |
| 2. Lower limb | - | 60 hours |
| 3. Head and Neck | - | 120 hours |
| 4. Brain and Eyeball | - | 40 hours |
| 5. Thorax | - | 40 hours |
| 6. Abdomen and Pelvis | - | 100 hours |
| Total hours of Dissection Classes | - | 420 hours |

B) Histology - 80 hours

Teaching – learning methods in theory classes, practical etc.

Sl. No	Date	Topic	Hrs	TLM
1		Descriptive Terms	1	Interactive session, Chalk & Talk
2		General Osteology	1	Demonstration
3		General & Systemic Embryology	40	PPT , OHP Presentation, Embryology models
4		General & Systemic Histology	40	PPT Presentation, Slide demonstration
5		Joints	10	Demonstration of movements
6		General Anatomy	10	Chalk & Talk
7		Radiological Anatomy	06	Demonstration of X rays, CT Scan, MRI
8		Systemic Anatomy		Demonstrating the Dissected cadaver
9		Thyroid Gland, Abdominal Viscera		Integrated Teaching
10		Neuro Anatomy	07	Demonstration, Taking Theory Classes
11		Surface Anatomy & Living Anatomy	06	Demonstrating on the Cadaver & Living Persons
12		Genetics	06	PPT Presentation, Chart Discussion

Various Techniques for INTERACTIVE TEACHING:

Putting questions to the audience: Questions can stimulate interest, arouse attention in students. Questions asked should be simple and to the point. The teacher's way should be non-threatening. He or she should wait for a response of the student.

Small Group Teaching: Class can be divided into small groups of two and four students sitting in the neighborhood and then asked to discuss one topic in a few minutes. This technique gives teacher an additional way of assessing student. This is powerful and affective method but noise produced during discussion is its drawback.

Brain Storming: Brain storming refers to that process whereby students generate a list of issues – in response to a specific question or topic. In the beginning of a lecture it is an invitation to everyone in a group to participate, in the middle it can be helpful to change the pace, to regain student's attention and at the end it allows the students to summarize the information discussed. (Newble & Cannon, 1994; Schwenk & Whiteman, 1987; Geuna S, 2002)

Quizzes and Short Answers: Quizzes or short answers can be used at the beginning or end of a class to provide a "check-up" on learning to summarize the information.

Computer Aided Teaching: Interactive teaching in a large group can be done with the help of computers. An alternative approach is the use of flash cards. (Kennewell S et al 2007)

Handouts: Handouts are written material helpful to the teacher as well as students. Handouts of slides (Amato & Quirt, 1990), (Maureen Tam et al 1993) allow students to participate more in thinking about the concepts rather than writing down every word of the lecture. The literatures on handouts give higher scores in test.

Audio Visual Aids: Overhead projectors allow the presenter to maintain eye contact with the students. Flip charts and white boards allow for the creation of diagram which is very helpful in medical science. Multimedia and computer assisted learning also promotes interaction.

Interactive models: More recently, interactive models have been developed that respond to actions taken by a student or physician. Until recently, these simulations were two dimensional computer programs that acted more like a textbook than a patient. Computer simulations have the advantage of allowing a student to make judgments, and also to make errors. The process of interactive learning through assessment, evaluation, decision making, and error correction creates a much stronger learning environment than passive instruction.

(5) Virtual World Patient (patient is a computer generated character - an avatar - living in a virtual world environment).

Artificial patient software and patient simulators are becoming increasingly commonplace in medical schools all over the world. Simulated patient databases however take considerable time, effort and resources to establish and are often created more than 90 percent of medical schools in the United States have eliminated animal laboratories from their curricula. The majority of medical schools in the U.S., including Harvard, Stanford, and Yale, have replaced their use of live animals in physiology, pharmacology, and/or surgical-training exercises with humane and effective non-animal teaching methods, including observation of actual human cardiac bypass surgery, patient simulators, cadavers, sophisticated computer programs, and more. An increasing number of veterinary schools have been able to employ similar humane educational alternatives, thereby saving the lives of countless animals who in the past would have been killed for the purposes of dissection or suffered through unnecessary surgeries. In addition to being more humane, non-animal teaching tools such as computer simulations, multimedia CD-ROMs, and models are also more economical than traditional animal-based teaching exercises. (Balcome J2000) Whereas the “traditional” approach involves the acquisition and disposal of animals on an ongoing basis, purchasing a set of CD-ROMs represents a one-time expenditure for a product that can be used repeatedly for many years. Schools can save tens of thousands of dollars each year by implementing reusable replacements for animal “specimens. Advances in medical simulation technology and computer-based interactive learning, increased awareness of ethical concerns, and progressive curriculum reform recognizing the need for human-based learning are a few of the many factors that have contributed to the replacement of live animals in medical education.

Card Test: Weekly we are conducting card test of that week dissected portion, this also arouse the interest student

Gross & Histology Journals: We ask the students to draw histology & gross diagrams in their respective journals by this they understand more.

Debates, Seminars and Guest Lectures: Debates can be conducted and the student on either side can be asked to support two different sides of the issue. (Frederick, 1986, 1987) similarly, seminars and guest lectures should be conducted after completion of one topic. All these will help in arousing attention in students and thus increasing inter activity.

INTERNAL ASSESSMENT

THEORY

Minimum 3 examinations recommended. They should be conducted like university examination pattern. Average marks of the best two notified internal examination should be reduced to 60.

If the student is absent for internal assessment examination, the cause is genuine provision should be made for the examination on other notified date.

Day to day assessment should be given 10% weight age. The marks will be given on the basis of the:

1. Part completion test
2. Tutorial test
3. Card test-which will include 50% oral and 50% MCQ's
4. . Seminar presentation and participation.

All the records should be maintained and must be ready for the verification from the university and if asked by the students.

Theory, Practical, Viva will be given equal weight age for I.A.

For eligibility to write examination student should get minimum of 35% in I.A.

PRACTICALS

Total practical assessment out of 20

5 marks are allotted for the records (Gross + Histology) and 2 best practical examination should be taken into consideration. Attained marks should be reduced to 15, added to the marks awarded for records.

Internal Assessment Marks should be notified to the students well in advance and their signature to be taken before submitting to the university.

UNIVERSITY EXAMINATION

DISTRIBUTION OF MARKS

Theory

Paper -1

Above diaphragm (100 marks)

2 long questions	-	2X10=20 marks
10 short essays	-	10X5= 50 marks
10 short answers	-	10X3= 30 marks

Paper - 2

Below diaphragm (100 marks)

2 long questions	-	2X10=20 marks
10 short essays	-	10X5=50 marks
10 Short answers	-	10x3=30 marks

2. Viva-Voice (40 marks)

Above diaphragm	-	10 marks
Below diaphragm	-	10 marks
Radiology	-	10 marks
Embryology	-	10 marks

THEORY (200 MARKS)

Paper-1 (100)

Marks allotted for each region

Head & Neck -----	35
Brain/spinal cord -----	10
Upperlimb -----	20
Thorax & diaphragm -----	20
General embryology } General Histology } General anatomy }	-----15

Paper-2 (100)

Marks allotted for each region

Abdomen -----	35
Pelvis and perineum -----	15
Lower limb -----	20
Systemic Histology -----	10
Genetics -----	10
Systemic embryology -----	10

Practical (80 marks)

1. Gross Anatomy ----- 50

A. Spotters-identification of structures in given specimen - 5x2=10 marks.

B. Surface marking -----10 marks

C. Discussion:

Above diaphragm----- 15 Marks

Below diaphragm -----15 Marks

2. Histology ----- 30 Marks

A) Spotters---Identification of 9 Slides and Interpretation of one Genetic chart 10x1 = 10 Marks

B) Discussion of two Given Slides ---- 10x2 =20 Marks

3. Viva-voce ----- - 40 marks

Above diaphragm ----- 10 marks

Below diaphragm ----- 10 marks

Embryology ----- 10 marks

Radiology ----- 10 marks

Colour Pencils and Sketch Pens to be used for gross diagrams and Haematoxyllin and eosin pencils for histology.

During setting of the theory paper allotment of marks on the basis of three levels will be as

Level 1 75%

Level 2 15%

Level 3 10%

Time slot for viva for a candidate minimum 03 minutes and maximum up to 06 minutes.

Anatomy Books Recommended

1. Gray's Anatomy
2. Sahana's Human Anatomy
3. Text Book of Anatomy Henry/ Rosse
4. Grant's Methods of Anatomy
5. Essentials of Human Anatomy A.K.Datta Vol. 1 to 3
6. Cunningham's manual of Practical Anatomy Vol. 1 to 3
7. Regional Anatomy by R.J.Last
8. Human Histology by Inderbir Singh
9. Atlas of Human Histology-DIFORE
10. Histology by Ham
11. Text book of Histology and Practical Guide -JP Gunasegaran
12. Surgical Anatomy- McGregor
13. Human Embryology- Inderbir Singh
14. Human Embryology by Sudhir Sant
15. Medical Embryology- Langman
16. Developing Human – Keith Moore
17. Surface Anatomy and Radiology- Halim
18. General Anatomy- B.D.Chourasia
19. General Anatomy by A.K.Datta
20. Text Book of Neuroanatomy- Inderbir Singh
21. Clinical Anatomy for Medical Students by Richard Snell
22. Human Osteology by Inderbir Singh
23. Human Genetics – SD Gangane
24. J.S.P.Lumbley et.al – M.C.Q's in Anatomy
25. Gray's anatomy for students – Drake
26. Dorland's Medical dictionary
27. Clinically Oriented Anatomy – Keith.L.Moore

UG SYLLABUS IN PHYSIOLOGY

Goal:

The goal of teaching Physiology to undergraduate students is to make them understand the Physiological Principles and Homeostatic mechanisms of Normal Human body so that he/she can understand the disease pattern better.

Objectives:

1. Learn normal functioning of all organs, systems and their interactions for well co-ordinated body function.
2. To assess relative contribution of each organ system to the maintenance of the milieu interior.
3. Elucidate the Physiological aspects of normal growth and development.
4. Describe the Physiological response and adaptations to environmental stress.
5. List Physiological Principles underlying pathogenesis and treatment of disease.
6. To apply Physiologic knowledge in Research activities.
7. To initiate to participate in Seminar.

Knowledge:

At the end of the course the student will be able to.

1. Describe the normal functioning of all the organ systems, regulatory mechanisms and interactions of various organs for well co-ordinated total body function.
2. Understand the basic Principles, mechanisms and homeostatic control of all the functions of human body as a whole.
3. Lay emphasis on Physiological basis in diagnosis and Management of diseases.
4. Correlate knowledge of Physiology in area indicated by National Health Programme.

Skills:

At the end of the course, the student shall be able to acquire the skills

1. To conduct the experiments for study of Physiological functions.
2. To interpret experimental and Investigative data.
3. To distinguish between normal and abnormal data derived as a result of Tests which he /she performed and observed in the Laboratory.
4. To understand different types of Biomedical waste, their potential risk and their management.

Integration:

At the end of the Integrated Teaching, the student shall acquire an integrated knowledge of organ structure and function and the regulatory mechanisms including Biophysics.

Teaching Hours

Total No. of Hours	:	480 hrs.
Theory didactic Lectures	:	160 hrs.
Non Lecture Teaching (Tutorials + Group Discussion)	:	40+40 hrs.
Practical /Demonstrations	:	240 hrs.

Course Contents

Theory	:	160 hrs.
1. General Physiology including Biophysics.	:	08 hrs.

Must know

History of Medicine with special reference to Physiology, Body Fluids Compartments, changes in Body Fluid and their Measurements Hypoproteinemia. Homeostasis, Concepts of Physiological norms range and variations, Transport across Cell membrane, relationship between stimulus and response. Structure of cell membrane, RMP, Cellular receptors, Intercellular communications.

Desirable to know

Apoptosis, Aging, Genetics overview

Nice to know: *Biopotentials*, Principles and uses of tissue grafting.

2. Blood & Lymph: 16 hrs.

Must know

Blood composition; cellular elements of blood their formation and regulation. Hemoglobin: Synthesis and functions Jaundice, Anemia & their Classification, Hemostatic mechanisms, Anticoagulants, Blood groups, Rh- incompatibility Blood transfusion, ESR, Basic Mechanisms of Immunity & Function of WBC, Lymph : Composition Circulation and functions. *Reticulo endothelial system, morphology and function of Platelet*

Desirable to know

Principles and uses of blood components and blood components therapy

Nice to know: *Blood Bank.*

3. Gastro intestinal Tract:

12 hrs.

Must know

Functional Morphology Smooth Muscle: Structure Mechanism of Contraction. Nerve supply and Nerve transmitters. Composition Function and regulation of secretion of Salivary glands, Stomach, Small Intestine, large Intestine, Pancreas and bile.

Regulation of gastrointestinal Movements, Functions of Gall bladder, liver. Site of production and action of GI Hormones. Mechanism of Absorption of food.

Pathophysiology and Physiological basis of treatment of Peptic ulcer, Diarrhoea and Constipation.

Motility disorders: Achalasia, Hirschsprung disease.

Nutrition: Introduction to Nutrition, BMR, Carbohydrates and dietary fibres, Proteins and Fats, Recommended dietary allowances,

Desirable to know

Balance diet, Effect of starvation, Pathophysiology and Physiological basis of treatment of obesity

Nice to know: *Diet during infancy, Childhood, pregnancy and lactation, Obesity and its complications.*

4. Respiratory System:

12 hrs.

Must know

Functional anatomy of Respiratory systems, Mechanics of Normal respiration, Physical Principles governing flow of air in respiratory passages, Dead space, Lung Compliance, Alveolar ventilation, ventilation perfusion Ratio, Oxygen and CO₂ transport, Diffusing capacity, pulmonary function Tests.

Regulation of respiration, Respiratory acidosis and alkalosis, Pulmonary blood flow, Hypoxia, Cyanosis, Asphyxia, Respiratory adjustments during muscle exercise, Hyperbaric conditions, Principles of Oxygen therapy, Artificial respiration, Hyaline Membrane disease, Pathophysiology of Restrictive and obstructive lung diseases, Pulmonary edema, Decompression sickness, Hyper baric Oxygen therapy and Dyspnoea.

Physiological response to high altitude and high atmospheric pressure, Space Physiology.

Desirable to know

Technique and uses of computerized pulmonary function testing

Nice to know: Principles and uses of blood gas analysis

5. Cardiovascular System:

25 hrs.

Must know

Functional anatomy of heart, properties of cardiac muscle, Cardiovascular Regulatory Mechanisms, Principles of Electro cardiography, Electrical and Mechanical changes in cardiac cycle, Conducting system of Heart, Normal ECG, Cardiac output: Values, Measurement in Man, Physiological Variations and Regulations.

Regulatory mechanisms of Heart rate and Blood pressure. Physical Principles governing flow of blood in Heart and blood vessels, Measurement and regulation of coronary blood flow, Cerebral blood flow and blood circulation in skeletal system, changes in CVS during muscular exercise, Postural changes, Hypovolemia, Hypoxia, and cardio pulmonary resuscitation. Microcirculation. Hemodynamics Pathophysiology of Hypertension, Shock, cardiac failure and coronary Artery Disease, Exercise Physiology.

Desirable to know

Abnormal ECG, Principles and uses of Stress test

Nice to know: Principles and uses of echocardiography.

6. Kidney:

10 hrs.

Must know

Functions of different parts of Nephron, Functions of Kidneys, Mechanism of urine formation, Role of Kidney in water and Electrolyte balance. Acidification of urine. Diuresis, Kidney function tests. Juxtaglomerular apparatus. Renin - Angiotensin system, Renal blood flow. GFR: Normal value, its measurement and regulation. Innervation of bladder, Micturition, Cystometrogram, Disorders of Micturition and Principles of Artificial kidney.

Environmental Physiology: Introduction, Body temp. regulation, Man in hot and cold environment.

Desirable to know

Classification, uses and disadvantages of Diuretics

Nice to know: Induced *Hypothermia and its uses.*

7. Muscle Nerve Physiology:

08 hrs.

Must know

Classification of Nerves and Muscle, Structure of skeletal muscle. Types of muscle fibers. Mechanism of contraction and Its molecular basis.

Thermal and chemical changes during muscle contraction. Oxygen debt. Neuromuscular Transmission Neuromuscular blocking drugs. Neuromuscular disorders Pathophysiology of Myasthenia Gravis. *Energetics of Nerve and muscle, Injury and repair of Nerves and Muscle, Types of contraction*

Desirable to know

Experimental techniques to study bioelectrical phenomena such as cathode ray oscilloscope and nerve conduction studies.

Nice to know: *Work Physiology*

8. Endocrine glands :

16 hrs.

Must know

Types of Endocrine glands and hormones, Mechanism of action of hormones, General Principles of Regulation of Endocrine glands. Hormonal functions, cellular mechanism of hormone action, regulation of secretion.

Experimental and clinical disorders of Anterior and Posterior Pituitary, Hypothalamus, Thyroid, Parathyroid, Adrenal Cortex and Medulla and Endocrine Pancreas. Stress and Hormones, Physiology of Growth, Minor Endocrine glands: Pineal Body, Heart and Kidney.

Desirable to know

Experimental techniques to study various endocrine disorders,

Nice to know: Principles and uses of radioimmunoassay

9. Reproduction :

10 hrs.

Must know

Sex determination and differentiation. Male Reproduction; Functions of Testes, Constituents of Semen, Testicular hormones, Spermatogenesis and regulation. Female Reproduction: Menstrual Cycle: Changes in ovary, uterus, Cervix, vagina and hormonal regulation. Ovulation and Its detection. Fertilization, Implantation, Physiological changes during pregnancy Fetoplacental

Unit, Nutritional needs of mother during pregnancy, Parturition, Lactation, composition of breast milk, Placental and Fetal Circulation, Menopause, Physiology of Newborn. Family planning & welfare: Physiological basis of Contraception, safe period, rhythm and other methods of contraception.

Desirable to know

Disorders of sex differentiation and aberration,

Nice to know: Principles and indications for assisted reproduction

10. Central Nervous System:

32 hrs.

Must know

Organisation of Central Nervous system, Functions and Neuronal organisation at spinal cord level, Reflexes, Sensory receptors, Synapse and synaptic transmission, motor and sensory systems and their lesions, Conduction through myelinated and non myelinated nerve fibres, Reticular system in brain stem, sleep, wakefulness, EEG waves and Physiological changes in EEG, clinical lesions and Experimental sections at spinal cord, brain stem and sub cortical levels, Physiology of Basal Ganglia, Cerebellum, Thalamus, Hypothalamus limbic system, Pre frontal lobe and cerebral cortex, speech and its disorders, Autonomic Nervous system,, Formation, circulation and functions of CSF, Blood Brain Barrier, Central Neuro transmitters. Cerebral blood flow and its measurements. Neuroglia, Physiological basis of CNS Disorders like Alzheimer's disease, Parkinsonism, Syringomyelia and Tabes dorsalis.

Desirable to know

Experimental studies of lesions at spinal cord, brain stem and sub cortical levels.

Yoga and Meditation: Introduction, Yogic Practices, Meditation: Principles and Practice, Physiological effects of Yoga, Yoga in Health diseases.

Nice to know: Principles and uses of CT and MRI Scan

11. Special Senses:

10 hrs.

Must know

- a) Eye: Functional anatomy of Eye, image formation on Retina, Structure of photoreceptors, Electrical activity of photoreceptors, Errors of Refraction, Functions of Aqueous humour, Intraocular tension. Mechanisms of Accommodation Dark adaptation, pupillary reflexes functions of Retina, optic pathway and lesions. Role of visual cortex in

perception. Field of vision. Colour vision, Acuity of vision, Photochemistry of vision, Nutritional deficiency blindness.

- b) Auditory Apparatus : Functional anatomy of Ear, Physics of sound , Role of Tympanic Membrane, Middle ear and cochlea in hearing , Auditory Receptors and Pathway, Deafness and its causes, Tuning fork tests & Interpretation.

Vestibular apparatus: Structure and Functions, Connections and lesions of vestibular apparatus.

- c) Taste and Smell: Modalities, Receptors, pathway, Cortical and limbic areas associated with taste and smell.

Desirable to know: Principles and uses of Audiometry

Nice to know: Visual and auditory evoked potential.

12. Biomedical Waste:

01hr.

Types, Potential Risks and their safe management

Practicals

The following list of practicals are minimum and essential. Additional exercises can be included as and when feasible and required. All the practicals have been categorized as Procedures and Demonstration. The procedures are to be performed by the students during practical classes to acquire skills. Some of these would be included in the practical during University examination. Those categorized as “Demonstrations” are to be shown to students during practical classes. However, these Demonstrations would not be included in the university examinations, but questions based on these would be given in the form of data, charts, problems and case - histories for interpretation by students.

Procedures to be performed by the students:

I. Hematology: Major Experiments

1. RBC count
2. Total WBC Count
3. Differential WBC Count.
4. Absolute Eosinophil Count.

Hematology: Minor Experiments

1. Estimation of Hemoglobin Content of blood.
2. Bleeding Time
3. Clotting Time.

4. Blood Grouping.
5. Determination of blood indices: MCV, MCH, MCHC and Colour Index.

II. Procedures to be performed on human subjects.

1. Mosso's Ergography: at normal condition, after venous occlusion and arterial occlusion.
2. Recording of Arterial Blood Pressure, effect of posture and exercise on it.
3. Stethography: at rest, effect of deglutition, exercise, voluntary hyperventilation and voluntary breath holding.
4. Spirometry: Lung volumes and capacities and FEV1, MVV & Dyspnoeic Index.
5. Visual field by Perimetry.
6. Body composition -BMI (by Quetlet's Index) & Body Fat % by Durenberg's equation, Calculation of BSA and Body temperature (TPR chart).

III. Clinical Examination

1. Clinical Examination of Radial Pulse.
2. Clinical Examination of Cardiovascular system.
3. Clinical Examination of Respiratory system.
4. Clinical Examination of Higher functions.
5. Clinical Examination of Sensory System.
6. Clinical Examination of Motor system including examination of Reflexes.
7. Clinical Examination of Cranial Nerves.

IV. Interpretation of charts, graphs, case histories, Calculations & Demonstrations:

1. Hematology: Hematocrit, (PCV) ESR, Platelet count and Reticulocyte count, osmotic fragility test.
2. Cardiovascular system : ECG Recording in lead II and calculation of Heart rate, PR Interval and Identification of J Point, Identification and Interpretation of graph : JVP
3. Cardiovascular fitness test by 2km walk test or bicycle ergometer or Harvard step test.
4. Nervous system: Autonomic Function Tests.
5. Amphibian Practicals: Muscle - Nerve and heart experiments may be demonstrated if feasible for academic interest only and not for university examination.

6. Respiratory system: Determination of lung volumes and capacities & other lung function tests by computerized spirometry, Flow – Volume loop.
7. Special Senses :
8. Audiometry , Purkinje - Sanson's images, ophthalmoscopy, Retinoscopy,
9. Examination of fundus.
10. CNS: Electroencephalogram.
11. N.M.Physiology: Electromyography.
12. *Renal Physiology : Identification and Functioning of Artificial Kidney*
13. *GIT : Identification and uses of Ryles' Tube*
14. *Interpretation of Investigation reports of Patients.*

Scheme of Examination

Internal Assessment

Total Marks: 80 (Theory: 60 and Practical: 20)

Theory: 60 Marks

There should be regular Formative assessment. Day to day performance should be given greater significance. Minimum of three sessional examinations are to be conducted. The sessional examination preceding the university examination may be similar to the pattern of university examination.

Average of any two best marks obtained in the examinations will be taken into consideration for calculating Internal assessment. 20% weightage will be given to day to day assessment (Performance in Periodic tests, MCQ, diagram training programme & structured viva voce training programme, Participation in Seminars and Research Projects etc). One of the three sessional examinations will be on MCQ. Average marks obtained in two best sessional examinations and marks obtained for day to day assessment will be added and the sum of these two shall be sent to the University.

Practical: 20 Marks

There will be three terminal practical examinations. Average of best two will be reduced to 16 and marks obtained for Practical Records and performance in periodic practical tests will be reduced to 04. One of the three terminal examinations will be OSPE Type. The Internal

Assessment Marks both in theory and practicals obtained by the candidate will be sent to the University at least fifteen days prior to the commencement of Theory Examinations.

The Internal Assessment marks should be displayed on the notice board. The students should be shown their answer scripts. Their signatures have to be taken against the marks obtained. The answer scripts should be stored in the respective department for 3yrs.

University Examination

Eligibility for writing the University examination:

Every candidate should have attendance not less than 75% of the total classes conducted in theory and practical/clinical jointly in the academic year calculated from the date of commencement of the term to the last working day as notified by the University in each of the subjects prescribed to be eligible to appear for the university examination. (vide Medical Council of India Notification on Graduate Medical Education (Amendment) Regulations 2003 published in the Gazette of India Part III, Section 4, Extraordinary issued on 15th October 2003).

The Principal should notify at the College, the attendance and progress in any subject(s) in theory or practical / clinical in the* first appearance should not be permitted to appear for the examination in that subject(s).*

Criteria for Pass

A student has to secure marks as follows to pass in a subject:

- i) 35% in internal assessment (for eligibility to appear for University examination)
- ii) 50% of total marks for theory with orals (only externals)
- iii) 50% of marks in Practical/Clinical (only externals)
- iv) 50% of aggregate (total of externals and internals)

Distribution of Marks for University Examination

I. Theory Examination

It is of three hundred marks in total, which consist of university theory examinations (Paper I and Paper II, 100 Marks each). 200 Marks.

University Viva Voce examination: 40Marks.

Theory I. A. : 60Marks.

Distribution of Portions for theory Papers will be as follows:

Paper - I

General Physiology (4), Blood (20), Cardiovascular system (24), Respiratory system (20). Gastrointestinal system (20), Renal system (12), (Note: Marks for Renal and Gastrointestinal system can be interchanged. (Figures shown in parentheses are weightage of marks recommended for the different topics).

Paper - II

Endocrine (20), Special senses (20), Reproduction (12), Central Nervous System (28), Muscle - Nerve (16), Skin and Body Temperature (4), Note: Marks for Endocrines and Reproduction can be interchanged. (Figures shown in parentheses are weightage of marks recommended for the different topics).

* The topics assigned to the different papers are generally evaluated under those sections. However, a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.

Scheme of Marks distribution

Paper - I 100 Marks

Paper- II 100 Marks

Duration of Each Paper will be 03hrs.

The Pattern of Question Paper will be of 03types.

I	Long Essays	02x10 = 20 Marks
II	Short Essays	10x05 = 50 Marks
III	Short Answers	10x03 = 30 Marks

B. Practical:

80 Marks

There shall be two practical sessions, Practical I and II, each carrying 40marks, each practical will be of 2 hrs, duration. The distribution of content and marks for the practical would be:

Practical I A:		20Marks
1. Clinical Examination	-	20 Marks.
2. Procedures on Human Subjects	-	20 Marks.
Practical II:		40 Marks.
3. Hematology (Major)	-	20 Marks.
(Minor)	-	10 Marks.

4. Interpretation of case histories/problems/ charts - 10 Marks.

C. Viva - Voce Examination: 40 Marks.

The viva - voce examination shall carry 40 marks and all examiners will conduct the examination.

Table 1 - Portions of Paper I - 20 Marks.

Table 2 - Portions of Paper II - 20 Marks.

Recommended Test Books and Reference Books

Deciding which textbook to buy is not an easy task. Choice of a textbook depends on the individual and his or her aptitude. It is desirable, and would certainly be helpful if each student has one textbook out of the recommended list of textbooks. The list of books under the section Reference books are categorized under three levels of difficulty-level-1 being the easiest. The books under level 1 are meant for providing an overall, simple but comprehensive account of physiology. Books at level 2 can be considered as alternative textbooks and some of them are excellent books for further reading. Level 3 books are really meant for purpose of reference during advanced study in any special area of Physiology.

Text Books (Latest Edition)

1. A.K.JAIN (RL), Understanding Medical Physiology; text book for medical students, Jaypee brothers, New Delhi.
2. MAHAPATHRA. Essentials of Medical physiology, Current books international, Calcutta.
3. CHAUDHURI (Sujith K), Concise Medical Physiology, New Central Books, Calcutta.
4. GUYTON (Arthur C), Text of Medical Physiology. Prism Publishers, Bangalore.
5. GANONG (William F), Review of Medical Physiology, Appleton and Lange
6. TORTORA (Gerald J), Principles of Anatomy and Physiology Harper Collins Ref. College Publication.

Reference Books

Level -1

MORAN Campbell E.J. Clinical Physiology, ELBS UK,

Level -2

1. BERNE (Robert M) and levy (Mathew), Physiology, Mosby Publication.
2. SCHMIDT (RF) and THEWS (G), Human Physiology, Springer Verlag, London.

Level -3

1. MOUNTCASTLE (Veernow B), Medical Physiology.
2. PATTON (Harry d), Text book of Physiology.
3. RAINER AND NINDHAERST - Text of Physiology - Springer verlog, London.

Text Books on Practical Physiology (Latest Edition)

1. Ghai., A textbook of Practical Physiology.
2. McLeod, Clinical Examination.
3. Hutchinson & Hunter, Clinical Methods.
4. A.K.Jain - Manual of Practical Physiology.

Topics for group discussion

Gen. Physiology: Transport across cell membrane. Blood: Body Fluid, Erythropoiesis, Morphology and functions of WBCs. GIT: Composition, Functions and Regulation of Secretion of Saliva, gastric juice and pancreatic juice. Motility of gut. Respiratory Physiology: Intrapleural, Intrapulmonary and Transpulmonary pressure changes during respiration, Transport of Oxygen and CO₂ in blood., Regulation of respiration, Hypoxia CVS : Properties of cardiac muscle, Cardiac output, Cardiac Cycle, Regulation of arterial BP and HR. Renal Physiology : Concentration and dilution of Urine. M. N. Physiology: E-C coupling. Endocrine System: Actions and regulation of secretion of GH, Thyroid hormones, Parathormone, Insulin, glucagon, glucocorticoids, mineralocorticoids, Adrenaline and Nor-adrenaline. Reproductive system: Spermatogenesis, Physiology of Menstrual cycle, Contraceptive measures. CNS: Connection and functions of cerebellum, Basal ganglia, Thalamus, hypothalamus and Limbic

system. Special Sense: Visual Pathway, Errors of Refraction, Mechanism of colourvision and hearing.

Topics for Interactive Sessions

Blood: Tests for bleeding disorders. Blood groups ESR, PCV, Blood Indices (Chart and Problem) Acid base balance. GIT: Gastric function tests, GI Hormones. Respiratory Physiology: Lung function tests, Artificial respiration in man. CVS: Tests to evaluate cardiopulmonary fitness. Heart sounds, Arterial pulse J.V.P. (Graph) ECG, (graph) Coronary blood flow, Shock Renal Physiology: Clearance tests (problem), Cystometrogram, Abnormal Urinary bladders, Body temperature regulation. M. N. Physiology: N. M. Junction and Transmission, Types of contraction, Genesis of fatigue. Endocrine System: Effects of abnormal secretions of GH, thyroid hormone, PTH and adrenocortical hormones. (Charts). Reproductive System: Ovulation (Chart). CNS : Receptors, Synapse, Reflex (Chart), Pyramidal and Extrapylamidal systems, Effects of sections of spinal cord at various levels (case histories), Effects of lesion in cerebellum / Basal ganglia / Sensory cortex (case histories). Special Sense: Tests for visual acuity, Tests for colour vision, Tests for hearing. Physiology of olfaction and gustation.

TOPICS FOR INTEGRATED TEACHING PROGRAMME

FOR MBBS PHASE I COURSE

Sl. No	Topics	Departments to participate
1	Cell Membrane: Structure (Anat), function(Bioc) and transport across the cell membrane (Phy)	Anatomy, Physiology, & Biochemistry
2	Anaemia: Pathophysiology (Patho), Investigation & treatment (Med) & Public health importance (Comm Med)	Physiology, Biochemistry, Pathology & community Medicine
3	Human Genetics: Anatomic considerations(Anat), applied aspects (Surgery & Paed)	Anatomy, Physiology, Biochemistry, Surgery & Pediatrics.
4	Acid base balance General considerations (Bioc), Acid Base balance (Phys) & disorders & Treatment (Med).	Physiology, Biochemistry, Medicine
5	Acid Peptic disease: Anatomy of stomach(Anat), Functional aspects of stomach (Phy), Pathophysiology of Acid Peptic disease (Path), Medical Management of acid peptic disease (Med), Surgical Management of acid peptic disease (Surg)	Anatomy, Physiology, Pathology, Medicine & Surgery.
6	Liver: Structure of Liver (Anat), functional aspect of liver (Phys), Biochemical aspect of liver (Bioch)	Anatomy, Physiology, Biochemistry.
7	Myocardial infarction: Anatomy of coronary arteries (Ana), physiological aspects of coronary blood flow (Phy), Pathophysiology of CAD (Pathology), Biochemical markers in CAD (Bioch), Medical management of CAD (Med), surgical management of CAD (Surg).	Anatomy, Physiology, Pathology, Biochemistry, Medicine, & Surgery.
8	Parkinsonism: Anatomy of Basal Ganglia (anat), Physiology of BG (Phys), clinical features, investigations & treatment (Med)	Anatomy, Physiology, Medicine.

HUMAN BIOCHEMISTRY

Goals:

The broad goal of teaching of Biochemistry to undergraduates is to develop scientific temper, acquire educational experience for proficiency in profession & promote healthy living.

The knowledge acquired in Biochemistry shall help the student to integrate molecular events with structure and function of the human body in health and disease. To acquire basic practical skills for Biochemical investigation in order to support clinical diagnosis of common disorders. To promote research activities for students and staff.

OBJECTIVES:

At the end of the course, the learner shall be able to

1. Understand, describe and summarize the molecular and functional organization of cells, structure, functional relationship and interrelationships of various biomolecules in health and disease.
2. Summarize the basic and clinical aspects of enzymology with emphasis on diagnostic and therapeutic uses of enzymes.
3. Understand and describe digestion, assimilation of nutrients, associated disorders like obesity, starvation, malnutrition and malabsorption syndrome.
4. Understand, describe and integrate the various metabolic pathways and their regulation.
5. Describe mechanisms involved in water, electrolyte and acid base balance and its disorders.
6. Understand and summarize basic molecular mechanism of organization of genome. Genetic expression and regulation, recombinant DNA technology and genetic engineering and explain the biochemical basis of common inherited disorders in India.
7. Summarize the basic aspects of immunology including body defense mechanism.
8. Biochemical aspects of carcinogenesis and effects of xenobiotics.
9. Basic principles of medical biotechnology and their applications in medicine.
10. Continue to learn recent advances in Biochemistry and apply the same in medical practice.
11. Identify principles of routine and specialized biochemistry, laboratory investigations and techniques, analysis and interpretation of biochemical laboratory techniques.

12. Use basic devices for qualitative and quantitative biochemical investigations.
13. Understand different types of biomedical waste, their potential risks and their management.
14. Explain the biochemical basis of inherited disorders with their associated sequelae.
15. Understand the biochemical basis of environmental health hazards.
16. To inculcate good behavioral skills, soft skills and communication skills.

Skills:

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

1. Make use of conventional techniques and perform relevant biochemical investigations for clinical screening and diagnosis.
2. Analyze and interpret laboratory investigations.
3. Demonstrate skills for solving clinical problems and arrive at final diagnosis using laboratory data.

IMPORTANT INSTRUCTIONS TO STUDENTS:

1. 75% attendance is compulsory.
2. 35% marks has to be obtained in the internal assessment compulsorily to attain eligibility for university examinations.
3. Discipline has to be strictly maintained.
4. Use of mobile phones/electronic devices is strictly prohibited in the lecture halls, practical hall, demonstration room and in the department.
5. Notice board has to be periodically seen for department notices and time tables.
6. Records and practical manuals should be brought for every practical without fail.
7. Records should be complete in every aspect and submitted before each practical session.
8. Records should be neatly maintained.

SAFETY MEASURES TO BE FOLLOWED IN THE UNDERGRADUATE LABORATORY:

1. Careful handling of reagents, especially with corrosives.
2. No mouth pipetting.
3. Careful handling of burner and flame.

4. Test tubes should be facing away while heating.
5. Aprons should be neat and tidy and half sleeves.
6. Working table should be kept clean.
7. Instructions should be followed properly.
8. Students are instructed to wear formal dresses.

Teaching Hours

CHEMICAL STRUCTURE S ARE NOT MANDATORY FOR UNDER GRADUATES

1. Lectures.	120 hours.
2. Tutorials/Small Group Discussion/Problem based learning/open book examination.	20 hours.
3. Seminars / Monthly tests/ Integrated Teaching Programme Internal assessment & Revision classes.	20 hours.
4. Practicals / Demonstrations/Revision practicals.	80 hours (40x2)

Total	240 hours

Distribution of theory classes

1. Introduction & History of Biochemistry.	1 hrs
2. Cell & sub cellular structures.	2 hrs
3. Acids, bases, pH, Buffers, Henderson Hasselbalch equation	1 hrs
4. Radioactive isotopes & their application in Medicine.	1 hrs
5. Enzymes.	8 hrs
6. Vitamins.	9 hrs
7. Bioenergetics & Biological oxidation.	3 hrs
8. Carbohydrate- chemistry, digestion, absorption & metabolism.	14 hrs
9. Lipids- chemistry, digestion, absorption & metabolism	14 hrs
10. Protein- chemistry, digestion, absorption & Metabolism.	18 hrs
11. Integration of metabolism and citric acid cycle.	1 hrs
12. Molecular Biology, Molecular Genetics & Medical Biotechnology	14 hrs
13. Haemoglobin chemistry and metabolism.	4 hrs

14. Organ function tests - LFT, KFT & Thyroid Function tests	3 hrs
15. Acid base balance & its disorders.	3 hrs
16. Water, electrolyte balance & its disorders.	1 hrs
17. Detoxification mechanism and metabolism of xenobiotics, Entoxification	1 hrs
18. Mineral Metabolism.	5 hrs
19. Nutrition & Energy metabolism, Diet planning	5 hrs
20. Biochemistry of Cancer.	1 hrs
21. Biochemistry of AIDS.	1 hrs
22. Tissue proteins in Health & disease.	3 hrs
23. Mechanism of action of peptide and Steroid hormones	1 hrs
24. Biochemical aspects of atherosclerosis & Biochemical markers of MI	1 hrs
25. SI units, quality control.	1 hrs
26. Biomedical waste management.	1 hrs
27. Body Fluids.	1 hrs
28. Environment & Health.	2 hrs

COURSE CONTENTS

Theory

120 hrs

Sl. No	Must Know	Desirable to know	Nice to Know
01	Introduction- Scope of Biochemistry. 1 hrs	History of Biochemistry and medical biotechnology.	
02	Cell and sub cellular structures and its functions 2 hrs i) Cell membrane composition ii) Transport across cell membrane a. Active transport. b. Facilitated diffusion. c. Receptor mediated transport. d. Endocytosis.	Cell receptors	
03	Acids, bases, pH, buffers- buffering capacity, mechanism 1 hrs of action, Henderson Hasselbalch's Equation (without derivation) and its clinical application.		
04	Radioactive isotopes and their application in medicine. 1 hrs i. Radiation, isotopes, half life, units of radio activity. ii. Isotopes in research, diagnosis and treatment,	Methods of study of intermediary metabolism.	Radiation Hazards
05	Enzymes 8 hrs i. Nature of enzymes, Classification, coenzymes, cofactors & activators. ii. Mechanism of action, specificity of enzymes iii. Enzyme Kinetics, physical	Uses of enzymes in clinical laboratory (Urease, uricase, Glucose oxidase peroxidase, Hexokinase, Cholesterol oxidase, lipase, Horse radish peroxidase, ALP,	Immobilized enzymes.

	<p>factors affecting enzyme action, Km value and its significance (derivation of Km is not required)</p> <p>iv. Enzyme inhibition –irreversible & reversible- competitive, non-competitive, uncompetitive, importance of competitive inhibition. Anti-metabolites and their clinical application.</p> <p>v. Regulation of enzyme activity- Hormonal, Feedback inhibition, covalent modification, allosteric, induction, repression, stabilization & compartmentalization.</p> <p>vi. Clinical enzymology – Enzymes, Isoenzymes and their diagnostic significance (LDH, CPK, AST, ALT, ALP, NTP, GGT, ACP, Cholinesterase, G-6-PD, amylase, lipase)</p> <p>vii. a) Therapeutic uses of enzymes (Asparaginase, Streptokinase, Urokinase, streptodornase, hyaluronidase, pancreatin, papain, alpa – 1 antitrypsin)</p> <p>viii) ELISA & RIA.</p>	<p>Restriction Endonuclease, Reverse transcriptase).</p>	
06	<p>Vitamins 9</p> <p>hrs</p> <p>Classification, Chemical nature (detailed structure is not required), coenzyme forms, biochemical functions, sources, requirement, deficiency manifestations, antagonists and toxicity.</p> <p>i. Vit A.</p> <p>ii. Vit D.</p> <p>iii. Vit E and Vit K.</p> <p>iv. Thiamine, Riboflavin.</p> <p>v. Pyridoxine, Pantothenic acid.</p> <p>vi. Niacin, biotin.</p> <p>vii. Folic acid (details of one</p>	<p>Free radicals, antioxidants,</p>	<p>Nitric oxide &, Nitric oxide synthase complex.</p>

	<p>carbon metabolism is not required</p> <p>viii. Vit B₁₂.</p> <p>ix. Vit C.</p>		
07	<p>Bioenergetics and biological oxidation.</p> <p>3 hrs</p> <p>i. Bioenergetics, redox potential, high energy and low energy compounds, Enzymes involved in ETC.</p> <p>ii. ETC components & arrangement.</p> <p>iii. Mechanism of oxidative phosphorylation.</p> <p>iv. Inhibitors of ETC, Uncouplers</p>	Brown adipose tissue metabolism.	
08	<p>Carbohydrate- chemistry, digestion, absorption and metabolism</p> <p>14 hrs</p> <p>i. Definition, Classification, Biological importance of carbohydrates. Monosaccharides- Classification, importance, Structure and important properties.</p> <p>ii. Disaccharides - Structure and their importance</p> <p>iii. Homopolysaccharides - Structure and their importance</p> <p>iv. Heteropolysaccharides - Structure and their importance</p> <p>v. Digestion & absorption of carbohydrates. Disorders associated with transport of glucose across the cell membrane.</p> <p>vi. Glycolysis – pathway, rate limiting steps & regulation.</p> <p>vii. Glycolysis inhibitors, energetics, fate of pyruvate in aerobic and anaerobic conditions.</p>	Glycosylated Hb & fructosamino albumin.	

	<p>viii. Production of acetyl CoA (PDH complex), Rappaport Leubering cycle and its significance.</p> <p>ix. Gluconeogenesis – pathway, key enzymes, regulation & Cori’s cycle.</p> <p>x. Glylogen synthesis & Glycogen degradation.</p> <p>xi. Regulation of glycogen metabolism in brief & glycogen storage diseases.</p> <p>xii. HMP shunt pathway (second part of pathway is not to be emphasized), NADPH generation, transketolase and its significance, tissue where HMP pathway takes place, G6PD deficiency.</p> <p>xiii. Metabolism of fructose, galactose, uronic acid pathway, inborn errors associated.</p> <p>xiv. Blood glucose levels and its maintenance, mechanism of action of insulin, insulin receptor, insulin resistance, glucagon & growth hormone.</p> <p>xv. Diabetes mellitus, etiology, biochemical basis of symptoms and complications (microalbuminuria).</p> <p>xvi. Glucose tolerance test – different types, precautions, procedure, interpretation.</p>		
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<p>09</p>	<p>Lipids – Chemistry, digestion, absorption & metabolism 14 hrs</p> <p>i. Definition, classification and biological importance, structural and functional aspects of simple lipids.</p> <p>ii. Structural and functional aspects of compound lipids.</p> <p>iii. Derived lipids, Fatty acids - saturated, unsaturated. Steroids and their properties. Eicosanoids.</p> <p>iv. Digestion and absorption of lipids, role of bile salts and disorders.</p> <p>v. β-Oxidation of fatty acids, carnitine & regulation. α and ω oxidation & its importance.</p> <p>vi. Denovo synthesis of fatty acids, regulation, elongation, desaturation.</p> <p>vii. Cholesterol – Chemistry, Synthesis, (up to mevalonate in detail & later on only crucial intermediates), regulation, transport, fate, formation of bile salts, fate of bile salts & other compounds derived from cholesterol (Steroid hormones). Isoprenoid units.</p> <p>viii. Blood levels of cholesterol, plasma lipoproteins, classification, transport, functions and its disorders.</p> <p>ix. Formation and utilization of ketone bodies, ketoacidosis (starvation,</p>	<p>Action of insulin, glucagon, GH, Liver-adipose tissue axis, post prandial and starvation states,</p>	
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	<p>DM).</p> <p>x. Metabolism of adipose tissue, Triacylglycerols & its regulation, hormone sensitive lipase, fatty liver, lipotropic factors.</p> <p>xi. Functions of essential fatty acids and PUFA, prostaglandins, prostacyclins, thromboxanes and leukotrienes and their functions.</p> <p>xii. Phospholipids– formation, degradation & Glycolipids, Sphingolipids inborn errors associated with it.</p>		
10	<p>Chemistry of proteins, digestion, absorption & metabolism.</p> <p>18 hrs</p> <p>i. Amino acids – definition, classification based on structure, nutritional requirement and metabolic fate.</p> <p>ii. Ionic properties of amino acids, isoelectric pH, buffering action of amino acids and proteins.</p> <p>iii. Structural organization of proteins – primary, secondary, tertiary & quaternary with suitable examples, forces involved in stabilization of their structure, biologically active peptides.</p> <p>iv. Classification based on their chemical nature and functions. Properties of proteins-denaturation, coagulation and</p>	<p>Metabolic importance of Glutamic acid, Glutamine, Aspartic acid, asparagine polyamines.</p>	

	<p>flocculation.</p> <p>v. Plasma proteins, separative techniques of plasma proteins, blood levels of plasma proteins. Albumin - functions & clinical aspects.</p> <p>vi. Transport proteins & acute phase proteins.</p> <p>vii. Immunoglobulins – Structure, types and functions, multiple myeloma, Bence Jones proteins.</p> <p>viii. Digestion and absorption of proteins and disorders.</p> <p>ix. General reactions of amino acids – decarboxylation, transamination, deamination, transdeamination.</p> <p>x. Formation of ammonia, urea cycle and disorders.</p> <p>xi. Metabolism and importance of glycine. Inborn errors & formation of creatine.</p> <p>xii. Metabolism and importance of cysteine, methionine & transmethylation reactions.</p> <p>xiii. Urinary sulphur, cystinuria, homocystinuria & glutathione.</p> <p>xiv. Phenylalanine and tyrosine metabolism and its inborn errors.</p> <p>xv. VMA and its importance.</p> <p>xvi. Metabolism of tryptophan (only end products and</p>		
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	<p>PLP dependent reactions.</p> <p>xvii. Xanthuronic acid, Niacin synthesis in brief, serotonin, melatonin, indoxyl, Hartnup's disease.</p> <p>xviii. Importance of branched chain amino acids (metabolic pathway is not necessary), Maple syrup urine disease,</p>		
11	<p>Integration of metabolism and citric acid cycle. 1 hrs</p> <p>i. Citric acid cycle, reactions, energetics & regulation.</p> <p>ii. Amphibolic role, anaplerotic reactions & inhibitors</p>	Integration of carbohydrates, lipids and protein metabolism.	
12	<p>Molecular biology, molecular genetics and medical biotechnology. 14 hrs</p> <p>i. Structure of Purines, Pyrimidines, Nucleosides Nucleotides, function of nucleotides & biologically important nucleotides.</p> <p>ii. Sources of carbon & nitrogen for Purine synthesis (no detailed steps of synthesis, only crucial intermediates), PRPP synthesis and functions. Degradation of purines. Gout and hyperuricemia. Conversion of ribonucleotides to deoxyribonucleotides.</p> <p>iii. Synthesis of pyrimidine, orotic aciduria (Degradation of pyrimidine is not required, only end products), Salvage pathway of purine and pyrimidine & Lesch Nyhan syndrome.</p> <p>iv. Structure, properties and functions of DNA, different types of DNA,</p>		Hybridoma technology & bioinformatics.

	<p>mitochondrial DNA, Base pairing rule, difference between DNA & RNA.</p> <ul style="list-style-type: none"> v. RNA – types of RNA, their structure and functions. vi. DNA replication, DNA polymerase, regulation, DNA repair mechanism and diseases associated inhibitors of DNA replication. vii. Transcription, RNA polymerase, post transcriptional modification, inhibitors, reverse transcriptase, introns and exons, ribozymes. viii. Genetic code, tRNA and ribosomes. ix. Translation, post translational modification & inhibitors of protein biosynthesis. x. Genome and its organization, Gene expression, regulation of gene expression (lac operon concept), repression, derepression, induction & mutations. xi. Recombinant DNA technology, Restriction endonuclease, Gene library, Gene therapy. xii. DNA hybridization techniques – Southern blot, northern blot, Western blot, PCR, reverse PCR, RFLP, 		
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13	Hemoglobin Chemistry and Metabolism. 4 hrs i. Porphyrins, heme & other heme containing proteins. ii. Biosynthesis of heme, regulation, porphyrias and laboratory diagnosis. iii. Brief chemistry, structure & normal variants of Hb. Degradation of hemoglobin & metabolism of bile pigments. iv. Jaundice - Classification, causes – congenital and acquired, investigation in blood and urine. v. Abnormal hemoglobin, hemoglobinopathies, thalassemia	Anemia.	
14	Organ function tests. 3 hrs i. LFT ii. KFT iii. Thyroid function tests	GFT	
15	Acid base balance and its disorders 3 hrs i. Acids and bases of the body, mechanism of pH regulation, body buffers, Respiratory and renal mechanism. ii. Acidosis, anion gap, alkalosis, assessment of acid base status	ABG analysis and interpretation.	
16	Water and electrolyte balance and its disorders. 1 hr	Water intoxication	
17	Detoxification mechanism and metabolism of xenobiotics, 1 hr		Entoxification.

18	<p>Mineral metabolism. 5 hrs</p> <p>Sources, dietary requirements, absorption, transport, fate, metabolism, functions, excretion, deficiency manifestations of the following.</p> <ol style="list-style-type: none"> i. Calcium, phosphorus ii. Iron, Copper, magnesium iii. Iodine, Fluoride iv. Zinc, manganese, selenium, chromium 		Toxicity of heavy metals – Cadmium, Arsenic, Nickel, Mercury & lead.
19	<p>Nutrition and energy metabolism & Diet planning. 5 hrs</p> <ol style="list-style-type: none"> i. Caloric value of food, RQ, BMR and its clinical significance, specific dynamic action of food, energy allowances based on age, sex and physical activities. ii. Nitrogen balance, protein quality, biological value of protein, nutritional value and protein requirement. iii. Balanced diet, proximate principles of diet and their relative proportions. iv. PEM – Kwashiorkar, Marasmus & Malabsorption syndrome. iv. Biochemistry of starvation, obesity, dietary fibers, 	Diet planning in health and diseases.	TPN (Total parenteral nutrition) Toxic substances in food (natural, additives).
20	<p>Biochemistry of cancer 1 hr</p> <ol style="list-style-type: none"> i. Aetiology – chemical carcinogens, Oncogenic virus, oncogenes, Anti-oncogenes, suppressor genes, Growth factors, tumour markers. 	Apoptosis	

21	Biochemistry of AIDS 1 hr Transmission, natural course of disease, laboratory analysis,		Anti – HIV drugs & prevention.
22	Tissue proteins in Health and disease 3 hrs i. Collagen synthesis, structure, functions and abnormalities. ii. Elastin, Keratin, contractile proteins - Actin, myosin, troponins & neurotransmitters.	Diseases due to abnormal protein structure – Prion's disease, lens proteins (Cataract).	Biochemistry of ageing, Alzheimers disease.
23	Hormones 1 hr i) Mechanism of action of peptide and steroid hormones (insulin, Glucagon, Epinephrine and steroids).	Structure and functions of hormones	
24	Biochemical aspects of atherosclerosis and biochemical markers of MI 1 hr i. Biochemistry of Atherosclerosis, lipid profile, apoproteins, Lp(a) homocysteine & C – reactive protein. ii. Biochemical markers of MI- LDH, CPK–MB, Myoglobin, troponin, SGOT.	Newer cardiac biomarkers.	
25	SI units & Quality control 1 hr i. SI units, Quality control-definition, collection of samples, Transport of samples. Limit of errors allowable in lab.	External Quality control programme	
26	Biomedical waste management 1 hr	Collection, handling, transport and disposal of BMW, functioning of	

		incinerator	
27.	Body Fluids 1 hr Milk,CSF,Amniotic Fluid, Synovial Fluid, Ascitic Fluid		
28.	Environment & Health 2 hrs Introduction, Classification of Environment Environmental Biochemistry, Environmental Pollution- Water Pollution, Air Pollution, Adaptation to an altered environmental temperature- Heat Stress & Cold Stress		

Practicals

PART – I Qualitative Experiments

40 X 2 = 80 Hours

1. Reactions of Glucose and Fructose.
2. Reactions of Lactose, Maltose.
3. Reactions of Sucrose and Starch.
4. Identification of unknown carbohydrate.
5. Precipitation and coagulation reactions of proteins.
6. Colour reactions of proteins: Albumin, casein.
7. Identification of unknown protein.
8. Identification of Biochemically important substances.
9. Normal constituents of urine and physical characteristics.
10. Organic: Urea, Uric Acid and Creatinine.
11. Inorganic: Ca, P, Cl, SO₄, and NH₃.
12. Analysis of abnormal constituents of urine.

PART - II Quantitative Experiments

1. Estimation of blood glucose and interpretation.
2. Estimation of blood urea and interpretation.
3. Estimation of serum inorganic phosphorus and interpretation.

4. Estimation of serum Calcium and interpretation.
5. Estimation of total serum proteins, Albumin and A: G ratio.
6. Estimation of serum creatinine and interpretation.

PART – III Demonstrations

1. Colorimetry.
2. Paper electrophoresis.
3. Paper Chromatography.
4. Ion Selective Electrode (ISE)
5. Glucose tolerance test.
6. Determination of AST (SGOT) and ALT (SGPT) and interpretation.
7. Determination of serum cholesterol (enzymatic method) and interpretation.
8. Determination of glucose, proteins and chloride in CSF and interpretation.
9. Determination of albumin in urine and test for Bence Jones proteins in urine and interpretation.
10. Spot test for PKU, Alkaptonuria and Homocysteinuria.
11. Determination of serum bilirubin and interpretation.
12. Determination of serum amylase and interpretation.
13. Determination of serum uric acid and interpretation.
14. Determination of serum alkaline phosphatase and interpretation.
15. Spotters.
16. Interpretation of charts, graphs and case reports.

SCHEME OF EXAMINATION:

Internal Assessment: Total – 40 (Theory 30, Practical 10 marks)

Theory 30 Marks:

There should be regular formative assessment. Day to day performance should be given greater significance. Minimum of three sessional examinations are to be conducted. The sessional examination preceding the university examination may be similar to the pattern of university examination.

Average of any two best marks obtained in the theory I A examinations will be taken into consideration for calculating Internal assessment. 20% of weightage will be given to day to day

assessment (Performance in monthly tests, participation in seminars and research work, MCQ, Home assignment, structured Viva-voce, Integrated teaching programme, ICMR STS research projects, Quiz competition, UG grand seminar, open book examination, case history, charts, problem based learning, self study, video and photographs etc). Average of best two I A marks and marks obtained for day to day assessment will be added and the sum of these two shall be sent to the University. One of the three sessional examinations will be of MCQ type (preferably II I A)

Practical 10 Marks:

There will be three sessional practical examinations. 20% of weightage will be given to day to day assessment. Average of best two practical I A marks will be reduced to 8 and marks obtained for practical records and performance in periodic practical tests, OSPE will be reduced 02. Average of best two I A marks and marks obtained for day to day assessment will be added and sum of these shall be sent to the university. One of the three sessional examinations will be of OSPE type. (Preferably II I A)

The Internal assessment marks should be displayed on the notice board. The individual student's signature should be taken against the marks obtained.

The Internal assessment marks both theory & practical obtained by the candidates should be sent to the university at least 15 days prior to the commencement of university theory examination.

Student should be shown evaluated answer script. The individual student's signature has to be taken on the answer scripts.

Submission of Practical records for the university examination:

At the time of practical examination each candidate shall submit to the examiners his or her laboratory record, duly certified by the head of the department as a bonafide record of the work done by the candidate

University Examination

Theory: 100 Marks.

There shall be two papers of 50 marks each. The total marks will be 100. The total duration of the paper will be 3 hrs. There shall be 3 types of questions.

Types of question & distribution of marks:

<u>Topics</u>	<u>Type of questions</u>	<u>No of Que & Marks</u>
Paper I	Long essay	1 x 10 = 10
	Short essay	5 x 5 = 25
	Short answer	5 x 3 = 15
Paper II	Long essay	1 x 10 = 10
	Short essay	5 x 5 = 25
	Short answer	5 x 3 = 15

Distribution of topics for each paper & weithage of marks in university examination

Paper I

Topics	Weithage of marks
1. Cell & sub cellular structures	5 Marks
2. Acids, bases, pH, Buffer, Henderson Hasselbalch equation	5 Marks
3. Radioactive isotopes & their application in Medicine	5 Marks
4. Enzymes	10 Marks
5. Vitamins	10 Marks
6. Bioenergetics & Biological oxidation	10 Marks
7. Carbohydrate- chemistry, digestion, absorption & metabolism	10 Marks
8. Lipids- chemistry, digestion, absorption & metabolism	10 Marks
9. Protein- chemistry, digestion, absorption & metabolism	10 Marks

Paper II

Topics	Weithage of marks
1. Integration of metabolism and citric acid cycle	10 Marks
2. Molecular Biology, Molecular Genetics, Medical Biotechnology	10 Marks
3. Haemoglobin chemistry and metabolism	10 Marks

4. Organ function tests - LFT, KFT & Thyroid Function tests	05 Marks
5. Acid base balance & its disorders	10 Marks
6. Water & electrolyte balance & its disorders.	05 Marks
7. Detoxification mechanism, metabolism of xenobiotics, Entoxification	05 Marks
8. Mineral Metabolism	10 Marks
9. Nutrition & Energy metabolism and Diet planning	10 Marks
10. Biochemistry of Cancer	05 Marks
11. Biochemistry of AIDS	05 Marks
12. Tissue proteins in Health & disease.	05 Marks
13. Mechanism of action of Hormones	05 Marks
14. Biochemical aspects of atherosclerosis & Biochemical markers of MI	05 Marks
15. SI units & quality control	05 Marks
16. Biomedical waste management	05 Marks
17. Body Fluids	05 Marks
18. Enviroment & Health	05 Marks

Note:

1. Long essay questions may be asked from topics with weithage of 10 marks.
2. Short essay questions may be asked from any of the topics.
3. Short answer questions may be set from all the chapters (except the chapter on which long essay and short essay questions have been set).
4. **The topic assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.**

University Practical Examination

Practical: 40 Marks

The practical examination consists of two exercises I & II, each of one hour duration and each exercise carries 20 marks.

Exercise I: 20 Marks

- 1. Quantitative estimation** – Every candidate shall perform one given procedure.
 - a) Principle and procedure for the estimation asked in the question should be written by the candidate in first five minutes. 5 Marks
 - b) After collecting the papers, correct procedure for the estimation is given and practical examination is done. Total marks would be 15 and the distribution of marks would be:
 - i) Results (values), Calculations and reporting. 5 Marks
 - ii) For interpretation of results and application of the estimation. 5 Marks
 - c) Case studies and discussion. 1X5 = 5 Marks.

Exercise II: 20 Marks

- 2. Qualitative analysis** – Every candidate shall perform one given procedure such as – identification of carbohydrates, proteins, substances of Biochemical importance, analysis of normal and abnormal constituents of urine. (Correct procedure for the analysis is given and practical examination is done).
 - i) For selection of appropriate reactions 5 Marks
 - ii) For reasoning of analysis and correct reporting 5 Marks.
 - iii) For interpretation of results 5 Marks.
- 3. Five spotters** including Biochemical techniques, instruments, crystals, biochemical tests and reagents (at the beginning of practical examinations). 1X5 = 5Marks.

Viva-Voce: 20 Marks

The viva voce examination shall carry 20 marks and all the four examiners will conduct the viva examination. The distribution of topics for each examiner is as under.

VIVA-VOCE ASSESSMENT PROGRAMME

Group - I (05)	Cell & subcellular structures, Carbohydrates – Chemistry, Classification, Digestion, Absorption and Metabolism, Biochemistry of cancer & AIDS, Radio isotopes, Integration of Metabolism & citric acid cycle.
Group - II (05)	Proteins-Chemistry, Classification, Digestion, Absorption & Metabolism, Enzymes and Clinical enzymology, Detoxification, SI units & Quality control.
Group - III (05)	Lipids –Chemistry, Classification, Digestion, Absorption, and Metabolism. Nucleic acids, Purine & Pyrimidine metabolism, Molecular biology & Genetics, Biological oxidation, Biochemical aspects of atherosclerosis & markers of MI.
Group-IV (05)	Vitamins, Minerals, Organ function tests (Liver, Kidney, Thyroid), Nutrition and Energy metabolism & Diet planning in health and diseases. Heme metabolism. Water, electrolyte & acid base balance & its disorders. Tissue proteins in health & diseases, Mechanism of action of peptide and steroid hormones, Biomedical waste management, Body Fluids, Environment & Health.

Note: Applied Biochemistry questions may be asked by all the 4 examiners in the respective subject.

Suggested books in Biochemistry: (Latest Edition)

Deciding which text book to buy is not an easy task. Choice of the text book depends on the individual and his or her aptitude. It is desirable, and would certainly be helpful if each student has one text book out of the recommended list of text books

RECOMMENDED BOOKS FOR THEORY

1. Textbook of Biochemistry by Rafi MD.
2. Textbook of Biochemistry by D.M.Vasudevan & Sreekumari.S.
3. Medical Biochemistry by Dinesh Puri.
4. Textbook of Biochemistry by Debajyoti Das
5. Textbook of Biochemistry by U.Satyanarayan & U. Chakrapani.
6. Textbook of Biochemistry Pankaja Naik.

RECOMMENDED BOOKS FOR PRACTICALS

1. Manual of Practical Biochemistry by Rafi MD.
2. Manipal manual of Clinical Biochemistry by Shivanand Nayak.
3. Laboratory Manual in Biochemistry by T.N.Pattabhiraman.

REFERENCE BOOKS

1. Harper's Review of Biochemistry
2. Practical in Clinical Biochemistry by Nath & Nath.

Topics for Group Discussion:

1. Application of radioactive isotopes in Medicine.
2. Diagnostic and Therapeutic uses of enzymes.
3. Antioxidant vitamins.
4. Biochemical investigations in Diabetes Mellitus.
5. Lipid storage disorders.
6. Inborn errors of aminoacid metabolism.
7. Recombinant DNA Technology.
8. Haemoglobinopathies.
9. Thyroid function tests.
10. Kidney function tests.

Topics for Interactive sessions:

1. ABG Analysis and interpretation.
2. Diet planning in health and diseases.
3. Obesity.
4. Biochemistry of ageing.
5. Biochemical markers of Atherosclerosis and MI.
6. Abnormal constituents of urine and interpretation.
7. Glucose tolerance test.
8. Liver function test.
9. Electrophoretic pattern in different diseases.
10. Analytical biochemistry and instrumentation.

TOPICS FOR INTEGRATED TEACHING

Sl. No	Topics	Dept. to organize	Dept. to participate
1	Transport across cell membrane	Biochemistry	Anatomy & Physiology
2	Anaemia	Physiology	Biochemistry & Pathology
3	Jaundice	Biochemistry	Physiology, Pathology, Paediatrics & Medicine
4	Coronary Circulation	Physiology	Anatomy, Biochemistry & Medicine
5	Malnutrition and starvation	Biochemistry	Physiology, Community Medicine & Paediatrics
6	Human genetics	Anatomy	Biochemistry, Physiology & Paediatrics
7	Acid base balance	Biochemistry	Physiology, Medicine & Anaesthesia
8	Thyroid gland	Anatomy	Physiology, Biochemistry, Medicine & Surgery
9	Diabetes mellitus	Biochemistry	Anatomy, Physiology & Medicine
10	Acid peptic disease	Physiology	Biochemistry, Medicine & Surgery

INTRODUCTION TO HUMANITIES AND COMMUNITY MEDICINE

PHASE – I (TERM I & II)

Introduction to Humanities and Community Medicine, which includes Evolution of Medicine, Demography, Medical Sociology, Behavioral Sciences inclusive of Communication Skills and brief introduction to Research methodology and Biostatistics.

Goal:

To prepare undergraduate medical students as a competent Community & Primary Care Physician.

Objectives:

Knowledge:

The student shall be able to:

1. Explain the principles of sociology including demographic population dynamics;
2. Identify social factors related to health, disease and disability in the context of urban and rural societies;
3. The impact of urbanization on health and disease;
4. Observe and interpret the dynamics of community behavior;
5. Describe the elements of normal psychology and social psychology;
6. Observe the principles of practice of medicine in hospital and community setting.
7. Understand the basics of Research in medical field

Skills:

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

1. Principles of practice of medicine in hospital and community settings and familiarization with elementary nursing practices.
2. Art of communication with patients including history taking and medico social work.
3. To formulate a research plan to undertake projects funded by STS ICMR, BLDE University etc.

Teaching of community medicine shall be both theoretical as well as practical. The practical aspects of the training programme shall include visits to the health establishments and to the

community where health intervention programmes are in operation so as to make students understand the role of social, cultural, economic and environmental factors on the health of population in urban & rural communities & also to orient the student about health care facilities available and the services provided by them in the underserved population.

In order to inculcate in the minds of the students the basic concept of community medicine to be introduced in this phase of training, it is suggested that the detailed curriculum drawn shall include at least 30 hours of lectures, demonstrations, seminars etc. together with at least 15 visits of two hours each.

III. COURSE CONTENTS

Lectures

30 Hours

Sl. No.	Topic
1	Introduction to Community Medicine, Evolution of Community Medicine, Indian Systems of Medicine
2	Social factors in health and disease including Behavioural psychology
3	Communication skills & Doctor-patient relationship
4	Demography and family welfare
5	Community Study - Rural, Urban Communities-features, health hazards, the study of family
6	Introduction to Research methodology including Ethics
7	Introduction to Bio-Statistics

Field Visits - 15 (2 hours each)

- **Urban Slum**
- **Community**
- **Primary Health Centre**
- **Hospital**
- **Rural Health Training Centre**
- **Urban Health Training Centre**

SECTION - IV

MEDICAL ETHICS

INTRODUCTION

Medical ethics is a systematic effort to work within the ethos of medicine, which has traditionally been service to sick.

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. Doctor and health professionals are confronted with many ethical problems. It is, therefore necessary to be prepared to deal with these problems.

In keeping with its goal to improve quality of education, BLDE University, recommends introduction of medical ethics in the regular teaching of M.B.B.S. course beginning from first year and continuing till internship.

OBJECTIVES

The objectives of teaching medical ethics should be to enable to students develop the ability to:

1. Identify underlying ethical issues and problems in medical practice.
2. Consider the alternatives under the given circumstances, and make decisions based on acceptable moral concepts and also traditions practices.

	Course Content	Department	Hours
1	Introduction to Medical Ethics What is Ethics? What are values and norms Relationship between being ethical and human fulfilment? How to form a value system in one's personal and professional life? Hemmans, Heteronomous Ethics and Autonomous Ethics Freedom and Personal Responsibility	Pathology	2
2	Definition of Medical Ethics Difference between medical ethics and bioethics Major Principles of Medical Ethics Beneficence = fraternity Justice = equality	Pathology	2

	Self determination (autonomy) = liberty		
3	Perspectives of Medical Ethics The Hippocratic oath The Declaration of Helsinki The WHO Declaration of Geneva International code of Medical Ethics (1983) Medical Council of India Code of Ethics	Physiology	2
4	Ethics of the Individual The patient as a person The Right to be respected Truth and Confidentiality The Autonomy of decision	Surgery	2
	The concept of disease, health and healing The Right to health Ethics of Behaviour modification The Physician Patient relationship Organ donation	Community Medicine	2
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 Fertilisation (IVF) Artificial Insemination by Husband (AIFI) Artificial insemination by Donor (AID) Surrogate motherhood Semen Intrafallopian Transfer (SIFT) Gamete Intrafallopian Transfer (GIFT) Zygote Intrafallopian Transfer (ZIFT) Genetic Engineering	OBG	6
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	Medical Education Department	6
7	Death and Dying Use of life-support systems Death awareness The moment of death Prolongation of life Ordinary and extraordinary life support Advanced life directives Euthanasia — passive and active Suicide — the ethical outlook The right to die with dignity	Anaesthesia	4
8	Professional 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 care	Surgery	4
9	Research Ethics Animal and experimental research Human experimentation Human volunteer research Informed Consent, Drug trails	Pharmacology	4
10	Ethical work-up of cases Gathering all scientific factors Gathering all human factors Gathering all value factors Identifying areas of value conflict setting of priorities Working out criteria towards decisions	All clinical departments	6
		Total hours	40

SECTION - V

ANNEXURE - I

Different Methods Recommended for Internal Assessment by MCI

The Medical Council of India has given some examples of methods for internal assessment of student, which may be followed by the colleges.

They are:

1. Credit for preparation and presentation of seminars by students
2. Preparation of clinical case for presentation.
3. Clinical case study / problems solving exercises.
4. Participation in project for health care in the community
5. Proficiency in conducting a small research project or assignment.
6. Multiple choice questions (MCQ) test after completion of a chapter / system.

Each item shall be objectively assessed and recorded. Some of the items can be assigned as homework/vacation work.

ANNEXURE - II

Coordinated Programme in Theory for MBBS Phase – I of One Year Course in Anatomy, Physiology and Biochemistry

I term

Month	Anatomy	Physiology	Biochemistry	Integrated teaching
1	General Anatomy General Embryology General Histology General Human Genetics	General Physiology Cell membrane, Transport Homeostasis Body fluids Biophysical principles	Cell structure Sub-cellular Components Biophysical Principles PH, buffers Biochemistry of nucleic acids	
2	Osteology Myology Arthrology	Haematology Muscle physiology	Classification sources & functions of proteins, carbohydrate &	Anatomy+ Physiology+ Biochemistry+ Pathology

			lipids	
3 & 4	Heart, Blood vessels, Lungs Pleura Systemic embryology	Cardiovascular System Respiratory System	Plasma proteins Protein synthesis Diagnostic Enzymology	
5 & 6	Abdomen, Digestive And Genitourinary Organswith Systemic embryology	Digestive system, secretion and motility	Digestive enzymes Vitamins, Digestion and absorption of food	

II term

Month	Anatomy	Physiology	Biochemistry	Integrated Teaching
	Pelvis	Renal and reproductive Physiology	Liver function, detoxification, renal function, gastric function	
7 & 8	Neuro anatomy Special senses Neural development	Nervous system Special senses Autonomic Nervous System Endocrine Glands	Metabolism of carbohydrates, Amino acids, Protein, fats, minerals, water.	Endocrine And exocrine pancreas (Diabetes Mellitus) Anatomy+ Physiology+ Biochemistry
9 & 10	Brain, Cerebral cortex, Ventricular system, Brain coverings, Limbic system	Higher functions Emotion, behaviors	Neurotransmitter, Radio Isotopes, Biological, Oxidation, Electron transfer cycle	CSF Anatomy+ Physiology+ Biochemistry

Coordinated Programme for Dissection / Practical / Demonstration

I term

Month	Anatomy	Physiology	Biochemistry
1	Upper limb dissection Prosected part, Histology tissues Muscles, Bone marrow	Osmotic effect Osmotic hemolysis of RBC, ESR. Principles of hemocytometry	Viscosity, Principles of colourimetry PH – meter Spectometry Sp. Gravity of body fluids
2	Lower limb dissection Prosected part Histology – bone connection Tissue Embryology	Heamatology experiments Muscle experiments	Biochemistry test for Carbohydrate, Proteins, Fats, Minerals.
3	Thorax Abdomen Embryology model	Spirometry Stethography Artificial respiration FEV, Breath sounds	

II term

Month	Anatomy	Physiology	Biochemistry
5 & 6	Thorax Abdomen Pelvis Embryology model	Arterial pulse Venous pulse Blood Pressure, ECG (Demon) Echocardiography (Demon) Stress test Heart sounds	Urine examination Liver function test Renal clearance test
7 & 8	Head and Neck	Clinical examination of : <ul style="list-style-type: none"> • Cranial nerves • Sensory function • Motor function 	Glucose Tolerance Test; Blood Glucose Estimation Chemistry of food Chemistry of milk
9 & 10	Brain	Examination of higher functions reflexes.	CSF Analysis

Urine: Physical and Chemical

Estimation of Glucose in blood and urine G.T.T

ANNEXURE - III

**List of Topics for Integrated Teaching Programme
During MBBS Phase – I course**

Sl. No.	Topics	Department to organize	Departments to participate
1	<i>Human Genetics:</i> Anatomic considerations (Anat), applied aspects (Surgery & Paed)	Anatomy	Anatomy, Physiology, Biochemistry, Surgery & Pediatrics.
2	<i>Acid Peptic disease:</i> Anatomy of stomach (Anat), Functional aspects of stomach (Phy), Pathophysiology of Acid Peptic disease (Path), Medical Management of acid peptic disease (Med), Surgical Management of acid peptic disease (Surg)	Anatomy	Anatomy, Physiology, Pathology, Medicine & Surgery.
3	<i>Liver:</i> Structure of Liver (Anat), functional aspect of liver (Phys), Biochemical aspect of liver (Bioch)	Anatomy	Anatomy, Physiology, Biochemistry.
4	<i>Parkinsonism:</i> Anatomy of Basal Ganglia (anat), Physiology of BG (Phys), clinical features, investigations & treatment (Med)	Anatomy	Anatomy, Physiology, Medicine.
5	<i>Uterus:</i> Anatomy of Uterus (Ana), Physiological changes (Phy), Applied aspects (OBG)	Anatomy	Anatomy, Physiology, OBG
6	<i>Inguinal Hernia:</i> Anatomy of hernia (Ana), Surgical aspects (Sur)	Anatomy	Anatomy, Surgery
7	<i>Thyroid Gland:</i> Anatomy of Thyroid Gland (Ana), Synthesis of thyroid Hormones (Phy), Medical Management of Thyroid disorders (Med), Surgical Management of Thyroid disorders (Sur)	Anatomy	Anatomy, Physiology, Medicine, Surgery
8	Joints	Anatomy	Anatomy, Orthopaedic, Radiology & Physiotherapy

**TOPICS FOR INTEGRATED TEACHING PROGRAMME
FOR MBBS PHASE I COURSE**

Sl. No	Topics	Departments to participate
1	<i>Cell Membrane:</i> Structure (Anat), function (Bioc) and transport across the cell membrane (Phy)	Anatomy, Physiology, & Biochemistry
2	<i>Anaemia:</i> Pathophysiology (Patho), Investigation & treatment (Med) & Public health importance (Comm Med)	Physiology, Biochemistry, Pathology & community Medicine
3	<i>Human Genetics:</i> Anatomic considerations (Anat), applied aspects (Surgery & Paed)	Anatomy, Physiology, Biochemistry, Surgery & Pediatrics.
4	<i>Acid base balance</i> General considerations (Bioc), Acid Base balance (Phys) & disorders & Treatment (Med).	Physiology, Biochemistry, Medicine
5	<i>Acid Peptic disease:</i> Anatomy of stomach (Anat), Functional aspects of stomach (Phy), Pathophysiology of Acid Peptic disease (Path), Medical Management of acid peptic disease (Med), Surgical Management of acid peptic disease (Surg)	Anatomy, Physiology, Pathology, Medicine & Surgery.
6	<i>Liver:</i> Structure of Liver (Anat), functional aspect of liver (Phys), Biochemical aspect of liver (Bioch)	Anatomy, Physiology, Biochemistry.
7	<i>Myocardial infarction:</i> Anatomy of coronary arteries (Ana), physiological aspects of coronary blood flow (Phy), Pathophysiology of CAD (Pathology), Biochemical markers in CAD (Bioch), Medical management of CAD (Med), surgical management of CAD (Surg).	Anatomy, Physiology, Pathology, Biochemistry, Medicine, & Surgery.
8	<i>Parkinsonism:</i> Anatomy of Basal Ganglia (anat), Physiology of BG (Phys), clinical features, investigations & treatment (Med)	Anatomy, Physiology, Medicine.

TOPICS FOR INTEGRATED TEACHING

Sl. No	Topics	Dept. to organize	Dept. to participate
1	Transport across cell membrane	Biochemistry	Anatomy & Physiology
2	Anaemia	Physiology	Biochemistry & Pathology
3	Jaundice	Biochemistry	Physiology, Pathology, Paediatrics & Medicine
4	Coronary Circulation	Physiology	Anatomy, Biochemistry & Medicine
5	Malnutrition and starvation	Biochemistry	Physiology, Community Medicine & Paediatrics
6	Human genetics	Anatomy	Biochemistry, Physiology & Paediatrics
7	Acid base balance	Biochemistry	Physiology, Medicine & Anaesthesia
8	Thyroid gland	Anatomy	Physiology, Biochemistry, Medicine & Surgery
9	Diabetes mellitus	Biochemistry	Anatomy, Physiology & Medicine
10	Acid peptic disease	Physiology	Biochemistry, Medicine & Surgery

ANNEXURE - IV
CATEGORIES OF BIO-MEDICAL WASTE
SCHEDULE-I
(See Rule 5)

**Waste Category No.	Waste Category ** Type	Treatment & Disposal ** Options
Category No.1	<u>Human Anatomical Waste</u> (human tissues, organs body parts)	Incineration ^o / deep burial*
Category No.2	<u>Animal waste</u> (animal tissues, organs, body parts, carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, colleges discharge from hospitals, animal houses)	Incineratin ^o / deep burial*
Category No.3	<u>Microbiology & biotechnology Waste</u> (wastes from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures.)	Local autoclaving/micro-waving/incineration ^o
Category No.4	<u>Waste sharps</u> (needles, syringes, scalpels, blades, glass etc., that may cause puncture and cuts. This includes both used and unused sharps)	Disinfection (Chemical treatment ^{oo} /auto- claving / micro-waving and mutilation / shredding ^{aa}
Category No.5	<u>Discarded Medicines and Cytotoxic drugs</u> (waste comprising of outdated, contaminated and discarded medicines)	Incineration ^o /destruction and drugs disposal in secured landfills
Category No.6	<u>**Soiled Waste</u> (items contaminated with blood and body fluids including cotton, dressings, soiled plaster casts, liners, beddings, other material contaminated with blood)	Incineration ^o autoclaving/micro-waving
Category No.7	<u>Solid Waste</u> (waste generated from disposable items other than the waste**sharps such as tubings, catheters, intravenous sets, etc.)	Disinfection by chemical treatment ^{oo} autoclaving/micro-waving and mutilation/shredding ^{aa}

Category No.8	<u>Liquid Waste</u> (waste generated from laboratory and washing, cleaning, housekeeping and disinfecting activities)	Disinfection by chemical treatment ^{oo} and discharge into drains
Category No.9	<u>Incineration Ash</u> (ash from incineration of any bio-medical waste)	Disposal in municipal landfill
Category No. 10	<u>Chemical Waste</u> (chemicals used in production of biologicals, chemicals used in disinfection as insecticides etc.,)	Chemical treatment ^{oo} and discharge into drains for liquids and secured landfill for solids

** As per Bio-Medical Waste (Management & Handling) (Second Amendment) Rules, 2000, dated 2nd June, 2000.

^{oo} Chemicals treatment using at least 1% hypochlorite solution or any other equivalent chemical reagent. It must be ensured that chemical treatment ensures disinfection.

^{aa} Mutilation/shredding must be such so as to prevent unauthorized reuse.

^o There will be no chemical pretreatment before incineration. Chlorinated plastics shall not be incinerated.

* Deep burial shall be an option available only in towns with population less than five lakhs and in rural areas.

COLOUR CODING AND TYPE OF CONTAINER FOR DISPOSAL OF BIO-MEDICAL WASTES

SCHEDULE – II
(See Rule 5)

Colour Coding	Type of Container	Waste Category	Treatment Options as per Schedule-I
Yellow	Plastic bag	Cat. 1, Cat.2, Cat.3, Cat.6.	Incineration/deep burial
Red	Disinfected container/plastic bag	Cat.3, Cat.6, Cat.7.	Autoclaving/Micro-waving chemical Treatment.
Blue/White Translucent	Plastic bag/puncture proof container	Cat.4, Cat.7.	Auto claving/Micro-waving/Chemical Treatment and destruction/shredding
Black	Plastic Bag	Cat.5, and Cat.9 and Cat.10 (solid)	Disposal in secured landfill

Notes:

1. Colour coding of waste categories with multiple treatment options as defined in Schedule-I shall be selected depending on treatment option chosen, which shall be as specified in Schedule-I
2. Waste collection bags for waste types needing incineration shall not be made of chlorinated plastics.
3. Categories 8 and 10 (liquid) do not require containers/bags.
4. Categories 3 if disinfected locally need not be put in containers/bags.



B L D E UNIVERSITY

Ordinance Governing **MBBS Degree** Course

(REVISED CURRICULUM-2016)

Phase-II

Published by
B L D E University

[Declared as Deemed to be University u/s 3 of UGC act, 1956, vide notification No.F.9-37/2007-U.3 (A)]

The Constituent College

Shri B.M.Patil Medical College, Hospital and Research Centre

Smt.Bangaramma Sajjan Campus, Dr. B.M.Patil Road, (Sholapur Road), Vijayapura-586 103, Karnataka, India

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BLDE UNIVERSITY

[Declared as Deemed-to-be- University u/s 3 of UGC Act, 1956 vide Government of India notification No. F.9-37/2007-U.3(A)]

The Constituent College

SHRI B. M. PATIL MEDICAL COLLEGE, HOSPITAL AND RESEARCH CENTRE

BLDEU/REG/GEN/2016-17/1917

September 09, 2016

NOTIFICATION

Sub: Revised Curriculum for the MBBS Degree-2016.

- Ref: 1. Medical Council of India Regulation on Graduate Medical Education, 1997 and subsequent amendments of the same from time-to-time.
2. Minutes of the meeting of the Standing Committee of Academic Council of the University held on September 7, 2016.

On approval of the Standing Committee of Academic Council the Curriculum for MBBS Degree course is approved.

The revised curriculum shall be effective from the Academic Session 2016-17 onwards, for MBBS degree course in the constituent College of the University viz. Shri B. M. Patil Medical College, Hospital and Research Centre.


REGISTRAR
REGISTRAR
BLDE University, Vijayapura.

To,
The Dean, FoM & Principal
Shri B. M. Patil Medical College,
Hospital and Research Centre,
Vijayapura.

Copy to:

- The Secretary UGC New Delhi.
- Controller of Examinations.
- Prof. & HODs of Pre, Para and Clinical Departments.
- P.S. to Hon'ble President.
- P.S. to Hon'ble Vice-Chancellor.

Smt. Bangaramma Sajjan Campus, Sholapur Road, Vijayapura - 586103, Karnataka, India.

Vision & Mission

- Excellence in all our endeavours.
- Committed to provide globally competitive quality medical education.
- Provide the best health care facilities in this backward region, in particular, to socially disadvantaged sections of the society.
- Constantly striving to become a Reputed research University with world-class infrastructure, latest tech-tools for teaching/research and adopting global best practices.

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Introduction

The revised M.B.B.S curriculum of The Medical Council of India (MCI) came into effect from May 1997 and it has undergone amendments thereof. The BLDE University has implemented the new regulations for the batches of students admitted to the M.B.B.S course from the academic year 2008-09 and onwards. Later the curriculum was revised in 2012-13. This third revision will be implemented for the batches of students admitted to the M.B.B.S Course from the academic year 2016-17 onwards.

These regulations recommend the following:

1. That every medical college should have curriculum committee which would plan curricula and instructional method which would be updated regularly.
2. That every medical college establishes a medical education unit for faculty development, preparation of learning resource materials and improved evaluation methods.
3. That every medical institution should evolve institutional objectives, which would be in consonance with the national goals (See Section II) and health policy. The institutional objectives should describe the attributes of their product.
4. That the medical curriculum should be oriented towards educating students to take up the responsibilities of physicians of first contact. The medical graduate should be capable of functioning independently in both urban and rural environment of our country and internationally.
5. That educational experience should emphasise health rather than only disease, and community orientation also instead of only hospital orientation. Population control, national health programs and family planning should also be given due emphasis. The thrust should be on common diseases rather than rare disorders.
6. Every effort should be made to provide educational experience that allows hands-on-experience both in hospital as well as in community setting. For this purpose, a comprehensive list of clinical skills that a graduate must acquire at the end of the course including internship has been prepared.
7. That there should be Shift in the role of medical teachers from mere imparting knowledge to that of a facilitator and motivator of student learning.
8. That every effort should be made to use learner oriented methods which would encourage cultivation of logical thinking, clarity of expression, independence of judgment, scientific habits, problem solving abilities, and self-directed learning.
9. Integration of ICT in teaching learning process is required and should be implemented.
10. Reduction of “didactic lectures (not more than 1/3 of total teaching hours) and increasing use of active methods of learning such as group discussion seminars, role play, field visits, demonstrations, peer interactions etc. which would enable students to develop personality, communication skills and other qualities which are necessary
11. That maximum effort should be made to encourage integrated teaching and every attempt be made to de-emphasise compartmentalization of disciplines so as to achieve horizontal and vertical integration in different phases. This can be planned by

encouraging integrated teaching between traditional subject areas using a problem based learning approach starting with clinical or community cases and exploring the relevance of various preclinical disciplines in both understanding and resolution of the problem.

12. Areas which need to be addressed with due importance are:
 - a. Maternal and child health
 - b. Sanitation and water supply
 - c. Immunization and revised guidelines
 - d. Health education
 - e. IHPS standard of health at various levels
 - f. Biomedical waste disposal
 - g. Orientation to Organizational and Institutional arrangements in health care delivery
 - h. Training in documentation skills and research
 - i. History of modern medicine
 - j. Awareness regarding ethical issues and problems, analysis and competency in dealing in an acceptable manner [Medical ethics teaching should be planned at all levels with dedicated time allotment. It should be taught in all phases with appropriate clinical relevance].
13. That every effort should be made to use learner oriented methods which would encourage cultivation of logical thinking, clarity of expression, independence of judgment, scientific habits, problem solving abilities, and self-directed learning.
14. Regular periodic assessment to be done throughout the course for internal assessment. The assessment need not be limited to written tests. It should relate to other items such as maintenance of records, participation in seminars and group discussions, clinical case study, proficiency in carrying out practical or clinical skill or participation in projects and assignments (even) during vacation. These be evaluated objectively and recorded.
15. Examinations be designed with a view to assess not merely the knowledge but also practical and clinical skills, habits and values which are necessary for a graduate to carry out professional day to day work competently

BLDE University endorses these recommendations and strongly desires to implement them while conducting the MBBS course.

SECTION - I

Objectives of Medical Education

(As stated in MCI Regulations, 1997 amended up to Feb 2012)

This section contains the goals and general objectives of graduate medical education as stated in MCI Regulations, It is desired that in consonance with these national goals, each medical college should evolve institutional objectives.

I. NATIONAL GOALS:

At the end of undergraduate programme, the medical student should be able to:

1. Recognize 'health for all' as a national goal and health right of all citizens and by undergoing training for medical profession fulfill his/her social obligations towards realization of this goal;
2. Learn every aspect of National policies on health and devote himself/herself to its practical implementation;
3. Achieve competence in practice of holistic medicine, encompassing promotive, preventive, curative and rehabilitative aspects of common diseases.
4. Develop scientific temper, acquire educational experience for proficiency in profession and promote healthy living.
5. Become exemplary citizen by observation of medical ethics and fulfilling social and professional obligations, so as to respond to national aspirations.

II. INSTITUTIONAL GOALS

The undergraduate students coming out of a medical institution should:

1. Be competent in diagnosis and management of common health problems of individual and the community, commensurate with his/her position as a member of the health team at the primary, secondary or tertiary levels, using his/her clinical skills based on history, physical examination and relevant investigations;
2. Be competent to practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems;
3. Appreciate for different therapeutic modalities, be familiar with the administrations of the "essential drugs" and their common side effects;
4. Be able to appreciate the social-psychological, cultural, economic and environmental factors affecting health and develop humane attitude towards the discharging one's professional responsibilities.
5. Possess the attitude for continued self learning and to seek further expertise or to pursue research in any chosen area of medicine, action research and documentation skills.
6. Be familiar with the basic factors which are essential for the implementation of the National Health Programs including practical aspects of the following:-
 - i. Family Welfare and Maternal and Child Health (MCH)
 - ii. Sanitation and water supply,
 - iii. Prevention and control of communicable and non-communicable diseases,

- iv. Immunization,
 - v. Health Education;
 - vi. IPHS standard of health at various levels of service delivery and medical waste disposal.
 - vii. Organizational institutional arrangements
 - viii. Basic management skills in managing various aspects of health care delivery, inventory skills
7. Acquire basic management skill in the area of human resources, materials and resource management related to health care delivery, general and hospital management, principal inventory skills and counseling.
 8. Be able to identify community health problems and learn to work to resolve these by designing, instituting corrective steps and evaluating outcome of such measures.
 9. Be able to work as a leading partner in health care teams and acquire proficiency in communication skills& work in a variety of health care settings.
 10. Be competent to work in a variety of health care settings.
 11. Have personal characteristics and attitude required for professional life such as personal integrity, sense of responsibility and dependability and ability to relate to or show concern for other individuals.
 12. All efforts must be made to equip the medical graduate to acquire the detailed skills as mentioned in the Appendix B of Medical Council of India Regulations on Medical Education, 1997.

[Source: GME Regulations amended up to February 2012]

SECTION - II

REGULATIONS GOVERNING M.B.B.S. DEGREE COURSE

(Eligibility for Admission, Duration, Attendance and Scheme of Examination as per the norms laid down in the Regulations on Graduate Medical Education of Medical Council of India and the amendments thereof (till July 2016); admission to UG course - MBBS)

1. ELIGIBILITY

1.1 **Qualifying Examination**

Student seeking admission to first MBBS course:

- i) shall have passed two year Pre University examination conducted by Department of Pre University Education, Karnataka State, with English as one of the subjects and Physics, Chemistry and Biology as optional subjects. The candidate shall have passed subjects of English, Physics, Chemistry and Biology individually.

OR

- ii) shall have passed any other examination conducted by Boards / Councils / Intermediate examination established by State Governments / Central Government and recognized as equivalent to two year Pre University examination by the BLDE University / Association of Indian Universities (AIU), with English as one of the subjects and Physics, Chemistry and Biology as optional subjects and the candidate shall have passed subjects of English, Physics, Chemistry and Biology individually.

OR

- iii) shall have passed Intermediate examination in Science of an Indian University / Board / council or other recognized examining bodies with Physics, Chemistry and Biology, which shall include a practical test in these subjects and also English as compulsory subject. The candidate shall have passed subjects of English, Physics, Chemistry and Biology individually.

OR

- iv) shall have passed first year of the three year degree course of a recognized University with Physics, Chemistry and Biology including a practical test in these subjects provided the examination is an 'University Examination' provided that the candidate shall have passed subjects of English, Physics, Chemistry and Biology individually in the Pre University or other examinations mentioned in the clauses above.

OR

- v) shall have passed B.Sc. Examination of an Indian University, provided that he/she has passed the B.Sc. examination with not less than two of the following subjects: Physics, Chemistry, Biology (Botany, Zoology) provided that candidate has passed

subjects of English, Physics, Chemistry and Biology individually in the qualifying examinations mentioned in clauses (i) (ii) and (iii).

Note: Candidates who have passed “Physical Science” instead of Physics and Chemistry as two separate subjects are not eligible for admission to MBBS course as per Medical Council of India Regulations vide letter MCI-37(2)/2001/Med.922 dated 14.02.2001

1.2 Marks

The selection of students shall be based on merit provided that:

- a) In case of admission on the basis of qualifying examination, a candidate for admission to MBBS course must have passed individually in the subjects of Physics, Chemistry, Biology and English and must have obtained not less than 50% marks for general category, 40% for SC, ST and OBC students taken together in Physics, Chemistry and Biology in the qualifying examination.
The minimum marks shall not be less than 45% taken together in Physics, Chemistry and Biology for physically handicapped candidates with lower limb locomotor disability of 40 to 70%.
- b) The student shall appear for All India National Eligibility cum Entrance Test [NEET] and must qualify securing valid rank.

1.3 Age: The candidate should have completed 17 years of age on or before 31st day of December of the year of admission.

DURATION OF THE COURSE

- i) Every student shall undergo a period of certified study extending over 4^{1/2} Academic years from the date of commencement of this study for the subject comprising the medical curriculum to the date of completion of the examination followed by one year compulsory rotating Internship.
The 4^{1/2} years course has been divided into three Phases.
 1. **Phase – I** – 1 year, consisting of two terms of 6 months each.
 2. **Phase – II** - 1^{1/2} years, consisting of three terms of 6 months each
 3. **Phase – III** - 2 years, consisting of 4 terms of 6 months each.
- ii) The first year shall be occupied in the study of the Phase - I (Pre Clinical) subject of Human Anatomy (650 hours), Physiology including Bio Physics (480 hours), Bio Chemistry (240 hours) and Introduction to Community Medicine (60 hours).
A detailed syllabus is given in later Section.
- iii) After passing pre-clinical subjects in Phase – I, the Phase – II shall be 3 terms (1^{1/2} years), devoted to Para clinical and Clinical subjects. Para Clinical subjects shall consist of Pathology, Pharmacology, Microbiology, Forensic Medicine including Toxicology and part of Community Medicine. During this phase the clinical

subjects shall be taught concurrently. The clinical subjects taught will be Medicine and its allied specialties, Surgery and its allied specialties and Obstetrics and Gynecology.

- iv) Phase – III Part-I consists of Community Medicine, ENT and Ophthalmology.
- v) Phase – III Part-II consists of Medicine& allied specialties, Pediatrics, Surgery and allied specialties, Obstetrics and Gynecology.

ACADEMIC TERMS

All candidates admitted beyond the last date stipulated by the University shall have to appear for I Professional Examination to be held subsequent to the regular examination after completion of the prescribed duration.

ATTENDANCE

Every candidate should have attendance not less than 75 % of the total classes conducted in theory, practical and clinical jointly in each calendar year calculated from the date of commencement of the term to the last working day as notified by the University in each of the subjects prescribed to be eligible to appear for the University Examination. (vide Medical Council of India Notification on Graduate Medical Education (Amendment) Regulations 2003, published in the Gazette of India Part III, Section 4, Extraordinary issued on 15th October 2003)

The Principal should notify at the college the attendance details at the end of the each term without fail under intimation to this University.

The candidate lacking in the prescribed attendance and progress in any subject(s) in theory or practical/clinical in the first appearance should not be permitted to appear for the examination in that subject(s).

Teaching Hours

Phase II

Table: Teaching hours for theory and practical classes for the Phase – II subjects

Subject	Theory	Practicals	Integrated Teaching	Total hours
Pathology	120 hrs	144 hrs	36 hrs	300
Pharmacology	120 hrs	144 hrs	36 hrs	300
Microbiology	120 hrs	94 hrs	36 hrs	250
Forensic Medicine	70 hrs	20 hrs	10 hrs	100
Community Medicine*	100 hrs	80 hrs	20 hrs	200

* Community Medicine teaching will continue in Phase III, Part I also

SCHEME OF EXAMINATION

INTERNAL ASSESSMENT

It shall be based on evaluation of assignment, preparation of seminar, clinical presentation etc. Regular periodic examinations should be conducted throughout the course. Although the question of number of examinations is left to the institution, there should be a minimum of at least three (3) sessional examinations during Phase – I of the course and average of best two examination marks should be taken into consideration while calculating the assessment. One of these tests can be in the form of MCQS and one practical test can be in the form of OSPE. The weightage given to internal assessment is 20% out of total marks assigned for a subject.

A student must secure at least 35% of total marks fixed for internal assessment in a particular subject in order to be eligible to appear in the University Examination of that subject. (vide Medical Council of India Notification on Graduate Medical Education (Amendment) Regulations 2003, published in the Gazette of India Part III, Section 4, Extraordinary issued on 15th October 2003).

Assistant Professor and above or lecturer with five years of teaching experience can conduct Internal Assessment Examination. Proper record of the work should be maintained which will be the basis of all students' internal assessment and should be available for scrutiny. The internal assessment marks of both theory and practical obtained by the candidates should be sent to the University at least fifteen days prior to the commencement of theory examination.

Phase II

Internal Assessment in Pathology, Pharmacology, Microbiology and Community Medicine

Total Marks: 80 (Theory – 60 and Practical – 20)

Theory

Minimum of three examinations are recommended. The examination preceding the University examination will be similar to the University examination. The total marks would be 60. Average marks of best of two notified internal examinations should be reduced to 60 and should be sent to the University.

Practicals

A minimum of three practical tests is to be conducted, one at the end of each term. Five marks will be for records and 15 marks for terminal examinations. Average marks of the three terminal examinations shall be reduced to 15 marks and added to the marks obtained for records and sum of the two shall be sent to the University.

Internal Assessment in Forensic Medicine

Total marks: 40 (Theory – 30 and Practical – 10)

Theory

Minimum of three examinations are recommended. The examination preceding the University examination will be similar to the University examination. The total marks would be 20. Average marks of the best of two notified internal examinations should be reduced to 20 and should be sent to the University.

Practicals

Internal Assessment examination for Practical and allotment of marks for records will be as follows: The total of 10 marks will be first increased notionally to 50. Out of the 50 marks, 40 will be allotted to terminal practical tests and 10 marks for records. Four practical tests shall be conducted each carrying 10 marks. The marks obtained in the four practical tests and records would be reduced to 10 and sent to the University.

University Examination – Subjects and Distribution of Marks

Phase II

Table: Examination components, Subjects and Distribution of Marks

		Pathology	Microbiology	Pharmacology	Forensic Medicine	Community Medicine
a.	Theory					
1.	Written Paper: No of papers & maximum marks for each paper	Two 2x100=200	Two 2x100=200	Two 2x100=200	One 100	Two 2x100=200
2.	Viva-Voca	40	40	40	20	40
3.	Internal assessment	60	60	60	30	60
	Total Theory	300	300	300	150	300
b.	Practical					
	Practical	80	80	80	40	80
2.	Internal	20	20	20	10	20

Assessment (Practical)	(Practicals 15 + Record 5)	(Practicals 15 + Record 5)	(Practicals 15 + Record 5)	(Practical s 5 + Record 5)	(Practicals 15 + Record 5)
Total Practicals	100	100	100	50	100
Grand Total	400	400	400	200	400

***Note: The examination for Community Medicine will be held in Phase III along with Part – I subjects.**

Table: Type, number of questions and distribution of marks for written paper.

Type of Questions	Number of questions	Marks for each question
Essay type questions	2	10
Short Essay types questions	10	5
Short answer questions	10	3

8. SUBMISSION OF LABORATORY RECORD NOTE BOOK

- a) At the time of Practical/Clinical Examination each candidate shall submit to the Examiners his/her laboratory notebook duly certified by the Head of the Department as a bonafide record of the work done by the candidate.
- b) No material, handwritten, cyclostyled or printed guides are allowed for reference during the practical examination.

9. ELIGIBILITY FOR EXAMINATION:

To be eligible to appear for University examination a candidate:

- (a) Shall have undergone satisfactory the approved course of study in the Subject/subjects for the prescribed duration.
- (b) Shall have attended at least 75% of the total number of classes in theory and practical/clinical, jointly to become eligible to appear for examination in that subject/subjects.
- (c) Shall secure at least 35 % of total marks fixed for internal assessment in a particular subject in order to be eligible to appear in the University Examination of that subject.
- (d) Shall fulfill any other requirement that may be prescribed by the University from time to time.
- (e) Who fails in the II professional examination shall not be allowed to appear in Part I of Third professional examination unless he/she passes all subjects of II Professional examination.

10. CRITERIA FOR PASS

For declaration of pass in any subject in the University examination, a candidate shall pass both in Theory and Practical/Clinical examinations components separately as stipulated below.

A student has to secure marks as follows to pass in a subject:

- i) 35% in internal assessment (for eligibility to appear for University examination)*
- ii) 50% of the total marks for Theory with Orals (only externals)*
- iii) 50% of the marks of Practical / Clinical (only externals)*
- iv) 50% of the aggregate (total of externals and internals)*

A candidate not securing 50% marks in aggregate in Theory or Practical/Clinical examination in a subject shall be declared to have failed in that subject and is required to appear for both theory and Practical/Clinical again in the subsequent examination in that subject.

11. DECLARATION OF CLASS:

- a) A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 75% of marks or more of grand total marks prescribed will be declared to have passed the examination with distinction.
- b) A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 65% of marks or more but less than 75% of grand total marks prescribed will be declared to have passed the examination in First Class.
- c) A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 50% of marks or more but less than 65% of grand total marks prescribed will be declared to have passed the examination in Second Class.
- d) A candidate passing the 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.

[Please note fraction of marks should not be rounded off for clauses (a), (b) and (c)]

12. MIGRATION

- a) Migration from one medical college another is not a right of a student. However, migration of students from one medical college to another medical college in India may be considered by Medical Council of India, only in exceptional cases on extreme compassionate grounds, provided following criteria are fulfilled. Routine migrations on other grounds shall not be allowed.
- b) Both the colleges, i.e., one at which the student is studying at present and one to which migration is sought, should have been recognized by the Medical Council of India.

- c) The applicant candidate should have passed first professional MBBS examination.
- d) The applicant candidate should submit his/her application for migration complete in all respects, to all authorities concerned within a period of one month of passing (declaration of results) the first professional Bachelor of Medicine and Bachelor of Surgery (MBBS) examination.
- e) The applicant candidate must submit an affidavit stating that he/she will pursue 18 months of prescribed study before appearing for II professional MBBS examination at the transferee medical college, which should be duly certified by the Registrar of the concerned University in which he/she is seeking transfer. The transfer will be applicable only after receipt of the affidavit.

NOTE I:

- i Migration during clinical course of study shall not be allowed on any ground.
- ii All applications for migration shall be referred to Medical Council of India by college authorities. No Institution/University shall allow migration directly without the approval of the Council.
- iii Council reserves the right, not to entertain any application which is not under the prescribed compassionate grounds and also to take independent decision where applicant has been allowed to migrate without referring the same to the Council.

NOTE II: * Compassionate grounds criteria:

- i Death of a supporting parent or guardian
- ii Illness of the candidate causing disability
- iii Disturbed conditions as declared by Government in the Medical College area.

13. ELIGIBILITY TO JOIN PHASE II OF THE COURSE

Only candidates who pass in all the Phase I (Pre Clinical) subjects shall be eligible to join the Phase II of the course.

SECTION-III

DEPARTMENT OF PATHOLOGY

CURRICULUM

GOALS

The goal of teaching pathology is to provide undergraduate students comprehensive knowledge of the causes, mechanisms of disease, the structural alterations induced in the cells and organs of the body, and the functional consequences of the morphological changes, in order to enable them to achieve complete understanding of the natural history and clinical manifestations of the disease.

OBJECTIVES

Knowledge

A MBBS student at the end of training in Pathology will be able to:

1. Understand the concepts of cell injury and changes produced thereby in different tissues and organs and the body's capacity for healing.
2. Understand the normal homeostatic mechanisms, the derangements of these mechanism and the effects on human systems.
3. Have a knowledge of common genetic, immunological and geriatric disorders and their resultant effects on the human body
4. Understand the concept of neoplasia with reference to the etiology, gross and microscopic features, diagnosis and prognosis in different tissues and organs of the body.
5. Understand the etiopathogenesis, the pathological effects and the clinico-pathological correlation of common infectious and non-infectious diseases.
6. Have an understanding of the common haematological disorders and the investigations necessary to diagnose them and determine their prognosis.
7. Correlate normal and altered morphology (gross and microscopic) of different organ systems in different diseases to the extent needed for understanding of disease processes and their clinical significance.
8. Understand different types of biomedical waste, their potential risks and their management.

Skills

At the end of the course, the student should be able to:

1. Describe the rationale and principles of technical procedures of the diagnostic laboratory tests and interpretation of the results.
2. Perform the simple bed-side tests on blood, urine and other biological fluid samples.
3. Plan for investigations aimed at diagnosis and management of the cases of common disorders in collaboration with clinical departments.

4. Understand biochemical/physiological disturbances that occur as a result of disease in collaboration with pre clinical departments.
5. Understanding the utility of frozen section, automated hematology cell counter, flow cytometry and molecular diagnostic techniques.

Integration: After training the student should be able to understand the evolution of disease states, clinical features and role of laboratory tests in the diagnosis and management.

COURSE CONTENTS

THEORY

A GENERAL PATHOLOGY

1. INTRODUCTION TO PATHOLOGY

- Introduction and scope of pathology
- Brief resume of historical aspects, present state and future.
- Terminology in pathology
- Branches of pathology

2. CELLULAR ADAPTATIONS, CELL INJURY AND CELL DEATH

MUST KNOW

Cellular adaptation of growth & differentiation:

- Hyperplasia
- Hypertrophy
- Atrophy
- Metaplasia

Diseased cell:

- Types, causes, mechanisms of cell injury
- Depletion of ATP
- Mitochondrial damage
- Influx of intra cellular calcium & loss of calcium homeostasis
- Oxidative stress & defects in membrane permeability

Morphology of cell injury

- Ischemic & hypoxic cell injury
- Ischemia reperfusion injury
- Chemical injury

Cell death – Necrosis types & morphology

Apoptosis

- Causes : Physiological & pathological with examples
- Morphology
- Biochemical features
- Mechanisms

Intracellular accumulations

- Lipids-fatty changes & others
- Proteins
- Glycogen
- Hyaline change
- Pigments- exogenous endogenous
- Pathological calcification- Dystrophic and metastatic

DESIRABLE TO KNOW

- Ochronosis, Porphyria

NICE TO KNOW

- Cellular ageing

3. ACUTE & CHRONIC INFLAMMATION

MUST KNOW

Acute inflammation

- Introduction
- Causes
- Vascular changes
- Cellular events
- Outcomes & morphological pattern

Chemical mediators of inflammation

- Vasoactive amines
- Plasma proteins arachidonic metabolites
- Platelet activating factors
- Cytokines & chemokines
- Nitric oxide
- Lysosomal constituents of leucocytes
- Oxygen derived free radicals
- Neuropeptides

Chronic inflammation

- Causes
- Morphological features
- Types of chronic inflammation-granulomatous inflammation with examples
- Systemic effects of inflammation

4. TISSUE RENEWAL & REPAIR

MUST KNOW

Introduction –

- Definitions of regeneration and healing
- Control of normal cell proliferation & tissue growth
- Tissue proliferative activity-labile tissues stable tissues permanent tissues

Wound healing by first intention and secondary intention

- Wound strength
- Factors affecting wound healing
- Complications in cutaneous wound healing-keloid & hypertrophic scar
- Healing of fracture bone

DESIRABLE TO KNOW

- Stem cell- role of stem cells in tissue homeostasis
- Growth factors
- Signaling mechanisms in cell growth-autocrine paracrine endocrine
- Cell cycle & regulation of replication
- Extracellular matrix & cell –matrix interaction in brief
- Angiogenesis

5. HEAMODYNAMIC DISORDERS

MUST KNOW

Edema

- Pathophysiology
- Types
- Clinical correlations

Hyperemia & Congestion

- CVC Liver, Spleen and Lung

Hemorrhage

Thrombosis

- Normal Homeostasis
- Pathogenesis
- Fate of thrombus

Embolism

- Types
- Fate & Effects

Infarction & Clinical correlation

Shock

- Pathogenesis
- Types
- Morphology
- Clinical course

6. GENETICS

MUST KNOW

- Basic concepts of genetic disorders
- Some common examples and congenital malformations

Down syndrome, Turner syndrome, Klinefelter syndrome, storage disorders

NICE TO KNOW

Molecular diagnosis of genetic diseases

7. DISEASES OF IMMUNITY

MUST KNOW

General features of immune system

- Innate & Adaptive Immunity
- Cells & tissues of immune system
- Cytokines
- Structure & functions of histocompatibility molecules

Hypersensitivity reactions

Transplant rejection

Autoimmune diseases

- Immunological tolerance
- Mechanisms of autoimmune diseases SLE as prototype

Immunological deficiency syndromes

- Primary immuno deficiency
- AIDS

Amyloidosis

DESIRABLE TO KNOW

Clinical evaluation of immune status

- Humoral immunity
- Cell mediated immunity

8. NEOPLASIA

MUST KNOW

Introduction to neoplasia

- Definition
- Nomenclature
- Biology of tumour growth
- Benign & Malignant neoplasms
- Differentiation & Anaplasia
- Local invasion, Metastasis, and Precancerous conditions

Essential alterations for malignant transformation

- Self sufficiency in growth signals: oncogenes
- Insensitivity to growth inhibitory signals: tumour suppressor genes
- Evasion of apoptosis
- DNA repair defects & genomic instability in cancer cells
- Limitless replicative potential: telomerase
- Development of sustained angiogenesis
- Invasion & metastasis
- Stromal micro environment & carcinogenesis

Dysregulation of cancer associated genes

Multistep carcinogenesis

Tumour progression & heterogeneity

Carcinogenic agents & their cellular interaction

- Chemical carcinogenesis
- Radiation carcinogenesis
- Microbial carcinogenesis

Clinical features of tumours

- Effects of tumours on host
- Grading & staging of tumour with relevant examples

Laboratory diagnosis of cancer

- Histology
- Cytology
- Cytochemistry
- Immunohistochemistry
- Molecular diagnosis
- Flow cytometry
- Tumour markers

DESIRABLE TO KNOW

Molecular basis of cancer

Host defense against tumours

Tumour immunity

- Tumour antigens
- Antitumour effector mechanisms

Immune surveillance

9. INFECTIOUS DISEASES

MUST KNOW

Introduction

- History
- **New & emerging infectious diseases**
- **Agents of bioterrorism**
- Categories of infectious agents
- Transmission & dissemination of microbes
- How microbes cause disease

Viral infections

- Measles
- Mumps
- Polio
- Rabies
- Herpes

Bacterial infections

- Diphtheria
- Anthrax
- Whooping cough
- Plague
- Chancroid
- Granuloma inguinale
- Pseudomonas infections

Mycobacterial infections

- Tuberculosis
- Leprosy

Spirochetes

- Syphilis

Fungal infections

- Candidiasis
- Cryptococcosis
- Moulds
- Aspergillosis
- Mucormycosis

Protozoa

- Malaria
- Leishmaniasis
- Amoebiasis
- Trypanosomiasis
- Metazoan

NICE TO KNOW

Special techniques for diagnosing infectious diseases

10. ENVIRONMENTAL & NUTRITIONAL PATHOLOGY

MUST KNOW

Nutrition & diseases

- Nutrition deficiency
- Protein energy malnutrition
- Anorexia nervosa and bulimia
- Vitamin deficiency
- Obesity

Biomedical wastes

- **Types**
- **Potential risks & their safety**
- **Management**

DESIRABLE TO KNOW

Environment & disease

- Recognition of occupational & environmental disease
- Mechanism of toxicity
- Common environmental & occupational exposures
- Personal exposures
- Tobacco use
- Alcohol abuse
- Drug abuse
- Radiation injury
- Ionizing radiation
- Ultraviolet radiation
- Electromagnetic fields
- Outdoor air pollution & indoor air pollution

NICE TO KNOW

Diet & cancer

Diet & atherosclerosis

11. DISEASES OF INFANCY AND CHILDHOOD

MUST KNOW

- Neonatal respiratory distress syndrome
- Hydrops fetalis
- Inborn errors of metabolism- Cystic fibrosis, Galactosemia, Phenylketonuria
- Tumors- Retinoblastoma, Neuroblastoma, Nephroblastoma

DISEASES OF ORGAN SYSTEMS

12. CARDIOVASCULAR PATHOLOGY

MUST KNOW

Disease of Blood vessels

Atherosclerosis

Hypertensive vascular disease

Aneurysms -Abdominal aortic aneurysm, Syphilitic aneurysm

Aortic dissection

Inflammatory disease (Vasculitides)

- Giant cell arteritis
- Takayasu arteritis
- Polyarteritis nodosa
- Leucocytoclastic vasculitis
- Wegener's granulomatosis
- Beurger's disease

Diseases of Heart

Congenital heart disease

- ASD
- VSD
- Fallot's tetralogy
- PDA
- Coarctation of aorta
- Pulmonary stenosis & atresia
- Aortic stenosis & atresia

Ischemic heart diseases

- Angina pectoris
- Myocardial infarction

Rheumatic fever & rheumatic heart disease

Infective endocarditis

Non infected vegetations

DESIRABLE TO KNOW

Cardiomyopathies

Tumours of heart

NICE TO KNOW

Pathology of vascular intervention

Cardiac transplantation

13. RBC DISORDERS AND BLEEDING DISORDERS

MUST KNOW

Normal Development of Cells

Anemia

- Classification
- Clinical Features
- Anemia of diminished erythropoiesis

Iron deficiency anemia

Megaloblastic anemia

Hemolytic anemias

- Classification
- Investigations

Hereditary spherocytosis

Sickle cell disease

Enzyme deficiencies

Thalassemia syndromes

- Beta Thalassemia
- Alpha Thalassemia

Acquired hemolytic anemias

- Immune hemolytic anemia- Autoimmune, Drug induced, Isoimmune
- Mechanical trauma- Microangiopathic hemolytic anemia
- Membrane abnormalities

Aplastic anemia

Blood grouping: Concept of blood group, selection of donor, major and minor cross matching, blood transfusion, reaction, diseases transmitted by blood transfusion and Coomb test.

Bleeding disorders

- Review of normal hemostasis
- Test to evaluate different aspects of hemostasis
- Bleeding disorders caused by vessel wall abnormalities
- Bleeding related to reduced platelet number
- Bleeding disorders related to defective platelet functions

Hemorrhagic diathesis related to abnormalities in clotting factors

- Von Willebrand disease
- Hemophilia A
- Hemophilia B

Disseminated intravascular coagulation

DESIRABLE TO KNOW

Study of bone marrow and marrow transfusion

14. WHITE BLOOD CELL DISORDERS

MUST KNOW

Leucopenia, Leucocytosis & leukemoid reaction

Leukemias: Classification

- Acute lymphoblastic leukemia
(morphology, immunophenotype, cytogenetics, molecular genetics, clinical features, prognosis)
- Acute myelogenous leukemia (pathophysiology, classification, morphology, chromosomal abnormalities, clinical features, prognosis)
- Chronic myelogenous leukemia (Pathophysiology, morphology, clinical features, prognosis)
- Chronic lymphocytic leukemia (Pathophysiology, morphology, clinical features, prognosis)
- Hairy cell leukemia (Pathophysiology, morphology, clinical features, prognosis)

Plasma cell neoplasms & related disorders

- Multiple myeloma
- Solitary myeloma
- Monoclonal gammopathy of uncertain significance
- Hodgkins lymphoma
- Non-Hodgkins lymphoma
- Splenomegaly

DESIRABLE TO KNOW

Myelo dysplastic syndromes

- Definition
- Cytogenetic changes
- Peripheral smear and bone marrow features
- Clinical features and prognosis

Chronic myeloproliferative disorders

- Polycythemia vera
- Essential thrombocytosis
- Primary myelofibrosis
- CML

15. RESPIRATORY PATHOLOGY

MUST KNOW

Atelectasis,

Congenital anomalies,
Acute lung injury
Pulmonary oedema
Acute respiratory distress syndrome
Acute interstitial pneumonia

Obstructive pulmonary diseases

- Emphysema
- Chronic bronchitis
- Bronchiectasis
- Asthma

Pulmonary infections

- Community acquired acute pneumonia
- Community acquired atypical pneumonia
- Nosocomial pneumonia
- Aspiration pneumonia
- Lung abscess
- Chronic pneumonia

Tumours of lung

- Etiology
- Pathogenesis
- Classification
- Morphology
- Staging

DESIRABLE TO KNOW

Pneumoconiosis

- Coal worker's pneumoconiosis
- Silicosis
- Asbestosis

Granulomatous diseases

- Sarcoidosis
- Tuberculosis- primary and secondary

Mesothelioma

16. GASTRO INTESTINAL TRACT

MUST KNOW

Oesophagus

- Congenital anomalies
- Achalasia
- Hiatus hernia
- Lacerations
- Oesophagitis- Reflux, infectious & chemical oesophagitis
- Barrett esophagus
- Tumours : malignant tumours- squamous cell carcinoma, adenocarcinoma

Stomach

- Gastric mucosal physiology
- Gastritis- Acute and Chronic
- Peptic ulcer disease
- Tumours - Gastric carcinoma, Gastric lymphoma, Gastric carcinoid

Small & large intestines

- Congenital anomalies- Atresia, Stenosis, Meckel's diverticulum, Congenital aganglionic megacolon
- Malabsorption syndromes- Introduction, classification, celiac disease, tropical sprue, whipple disease, disaccharidase deficiency, abetalipoproteinemia
- Idiopathic inflammatory bowel disease- Etiology & pathogenesis, Crohn disease, Ulcerative colitis
- Tumours of colon & rectum- Non neoplastic polyps, Adenomas, Familial syndromes, Carcinoid tumours, Colorectal cancer, Gastrointestinal lymphoma

Appendix

- Acute appendicitis
- Tumours of appendix
- Mucocele & Pseudomyxoma peritonei
- Carcinoid tumor

Salivary gland tumours- Pleomorphic adenoma, Warthin's tumour, Mucoepidermoid carcinoma, Acinic cell tumours

17. LIVER, BILARY TRACT AND PANCREAS

MUST KNOW

- Hepatic failure

- Cirrhosis with Indian childhood cirrhosis
- Portal hypertension
- Jaundice & cholestasis,
- Liver function tests
- Viral hepatitis
- Neonatal hepatitis
- Autoimmune hepatitis
- Alcoholic liver disease
- Haemochromatosis
- Wilson disease
- Alpha 1 antitrypsin deficiency
- Biliary cirrhosis
- Nodules & tumours

Disorders of gall bladder

- Cholelithiasis
- Cholecystitis
- Biliary atresia
- Carcinoma of gall bladder & extra hepatic bile ducts

The Pancreas

- Acute pancreatitis
- Chronic pancreatitis
- Pancreatic carcinoma

18. THE KIDNEY

MUST KNOW

Clinical manifestations of renal diseases

Congenital anomalies including cystic diseases of the kidney

Pathogenesis of glomerular injury

Mechanisms of progression in glomerular disease

- Acute glomerulonephritis
- Rapidly progressive glomerulonephritis

Nephrotic syndrome

- Membranous glomerulopathy
- Minimal change disease
- Focal segmental glomerulosclerosis
- Membrano proliferative glomerulonephritis
- IgA nephropathy
- Alport's syndrome

Chronic glomerulonephritis

Glomerular lesions associated with systemic disease

- Diabetic glomerulosclerosis
- Other diseases

Acute tubular necrosis

Tubulointerstitial nephritis

- Pyelonephritis & urinary tract infection
- Acute pyelonephritis
- Chronic pyelonephritis & Reflux nephropathy
- Myeloma kidney

Renal function tests

Tumours of the kidney

- Renal cell carcinoma

Urothelial carcinoma of the renal pelvis

DESIRABLE TO KNOW

Nephrosclerosis: benign & malignant

Obstructive uropathy

Urolithiasis

19. LOWER URINARY TRACT & MALE GENITAL SYSTEM

MUST KNOW

Ureters

- Congenital anomalies
- Inflammations
- Tumours & tumour like lesions
- Obstructive lesions

Urinary bladder

- Congenital anomalies
- Inflammations
- Metaplastic lesion
- Neoplasms
- Obstruction

Penis

- Congenital anomalies
- Tumours

Testis & epididymis

- Congenital anomalies
- Regressive changes
- Inflammations
- Vascular disturbances
- Testicular tumours

Prostate

- Inflammations
- Benign enlargement
- Tumours

Semen Analysis

20. THE FEMALE GENITAL TRACT

MUST KNOW

Vulva

- Bartholin cyst
- Lichen sclerosis
- Lichen simplex chronicus
- Neoplasms

Vagina

- Congenital anomalies
- Premalignant & malignant neoplasms

Cervix

- Inflammations
- Endocervical polyps
- Cervical intraepithelial neoplasia
- Invasive squamous neoplasms

Body of the uterus & endometrium

- Endometrial histology in the menstrual cycle
- Dysfunctional uterine bleeding

- Chronic endometritis
- Endometriosis & adenomyosis
- Endometrial hyperplasia
- Carcinoma of endometrium
- Myometrial tumours- Leiomyoma, Leiomyosarcoma

Ovaries

- Follicular & leuteal cyst
- Polycystic ovaries
- Stromal hyperthecosis
- Ovarian tumours- Pathogenesis, Classification (Tumours of Mullerian epithelium, Germ cell tumours, Sex cord stromal tumours)

Exfoliative cytology, FNAC and FNAB

Gestational &placental disorders

- Spontaneous abortion
- Ectopic pregnancy
- Placental anomalies
- Inflammations toxemia of pregnancy
- Hydatiform mole- Complete, Partial, Invasive
- Choriocarcinoma
- Placental site trophoblastic tumour

DESIRABLE TO KNOW

Approch to female infertility

21. THE BREAST

MUST KNOW

Benign epithelial lesions

- Fibrocystic change
- Proliferative breast disease without atypia
- Proliferative breast disease with atypia

Carcinoma of the breast

- Risk factors
- Etiology & pathogenesis
- Classification- Morphology of each

DESIRABLE TO KNOW

Gynaecomastia
Stromal tumors of breast

22. THE ENDOCRINE SYSTEM

MUST KNOW

Thyroid gland

- Hyperthyroidism
- Hypothyroidism-Cretinism and Myxedema
- Thyroiditis- Hashimoto, subacute, lymphocytic
- Grave's disease
- Diffuse & multinodular goiter
- Neoplasms of the thyroid- Adenomas, Carcinomas
- Thyroid function tests

Diabetes mellitus

- Classification
- Normal insulin physiology
- Clinical features
- Pathogenesis of Type 1 DM
- Pathogenesis of Type 2 DM
- Monogenic forms of DM
- Pathogenesis of complications of dm
- Morphology of diabetes & its complications
- Diagnosis

DESIRABLE TO KNOW

Adrenal glands

- Adrenocortical hyperfunction- Cushing syndrome, Primary hyperaldosteronism, Adrenogenital syndromes
- Adrenal insufficiency- Primary acute adrenocortical insufficiency, Waterhouse-Friderichsen syndrome, Addison disease, Secondary adrenocortical insufficiency
- Tumours- Adrenocortical neoplasms, Adrenal medullary neoplasms

MEN syndromes

Pituitary gland

- Normal
- Pituitary adenoma & hyperpituitarism
- Hypopituitarism
- Posterior pituitary syndromes

Parathyroid glands

- Normal
- Hyperparathyroidism- Primary, Secondary
- Hypoparathyroidism
- Pseudo hypoparathyroidism

23. THE SKIN

MUST KNOW

Skin tumours

- Squamous cell carcinoma
- Basal cell carcinoma
- Nevus, Dysplastic nevi
- Malignant melanoma.

Inflammatory Dermatoses:

- Acute: Urticaria, Acute eczematous Dermatitis, Erythema Multiforme
- Chronic: Psoriasis, Lichen planus

DESIRABLE TO KNOW

Bullous diseases:

- Pemphigus, Bullous pemphigoid, Dermatitis herpetiformis.

Panniculitis, Verrucae, Molluscum contagiosum

24. BONES, JOINTS AND SOFT TISSUES

MUST KNOW

Osteomyelitis

- Pyogenic osteomyelitis
- Tuberculous osteomyelitis

Arthritis

- Rheumatoid arthritis
- Osteoarthritis
- Gout and Gouty Arthritis
- Infectious Arthritis

Bone Tumours:

- Bone forming Tumours: Osteoma, Osteoid Osteoma. Osteoblastoma, Osteosarcoma.
- Cartilage forming tumours: Osteochondroma, Chondroma, Chondroblastoma Chondromyxoid fibroma, Chondrosarcoma.
- Fibrous and Fibro-osseous tumours: Fibrous Cortical Defect and Nonossifying fibroma, Fibrous dysplasia, Fibrosarcoma and Malignant fibrous histiocytoma
- Miscellaneous tumours: Ewing sarcoma and Primitive neuroectodermal tumour(PNET)
- Giant Cell Tumour
- Metastatic Tumours
- Tumour like lesions

DESIRABLE TO KNOW

Metabolic bone diseases

- Osteoporosis
- Paget disease
- Rickets and osteomalacia
- Hyperparathyroidism
- Renal osteodystrophy

Diseases of joints

- Ganglion and synovial cyst.
- Pigmented villonodular synovitis
- Giant cell tumour of tendon sheath.

NICE TO KNOW

Soft tissue tumors

- Fibrous Tumours and Tumour like lesions: Nodular Fasciitis, Myositis Ossificans, Superficial Fibromatoses, Desmoid Tumour and Fibrosarcoma.
- Fibrohistiocytic Tumours: Benign Fibrous Histiocytoma, Malignant Fibrous Histiocytoma.
- Tumours of Skeletal muscle: Rhabdomyoma, Rhabdomyosarcoma
- Tumours of Smooth Muscle: Leiomyoma, Leiomyosarcoma,
- Synovial Sarcoma

25. PERIPHERAL NERVE AND SKELETAL MUSCLE

DESIRABLE TO KNOW

General reactions of the motor unit

Diseases of the peripheral nerve

- Inflammatory neuropathies
- Infectious polyneuropathies
- Hereditary neuropathies
- Acquired metabolic and toxic neuropathies

Diseases of the skeletal muscle

- Denervation atrophy
- Muscular dystrophies
- Ion channel myopathies
- Congenital myopathies
- Myopathies associated with inborn errors of metabolism
- Inflammatory myopathies
- Toxic myopathies
- Diseases of the neuromuscular junction

26. THE CENTRAL NERVOUS SYSTEM

MUST KNOW

Infectious diseases

- Acute meningitis: Pyogenic, Viral
- Acute suppurative meningitis: brain abscess, subdural empyema, extradural abscess.
- Chronic bacterial meningoencephalitis
- Tuberculosis
- Neurosyphilis
- Viral Meningoencephalitis: Rabies, HIV meningoencephalitis, Poliomyelitis
- Fungal meningoencephalitis
- Other infectious diseases of the nervous system: toxoplasmosis, cysticercosis

DESIRABLE TO KNOW

Degenerative diseases

- Alzheimer Disease
- Parkinsonism

Tumours:

- Gliomas: Astrocytoma, Oligodendroglioma, Ependymoma .
- Neuronal tumours: ganglion cell tumour
- Poorly differentiated tumours: medulloblastoma, meningioma.

PRACTICALS

A. HEMATOLOGY

1. How to draw blood – demonstration
2. Anticoagulants and their use
3. Drawing of blood film – practice
4. Staining (Leishman) – practice
5. Focusing the slide under microscope and identification of cells

Students should be shown following slides

- Microcytic hypochromic anemia
 - Macrocytic anemia
 - Dimorphic anemia
 - Hemolytic anemia
 - Eosinophilia
 - Neutrophilia
 - Reticulocytosis
 - Malarial parasites and microfilaria
 - Megaloblastic anemia-Bone marrow
 - ITP- Bone marrow
 - Multiple myeloma- Bone marrow
 - Acute myeloid leukemia
 - Chronic myeloid leukemia
 - Acute lymphoid leukemia
 - Chronic lymphoid leukemia
6. ESR by Westergren pipette – practice
 7. Total count of WBC by Neubauer chamber – practice
 8. Packed cell volume by Wintrobe tube – demonstration
 9. Hemoglobin estimation by acid hematin method – practice
 - 10. Hemoglobin estimation by Drabkin's method – demonstration**
 11. Reticulocyte count- demonstration
 12. Bleeding time and Clotting time – practice
 - 13. Prothrombin time – demonstration**
 14. Blood grouping – ABO & Rh – practice
 15. Blood bank functioning - demonstration

B. CLINICAL PATHOLOGY

1. Urine – Noting the physical characters, how to measure specific gravity – practice
2. Urine – Chemical tests for protein, reducing substances and ketone bodies- practice
3. **Use of different uristix and their interpretation – demonstration**
4. Microscopic examination of urine – practice
5. CSF – demonstration of cell type in a normal CSF sample and a case of pyogenic meningitis

C. HISTOPATHOLOGY & CYTOPATHOLOGY

1. Techniques of histopathology & Cytopathology (including FNAC) – demonstration
2. H & E staining and other special staining – demonstration
3. Demonstration of HP slides and **specimens**

Following histopathology slides and/or specimens should be shown.

- Kidney cloudy change
- Fatty change liver
- Uterus - Leiomyoma with hyaline change
- Kidney - amyloid
- Lymph node - caseous necrosis
- Kidney - infarct (Coagulation necrosis)
- Acute ulcerative appendicitis
- Pyogenic meningitis
- Lepromatous leprosy - skin
- Tuberculoid leprosy - skin
- Actinomycosis
- Granulation tissue
- Ileum - typhoid ulcer
- Tuberculous lymphadenitis
- Amoebic colitis
- CVC lung - haemosiderin pigment
- CVC liver
- Artery - recent / organised thrombus
- Hashimoto's thyroiditis
- Skin - papilloma
- Squamous cell carcinoma
- Adenocarcinoma - Colon
- Lymph node - metastasis
- Skin - capillary haemangioma
- Cavernous haemangioma
- Benign cystic teratoma (Dermoid cyst)
- Stomach - chronic peptic ulcer

- Liver - Viral hepatitis (Massive/ sub-massive necrosis)
- Liver- portal and biliary cirrhosis
- Lung - lobar and broncho pneumonia
- Lung - fibrocaceous tuberculosis
- Heart - rheumatic myocarditis
- Heart - healed infarct
- Aorta - atherosclerosis
- Kidney - crescentic glomerulonephritis
- Kidney - chronic glomerulonephritis
- Kidney - chronic pyelonephritis
- Kidney - RCC
- Benign prostatic hyperplasia
- Testis - seminoma
- Uterus - leiomyoma
- Products of conception
- Hodgkin's lymphoma
- Brain - tuberculous meningitis
- Brain - meningioma
- Bone - osteogenic sarcoma
- Bone - chondroma
- Bone - osteoclastoma
- Skin - melanoma and nevus
- Breast - fibroadenoma
- Breast - carcinoma
- Thyroid - colloid goitre
- Thyroid - papillary carcinoma
- Skin - basal cell carcinoma
- Pap smear- Squamous cell carcinoma- cervix
- FNAC smear- Fibroadenoma breast, carcinoma breast, colloid goiter, tuberculous lymphadenitis.

D. INSTRUMENTS:

- Lumbar puncture needle
- Liver biopsy needle
- Bone marrow aspiration needle
- Wintrobe Tube with stand
- Westergren's E.S.R. Tube and Stand
- Urinometer
- R.B.C. Pipette
- W.B.C. Pipette
- Sahli's Haemoglobinometer
- Sahli's Haemoglobinometer central diluting tube
- Sahli's Haemoglobinometer pipette

- Albuminometer
- Neubauer's Counting Chamber
- CPDA blood bag
- Anticoagulant bulbs
- L blocks
- Microtome
- ELISA based diagnostic cards
- Uristix

E. CHARTS

- T.B.Meningitis
- Viral meningitis
- Pyogenic meningitis
- Nephrotic syndrome
- Acute lymphoblastic leukemia
- Acute myeloblastic leukemia
- Chronic lymphatic leukemia
- Chronic myeloid leukemia
- Microcytic hypochromic anemia
- Multiple myeloma
- Spherocytic anemia with hemolytic jaundice
- Obstructive jaundice
- Juvenile diabetic ketoacidosis
- Vaginal smear - Carcinoma cervix
- FNAC – Fibroadenoma Breast
- FNAC – Infiltrating duct carcinoma breast

TEACHING AND LEARNING METHODOLOGY

Department stresses on teaching basic fundamentals of the disease process and the applied aspects relevant to the clinical subjects.

General Pathology

Taught with the help of Didactic lectures on specific topics, followed by practicals pertaining to that topic. Besides microscopic examination, fresh specimens obtained at autopsy or surgical operations are shown.

Systemic Pathology

The following tools are employed:

- i) Didactic lectures: discussing a particular topic at length in an one hour lecture
- ii) Paraclinical seminars: are conducted by a combined team of pathologist and a clinician who discuss the pathophysiology and clinical aspects of the particular disease entity.

- iii) Case studies: The significant and common diseases are discussed in the form of a representative clinical case in which the clinical features, the course of the disease in that particular patient and relevant laboratory investigations are discussed by a faculty in an interactive manner in small groups. This is followed by demonstration of the gross and microscopic features of the disease in that case by the pathologist. This is followed by clinico-pathologic correlation.
- iv) Practicals - Deals with demonstration of gross, and/or microscopic features of the disease entities.
- v) Problem based exercises(Charts)
- vi) Small group discussion
- vii) Self learning tools
- viii) Interactive learning
- ix) Clinical case demonstration - Patients of a particular disease are demonstrated to the students by a clinical faculty in the ward, discussing the clinical features in the patient which provides them a real-life experience of studying a disease as it presents in a patient.
- x) e-modules
- xi) Video/practical demonstration of procedures like Bone marrow aspiration, lumbar puncture, pleural & ascetic fluid tapping**

By a combination of above modalities/tools, student learns applied aspects of the disease process.

TEACHING SCHEDULE				
Sl.No	Date	Topic	Hrs	Teaching methods
		GENERAL PATHOLOGY		
		INTRODUCTION	1hr	
1.		Introduction & scope of pathology		Didactic lecture
		CELLULAR ADAPTATION, CELL INJURY & CELL DEATH	6hrs	
2.		Cellular adaptation of growth & differentiation :		Didactic lecture
3.		Cell injury :		Didactic lecture
4.		Morphology of cell injury & necrosis		Didactic lecture

5.		Apoptosis		Didactic lecture
6.		Intracellular accumulations		Didactic lecture
7.		Pathological calcification		Didactic lecture
		ACUTE & CHRONIC INFLAMMATION	3hrs	
8.		Acute inflammation		Didactic lecture
9.		Chemical mediators of inflammation		Didactic lecture
10.		Chronic inflammation		Didactic lecture
		TISSUE RENEWAL & REPAIR	3hrs	
11.		Definition –		Didactic lecture
12.		Extracellular matrix & cell –matrix interaction in brief		Didactic lecture
13.		Wound healing by first intention, secondary intention And Healing of fracture bone		Didactic lecture
		HEMODYNAMIC DISORDERS	4hrs	
14.		Edema		Interactive session, case history ,charts
15.		Thrombosis		Didactic lecture
16.		Embolism		Didactic lecture
17.		Shock		Interactive session, case history ,charts
		RBC DISORDERS	8hrs	
18.		Normal Development of Cells Anemia- Introduction		Didactic lecture
19.		Anemias of diminished erythropoiesis Iron deficiency anemia Megaloblastic anemia		Interactive session, case history ,charts

20.		Hemolytic anemia		Interactive session,case history ,charts
21.		Hereditary spherocytosis Sickle cell disease Enzyme deficiencies Thalassemia syndromes		Interactive session,case history ,charts
22.		Acquired hemolytic anemia		Interactive session,case history ,charts
23.		Pancytopenia		Interactive session,case history ,charts
		NEOPLASIA	8hrs	
24.		Neoplasia- Introduction		Didactic lecture
25.		Molecular basis of cancer-I		Didactic lecture
26.		Molecular basis of cancer –I		Didactic lecture
27.		Molecular basis of cancer- III		Didactic lecture
28.		Carcinogenic agents & their cellular interaction		Didactic lecture
29.		Host defense against tumours Clinical features of tumours		Didactic lecture
30.		Laboratory diagnosis of cancer		Didactic lecture
31.		Study of bone marrow and marrow transfusion	1hr	Didactic lecture
32.		Blood banking	1hr	Didactic lecture
		WBC DISORDERS	4hrs	
33.		Leukemia –I		Interactive session,case history ,charts
34.		Leukemia-II		PBL

35.		Plasma cell neoplasms and related disorders		Interactive session,case history ,charts
36.		Myelodysplastic syndrome		Didactic lecture
		LYMPHORETICULAR SYSTEM	2hrs	
37.		Hodgkins lymphoma		Didactic lecture
38.		Non-Hodgkins lymphoma		Didactic lecture
		BLEEDING DISORDERS	3hrs	
39.		Platelet disorders		Didactic lecture
40.		Hemorrhagic diathesis related to abnormalities in clotting factors		Didactic lecture
41.		Disseminated intra vascular coagulation		Interactive session,case history ,charts
		DISEASES OF IMMUNITY	5hrs	
42.		General features of immune system		Didactic lecture
43.		Hypersensitivity reactions Transplant rejection (in brief)		Didactic lecture
44.		Autoimmune diseases		Didactic lecture
45.		Immunological deficiency syndromes		Didactic lecture
46.		Amyloidosis		Didactic lecture
		CARDIOVASCULAR PATHOLOGY	7hrs	
47.		Atherosclerosis		Case study,theory
48.		Hypertensive vascular disease		Didactic lecture
49.		Inflammatory disease-the vasculitides		Didactic lecture
50.		Congenital heart disease Aortic stenosis & atresia		Self study
51.		Ischemic heart diseases		Seminar,case

			discussion
52.		Rheumatic fever & rheumatic heart disease	Case discussion
53.		Cardiomyopathies Tumours of heart Kaposi's sarcoma	Didactic lecture
		RESPIRATORY PATHOLOGY	6hrs
54.		Atelectasis, congenital anomalies, Acute lung injury	Didactic lecture
55.		Obstructive pulmonary diseases	Case discussion
56.		Pneumoconiosis	PBL
57.		Granulomatous diseases	Seminar/case discussion
58.		Pulmonary infections	Case discussion
59.		Tumours of lung & mesothelioma	Didactic lecture
		GASTRO INTESTINAL TRACT	09hrs
60.		Oesophagus	Didactic lecture
61.		Stomach –Gastritis & Peptic ulcer disease	Interactive session
62.		Tumours	Didactic lecture
63.		Small & large intestines Congenital anomalies Malabsorption syndromes	Didactic lecture
64.		Idiopathic inflammatory bowel disease	Didactic lecture
65.		Tumours of colon & rectum	Didactic lecture
66.		Colorectal cancer	Didactic lecture
67.		Appendix - Pathology	Self study

68.	Salivary gland- Tumours		Self study
	LIVER & BILARY TRACT	7hrs	
69.	Hepatic failure Cirrhosis Portal hypertension		Didactic lecture
70.	Jaundice & cholestasis, Liver function tests		Case study
71.	Viral hepatitis Neonatal hepatitis Autoimmune hepatitis		Didactic lecture
72.	Alcoholic liver disease Haemochromatosis Wilson disease Alpha 1 antitrypsin deficiency Biliary cirrhosis		Seminar
73.	Nodules & tumours		Self study
74.	Disorders of gall bladder		Self study
75.	The Pancreas		Didactic lecture
	THE KIDNEY	9hrs	
76.	Clinical manifestations of renal diseases		Group Discussion
77.	Pathogenesis of glomerular injury		Didactic lecture
78.	Acute glomerulonephritis Rapidly progressive glomerulonephritis		Case discussion
79.	Membranous glomerulopathy		Case discussion

	Minimal change disease Focal segmental glomerulosclerosis Membrano proliferative glomerulonephritis IgA nephropathy Alport's syndrome		
80.	Chronic glomerulonephritis Glomerular lesions associated with systemic disease Acute tubular necrosis		Didactic lecture
81.	Tubulointerstitial nephritis		Self study
82.	Nephrosclerosis : - benign & malignant Obstructive uropathy :- urolithiasis		Self study
83.	Renal function tests		Didactic lecture
84.	Tumours of the kidney		Case discussion
	LOWER URINARY TRACT & MALE GENITAL SYSTEM	5hrs	
85.	Ureters and Urinary bladder		Case discussion
86.	Penis, testis & epididymis		Case discussion
87.	Prostate		Didactic lecture
88.	Semen Analysis		Didactic lecture
	THE FEMALE GENITAL TRACT	7hrs	
89.	Vulva & Vagina		Didactic lecture
90.	Cervix		Seminar& chart discussion
91.	Body of the uterus & endometrium		Case discussion with gross specimen
92.	Ovaries		Didactic lecture

93.	Exfoliative cytology, FNAC and FNAB		Didactic lecture
94.	Gestational & placental disorders		Didactic lecture
	THE BREAST	2hrs	
95.	Benign epithelial lesions Carcinoma of the breast		Case discussion with charts
96.	Carcinoma breast continued		
	THE ENDOCRINE SYSTEM	5hrs	
97.	Thyroid gland		Case discussion- solitary nodule, hypo & hyperthyroidism
98.	Neoplasms of the thyroid		Didactic lecture
99.	Thyroid function tests		Didactic lecture
100.	Diabetes mellitus		Seminar & group discussion
101.	Adrenal glands		Didactic lecture
102.	Pituitary gland and Parathyroid glands		Didactic lecture
	THE SKIN	2hrs	
103.	Skin tumours		Didactic lecture
104.	Inflammatory Dermatoses & Bullous diseases		Didactic lecture
	BONES, JOINTS AND SOFT TISSUES	4hrs	
105.	Metabolic bone diseases		Didactic lecture
106.	Osteomyelitis and Arthritis:		Case discussion
107.	Bone Tumours		Theory & case discussion
108.	Tumour like lesions Fibrous Tumours Fibrohistiocytic Tumours		Didactic lecture

		Tumours of Skeleton muscle Tumours of Smooth Muscle		
		THE CENTRAL NERVOUS SYSTEM	4hrs	
109.		Infectious diseases		Didactic lecture
110.		Degenerative diseases		Didactic lecture
111.		Tumours		Didactic lecture
112.		CSF Analysis, Body fluids- Pleural, peritoneal, synovial, pericardial fluids		Case study, charts
		DISEASES OF INFANCY AND CHILDHOOD	2hrs	Didactic lecture
113.		Retinoblastoma, Neuroblastoma Nephroblastoma		Didactic lecture
114.		Neonatal respiratory distress syndrome Fetal hydrops Inborn errors of metabolism		Didactic lecture
		INFECTIOUS DISEASES	7hrs	
115.		Infectious diseases- Introduction		Didactic lecture
116.		Viral infections		Didactic lecture
117.		Bacterial infections		Didactic lecture
118.		Mycobacterial infections		Didactic lecture
119.		Fungal infections		Didactic lecture
120.		Protozoa		Didactic lecture
121.		Biomedical wastes		Didactic lecture
		ENVIRONMENT AND NUTRITION	3hrs	
122.		Environmental- I		Didactic lecture
123.		Environmental- II		Didactic lecture
124.		Nutrition & diseases		Didactic lecture
125.		Genetics	1hr	Didactic lecture

PRACTICAL SCHEDULE INCLUDING REVISION PRACTICALS, VIVA -VOCE, SEMINARS AND INTERNAL ASSESSMENT EXAMINATIONS.

Sl.No	Date	Topic	Incharge
1.		Introduction	Briefing
2.		Microscope, Introduction to HPR + Cytology	Briefing
3.		Cell Injury I	Briefing
4.		Cell Injury II	Briefing
5.		Acute Inflammation	Briefing
6.		Chronic Inflammation	Briefing
7.		Chronic Venous Congestion – Lung & Liver Organizing thrombus, Myocardial infarction Gangrene	Briefing
8.		Haematopoiesis, collection of blood, Anticoagulants.	Visit to laboratory
9.		Hemoglobin estimation, ESR, Demonstration of PCV, RBC count, Blood Indices and principles of cell counter.	Briefing
10.		Preparation of blood film and staining (Leishman) Microcytic hypochromic Anemia Macrocytic anemia	Case study& charts
11.		3rd term mid term exam	
12.		Dimorphic anemia, Hemolytic anemia, Reticulocyte count(Demonstration)	Briefing
13.		Eosinophilia, Neutrophilia, Malarial parasites and microfilaria	Briefing
14.		Megaloblastic anemia-Bone marrow	Briefing

		ITP- Bone marrow Multiple myeloma- Bone marrow	
15.		WBC disorders – TC,DC, AEC demonstration	Briefing
16.		Acute myeloid leukemia, Chronic myeloid leukemia , Acute lymphoid leukemia, Chronic lymphoid leukemia	Case study& charts
17.		Neoplasia – Benign epithelial & mesenchymal neoplasms- squamous papilloma, adenoma,lipoma, leiomyoma, haemangioma	Briefing
18.		Neoplasia – Malignant epithelial & mesenchymal neoplasm - squamous carcinoma, Basal cell carcinoma, malignant melanoma, adenocarcinoma, leiomyosarcoma, liposarcoma	Briefing
19.		3rd term- term end exams	
20.		Blood Banking	Visit to blood bank
21.		Bleeding disorders – BT, CT, PT, APTT Prothrombin time – demonstration INR	Case study& charts
22.		Urine Examination - I	Briefing
23.		Urine Examination - II	Briefing
24.		Cardio Vascular System	Briefing
25.		Respiratory System	Briefing
26.		Gastro Intestinal Tract	Briefing
27.		Hepatobiliary system	Case study,charts
28.		Renal system	Case

			study,charts
29.		Male genital system	Briefing
30.		4th term mid term exams	
31.		Female genital system, Breast	Case study,charts
32.		Instruments I	Video/practical demonstration of Bone marrow aspiration
33.		Instruments II	Video/demonstration of Lumbar puncture, pleural & ascetic fluid tapping
34.		Charts - I	Briefing
35.		Charts – II	Briefing
36.		Charts- III	Briefing
37.		Endocrine System	Case study
38.		Lymph node	Briefing
39.		Musculo skeletal system and CNS	Charts
40.		Revision practicals- Hb,blood grouping, ps study	Revision
41.		Revision practicals- Urine and. Charts,Instruments	Revision

42.		4th term- term end exams	
43.		Revision HPR-General pathology	Revision
44.		Revision HPR- CVS,RS,GIT,lymphoreticular.	Revision
45.		Revision HPR- Hepatobiliary,renal,male and female genital system musculoskeletal system & CNS	Revision
46.		1 st Viva-voce Clinical path & haematology	Viva
47.		Journal correction	
48.		2 nd Viva-voce General pathology	Viva
49.		OSPE	OSPE
50.		3 rd Viva-voce Systemic pathology-I	Viva
51.		Record book certification	
52.		4 th Viva-voce Systemic pathology-II	Viva
53.		.OSPE/ Revision	OSPE/Revision
54.		OSPE/Revision	OSPE/Revision
55.		5th term mid term exams/ Preliminary examinations	

3hrsx48=144hrs

Common areas for integrated teaching in Pathology:

Sl. No	Area/Topic	Collaborating Dept.
1.	Shock	Anesthesia, Surgery, Medicine
2.	Rheumatic heart disease	Pediatrics, Medicine, Microbiology
3.	Atherosclerosis	Medicine, Physiology, Biochemistry
4.	Ischemic heart disease	Medicine, Physiology, Biochemistry
5.	Hypertension	Medicine, Physiology, Biochemistry
6.	Tuberculosis	Microbiology, Medicine, Pediatrics
7.	COPD	Medicine, Physiology, Pediatrics
8.	Nephrotic syndrome	Medicine, Physiology, Pediatrics
9.	Inflammatory bowel disease	Surgery, Microbiology
10.	Cirrhosis	Medicine, Physiology
11.	Diabetes mellitus	Medicine, Biochemistry, Physiology, Pediatrics
12.	AIDS	Microbiology, Medicine, OBG, DVL
13.	Iron deficiency anemia	OBG, Physiology, Medicine, Geriatrics
14.	Jaundice	Medicine, Pediatrics, Surgery, Biochemistry

D. RECOMMENDED BOOKS: (Latest edition)

1. ROBBINS and COTRAN, **Pathologic Basis of Disease**
2. HARSH MOHAN, **Textbook of Pathology**,
3. General and systematic pathology by **JCE Underwood**,
4. WALTER and Israel, **General Pathology**

5. Govan., **Pathology, Illustrated**,
6. SABITRI SANYAL, Prep manual for undergraduates- Clinical pathology.
7. DR. TEJINDER SINGH, **Textbook of Haematology**
8. EVAN DAMJANOV- Secrets in Pathology.

E. REFERENCE BOOKS

1. CURRAN, **Colour Atlas of Histopathology**
2. DACIE and Lewis (SM), **Practical Haematology**
3. **Wintrob's Clinical, Hematology**
4. HENRY, **Clinical Diagnosis and Management by Laboratory Method**,
5. Pathology by Rubin and Farber

RECOMMENDED WEBSITES

www.pathologylinks.com

EVALUATION

Total Marks: 400

Internal Assessment: 80

University Examination: 320

Internal Assessment: Total marks 80 (Theory: 60 & practical: 20)

Theory: 60 Marks

There should be regular formative assessment. Day to day performance should be given greater significance. Minimum of three sessional examinations are to be conducted. The sessional examination preceding university examination will be similar to the pattern of university examination.

Average of two best marks obtained in the examinations will be taken into consideration for calculating Internal assessment. Weightage will be given to performance in periodic tests, participation in seminars & research projects. Average marks & marks obtained for day to day assessment will be added and sum of these two shall be sent to the University.

Practical: 20 Marks

There will be three terminal practical examinations. Average of best two marks will be reduced to 16 and marks obtained for Practical records & performance in periodic practical tests will be reduced to 04.

The Internal Assessment Marks both in Theory & Practicals shall be sent to The University at least fifteen days prior to the commencement of Theory Examination.

University Examination

Eligibility For writing University Examination: Every candidate should have attendance not less than 75% of the total classes conducted in theory & practical/clinical jointly in the academic year calculated from the date of commencement of the term to the last working day as notified by the University in each of the subjects prescribed to be eligible to appear for the University Examination. (vide Medical Council of India Notification on Graduate Medical Education (Amendment) regulations 2003 published in the gazette of India part III,Section 4, extraordinary issued on 15th October 2003).

The Principal should notify at the college, the attendance & progress in any subject in theory & practical.

Criteria for Pass:

For declaration of pass in any subject in the University examination ,a candidate shall pass both in theory & Practical /Clinical examinations components separately as stipulated below; The Theory component consist of marks obtained in University Theory examinations,Viva – Voce & internal assessment (Theory).For pass in theory, a candidate shall secure not less than

50% marks in written examination & Viva-Voce examination. after securing 50% marks in theory Internal assessment (Theory) added together. For pass in practical/clinical examination a candidate shall secure not less than 50% marks in aggregate, i.e., marks obtained in University practical/clinical examination & Internal examination (practical) added together.

A candidate not securing 50% marks in aggregate, in theory & practical/clinical examination in a subject shall be declared to have failed in that subject & is required to appear for both in theory & practical/clinical again in the subsequent examination in that subject.

Distribution of Marks for University Examination

Theory		Practicals	Viva	Internal Assessment Theory	Internal Assessment Practicals	Total
Paper I (General Pathology and Hematopathology, Clinical pathology)	Paper II (Systemic Pathology)					
100	100	80	40	60	20	400

UNIVERSITY EXAMINATION

A. THEORY PAPERS:

200 MARKS

Two theory papers of 100 mark each, of 3 hours duration

The pattern of questions is as follows.

Type of questions	Number of questions	Marks for each question	TOTAL
Long essay	02	10	20
Short essay	10	05	50
Short answers	10	03	30
Total Marks			100

The distribution of topics and weightage of marks for university examinations is as under:

Paper I

- | | |
|------------------------|----------|
| 1. General pathology- | 50 marks |
| 2. Hematology- | 30 marks |
| 3. Clinical pathology- | 20 marks |

Max Marks **100 Marks**

Paper II

- | | |
|----------------------------|----------|
| 1. CVS and RS | 20 marks |
| 2. GIT and HBS | 20 marks |
| 3. Endo, RES and Breast | 20 marks |
| 4. Renal, MGS, and FGS | 20 marks |
| 5. B&J, ST, CNS, PNS, Skin | 20 marks |

Max Marks **100 marks**

The topics assigned to the different papers are generally evaluated under those sections.

However a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.

There is no negative marking in MCQ

*Long essay question can be split into 3-4 subquestions and marks can be divided accordingly.

Ex- Define neoplasia. Classify the chemical carcinogens. Write about mechanism of chemical carcinogenesis. (2+3+5=10 Marks)

In paper II One long essay question should be clinical problem oriented, with subquestions.

Ex- A 45-year-old man was rushed to the hospital following an episode of crushing substernal chest pain with breathing difficulty. An urgent ECG was done which showed elevation of ST segment with deep Q wave.

- What may be the possible diagnosis?
- What other investigations will you suggest for evaluation of this case?
- Enumerate the common complications that may arise in this case (1+7+2=10Marks)

B. PRACTICAL EXAMINATION:**80 MARKS**

- | | | |
|--|-------------|----------|
| 1. Spotters (OSPE)
(Including slides, specimens, instruments & charts) | 10 X 2 mark | 20 marks |
| 2. Urine examination with clinical history and findings
and interpretations | | 15 marks |
| 3. Stained smear given with clinical history
for reporting and interpretation | | 15 marks |
| 4. Chart: Clinical pathology, Haematology and cytology
with interpretation | | 10 marks |
| 5. Haemoglobin estimation / Blood grouping | | 10 marks |
| 6. One histopathology and/ or cytology slide | | 10 marks |

Total practical marks**80 Marks****C. VIVA VOCE EXAMINATION MARKS**

- | | |
|---------------------------------------|----------|
| 1. General pathology | 10 marks |
| 2. Clinical pathology and haematology | 10 marks |
| 3. Systemic pathology – I | 10 marks |
| 4. Systemic pathology – II | 10 marks |

Total viva marks**40 Marks****Changes suggested in the II M.B.B.S. curriculum:**

Sl. No	Present status	Changes suggested
01	Course Content – Theory	Teaching schedule theory specified with topics for various teaching- learning methods like case discussion, seminars, group discussion, self study, interactive session & problem based learning
02	Practicals	Teaching schedule practical specified with topics for various teaching- learning methods like Case study & chart discussion
03	Teaching learning method	Introduction of use of case studies, student seminars, clinico Pathologic conferences, interactive sessions, problem based learning & charts for student learning. Video/practical demonstration of procedures like Bone marrow aspiration, lumbar puncture, pleural & ascetic fluid tapping
04	Evaluation	No changes suggested

DEPARTMENT OF MICROBIOLOGY

CURRICULUM

GOALS:

1. Globally competitive centre of excellence in infectious disease diagnosis and research
2. To produce next generation of global leaders in infectious disease.
3. To produce highly skilled & competent microbiologist to face emerging infectious disease threats
4. To support our national needs of infectious disease diagnosis, outbreak investigations and preventive measures.

OBJECTIVES:

A MBBS student at the end of the microbiology course will be able to:

KNOWLEDGE

1. Describe the mechanisms of host parasite relationship.
2. Enumerate the normal flora and its importance in health and disease.
3. Describe the etiology and pathogenesis of common infectious diseases.
4. List the microbes that cause opportunistic infections in humans and describe their pathogenesis.
5. Explain the importance of National health programmes for the prevention of communicable diseases.
6. Understand the ecology (microbial) of specialized areas like hospital, water, food and prevent the possible spread of infections.

SKILLS

1. Choose appropriate laboratory investigations required for a clinical diagnosis.
2. Sample the right specimen, at the right time, by the right method.
3. Analyze and interpret the results of laboratory tests.
4. Choose the suitable antimicrobial agent for treatment.
5. Apply the principles of immunology in the pathogenesis, diagnosis and prevention of infectious and non-infectious diseases.
6. Practice the techniques of asepsis, antisepsis and sterilization in day-to-day procedures and apply universal precautions in laboratory and clinical practice.

COURSE CONTENTS THEORY

I. INTRODUCTION

Must know

Morbidity and mortality data of infectious diseases prevalent in the country with reference to the National Health Programmes and in the local geographic area.

Desirable to know

Significant milestones in the history of Microbiology

II. GENERAL MICROBIOLOGY

Must know

1. Definitions: infections, parasite, host, vector, fomite, contagious disease, infectious disease epidemic, endemic, pandemic, Zoonosis, Epizootic, Attack rate.
2. Normal flora of the human body.
3. Routes of infection and spread; endogenous and exogenous infections; source at reservoir of infections.
4. Bacterial cell. Morphology limited to recognizing bacteria in clinical samples Shape, motility and arrangement. Structures, which are virulence, associated. Physiology: Essentials of bacterial growth requirements.
5. Sterilization, disinfection and universal precautions in relation to patient care and disease prevention. Definition of asepsis, sterilization, disinfection.
6. Antimicrobials: Mode of action, interpretation of susceptibility tests, resistance spectrum of activity.
7. Bacterial genetics and molecular biology.

Desirable to know

1. Preparation of media,
2. Collection of Samples

Nice to know:

1. Demonstration of capsule
2. flagella and spore

III. IMMUNOLOGY

Must Know

1. Basic principles of immunity immunobiology: lymphoid organs and tissues. Antigen. Antibodies, antigen and antibody reactions with relevance to pathogenesis and serological diagnosis.
2. Humoral immunity and its role in immunity.
3. Cell mediated immunity and its role in immunity.
4. Immunology of hypersensitivity.
5. Measuring immune functions.
6. Immunological basis of the autoimmune phenomena.
7. Immunodeficiency with relevance to opportunistic infections.
8. Basic principles of transplantation immunity
9. Basic principles of tumour immunity.
10. Complement
11. Hypersensitivity
12. Auto immunity
13. Monoclonal antibodies

Desirable to know

1. Immunofluorescence,
2. ELISA,
3. Agglutination tests.

Nice to know:

1. Electrophoresis,
2. CD4 count

IV - SYSTEMIC BACTERIOLOGY

To be considered under the following headings.

Morphology, classification according to pathogenicity, mode of transmission, methods of prevention, collection and transport of samples for laboratory diagnosis, interpretation of laboratory reports, rapid bedside diagnosis where feasible, list of antimicrobial agents and control measures with special relevance to the National Control and Eradication programmes, in respect of .

Must know

1. Staphylococci,
2. Streptococci and Pneumococci,
3. Neisseriae,
4. Corynebacterium diphtheria

5. Mycobacteria : Tuberculosis, M.leprae, atypical mycobacteria,
6. Enterobacteriaceae,
7. Parvobacteria : Haemophilus, Bordetella, Brucella, Pasteurella, Gardnerella.
8. Vibrios : V.cholerae and other medically important vibrios,
9. Campylobacters and Helicobacters,
10. Pseudomonas,
11. Bacillus anthracis, B.cereus
12. Sporing and non-sporing anaerobes : Clostridia, Bacteroides and Fusobacteria.
13. Chlamydiae : Mycoplasma.
14. Actinomycetales : Actinomycetes and Nocardia.
15. Spirochaetes, Donovanias granulomatis
16. Rickettsiae

Desirable to know

1. Listeria monocytogenes
2. Mycoplasma
3. Legionella
4. Acinetobacter

Nice to Know

1. E test
2. BACTEC

V - GENERAL VIROLOGY

Must know

General properties:

1. Basic structure and broad classification of viruses.
2. Cultivation of viruses,
3. Pathogenesis and pathology of viral infections,
4. Immunity and prophylaxis of viral diseases.
5. Principles of laboratory diagnosis of viral diseases.
6. List of commonly used antiviral agents.
7. Bacteriophage with relation to virulence mechanism and epidemiology,
8. Viral vaccines

Desirable to know

1. Replication and genetics.

Nice to Know:

1. Cell cultures

VI - SYSTEMIC VIROLOGY

Must know

1. Herpes viruses: List of viruses included, lesions produced, pathogenesis and latency principles and Laboratory diagnosis.
2. Arbo viruses: List of arboviruses prevalent in India, general properties, mode of transmission, disease syndromes produced, common diagnostic tests, prevention of spread.
3. Picorna viruses: Common infections produced, classification and general properties, pathogenesis of poliomyelitis, immunoprophylaxis of poliomyelitis.
4. Myxoviruses : General properties, classification according to diseases produced, antigenic variations in influenza virus with relevance to vaccine efficacy; measles, mumps and rubella important features and prophylaxis.
5. Rabies virus: General properties; antemortem diagnosis in rabies and prophylaxis.
6. Hepatitis virus: list of viruses, pathogenesis, mode of infection, list of diagnostic tests and their interpretation, methods of prevention and control.
7. Human immunodeficiency virus; Structure with relevance to laboratory diagnosis and type of infection, laboratory tests and their interpretation. Universal precautions, specific precautions, recent trends in diagnosis and prophylaxis.
8. Rota virus: Laboratory diagnosis.
9. Adenovirus – Infections caused and Laboratory diagnosis.

Desirable to know

1. Poxviruses.
2. Oncogenic viruses.
3. Viral haemorrhagic fever

Nice to Know

1. Slow viral infections
2. Emerging & reemerging viral infections

VII - MYCOLOGY

Must know

1. General properties of fungi.
2. Classification based on disease: superficial, subcutaneous, deep mycoses
3. opportunistic infections
4. Mycotoxins,
5. systemic mycoses.
6. General principles of fungal diagnosis,
7. Rapid diagnosis.

8. Method of collection of samples.
9. Antifungal agents.

Desirable to know

1. Slide culture techniques
2. Reynauld Braude phenomenon

Nice to Know

1. Anti fungal susceptibility testing

VIII - PARASITOLOGY

Must know

1. Terminologies used in parasitology
2. Protozoans:
 - i. Intestinal
 - ii. Genital
 - iii. Protozoans in blood
 - iv. Opportunistic protozoans.
3. Helminths : Cestodes : Taenia, Echinococcus, Hymenolepis
4. Nematodes : Intestinal, Tissue
5. Medical entomology with reference to vectors.

Desirable to know

1. Trematodes of medical importance.
2. Stool concentration techniques

Nice to Know:

1. Cultivation of parasites

IX - CLINICAL / APPLIED MICROBIOLOGY

Must know

1) Streptococcal infections: Rheumatic fever and Rheumatic heart disease, 2) Meningitis. 3) Tuberculosis, 4) Enteric fever, 5) Dysentery, 6) Diarrhoeal diseases, 7) Pyrexia of unknown origin, 8) Eye-infections, 9) leprosy, 10) Sexually transmitted diseases, 11) Poliomyelitis, 12) Hepatitis, 13) Acute-respiratory infections, 14) Central nervous System infections, 15) Urinary tract infections, 16) Pelvic inflammatory disease, 17) Wound infection 18) Opportunistic infections, 19) HIV infection, 20) Malaria, 21) Filariasis, 22) Zoonotic diseases. 23) Food poisoning 24) Hospital acquired infections 25) Bio medical waste and its management.

(Integrated teaching suggested for the above topics)

Desirable to know

1. Bone and joint infections
2. Exanthematous conditions
3. Organisms used in bioterrorism
4. Automated systems in microbiology
5. Laboratory safety

Nice to Know:

1. Molecular methods in diagnostic microbiology

SKILLS

Must know

1. Do stool exam for ova and cysts; and hanging drop for Vibrio for Vibrio cholera.
2. Perform and interpret Gram's stain, and Ziehl-Neelsen or modified Ziehl Neelsen's stain.
3. Perform skin scrapings and do a KOH preparation for fungal infection.
4. Do cell counts and gram stain of CSF and other body fluids.
5. Interpret blood smear for parasites like malaria and filarial.
6. Interpret antimicrobial sensitivity reports.
7. Interpret serological tests such as VDRL, ASLO, WIDAL, HIV, Rheumatoid factor, hepatitis and TORCH infections, Treponema pallidum Haemagglutination, Haemagglutination in Virology, Haemagglutination inhibition.
8. Be able to collect and transports following clinical samples for microbiological tests: Blood, pus, urine, CSF, body fluids, stool, sputum, throat swabs and serum.
9. Adopt universal precautions for self precaution against HIV and hepatitis.

**TEACHING HOURS
THEORY**

No. of hours of teaching: **120 hrs.**

1. Introduction to Microbiology and General Bacteriology	10 hrs
2. Immunology	20 hrs
3. Systematic Bacteriology	35 hrs
4. Virology	20 hrs
5. Mycology	05 hrs
6. Parasitology	25 hrs
7. Applied Microbiology	05 hrs

PRACTICAL PRACTICAL EXERCISES IN MICROBIOLOGY

The students would perform the following procedures:

- i) Gram stain, ii) Ziehl Neelsen stain, iii) Modified Ziehl Neelsen stain, iv) Albert stain, v) Hanging drop vi) Wet mount for stool examination, vii) Iodine mount for stool examination, viii) Lactophenol cotton blue mount for fungus examination, ix) Simple stain.

I - MICROSCOPE

- a) Principles and use of compound Microscope in detail
- b) Dark ground Microscope
 - Fluorescent Microscope
 - Phase Contrast
 - Microscope Electron
 - Microscope

II - STERILIZATION:

- a) Principle, Uses and Demonstration of common sterilization equipment, namely, Autoclave, Hot Air Oven, Serum Inspissator, Arnold Steriliser, Filters.

III - CULTURE MEDIA:

Classification of culture media, Principles, main ingredients and uses of common culture media. Namely-Peptone water, Nutrient Broth, Nutrient Agar, Blood Agar, Chocolate agar, Mac Conkey, Wilson Blair, TCBS, LJ, Potassium telluride, Dorset egg, Loeffler's serum slope, RCM, milk agar, Selenite F-broth, Blood culture broth. Media for Biochemical reaction – Sugar Fermentation, Urease, Citrate, Indole Media with growth of common organisms for demonstration namely Staphylococci, C. diphtheria. Mycobacterium tuberculosis, Salmonella on W.B., Vibrio on TCBS, Mac-Conkey with LF & NLF, Milk Agar with Staphylococci, Proteus on Nutrient Agar, Antibiotic sensitivity – methods & principles.

IV - HANGING DROP AND STAINING

1. Demonstration of motility by hanging drop method.
2. Gram Stain
3. ZN Stain

V - PARASITIOLOGY:

Examination of faeces for helminthic Eggs, (Round worm, hook worm, whip worm, H. Nana)

VI - APPLIED BACTERIOLOGY:

Demonstration of specimen collection.

Growth on appropriate
media Biochemical
reactions.

Appropriate special tests for the lab-diagnosis of common infectious diseases. Namely:

1. Pyogenic Infection
2. Enteric Fever
3. Bacillary Dysentery
4. Cholera
5. U.T.I
6. Infantile Diarrhoea
7. Tuberculosis

VII - DEMONSTRATION OF SEROLOGICAL TEST:

Widal test, VDRL, ELISA, CRP, ASO, RF, WEIL, FELIX TEST, Brucella Agglutinations test.

VIII - USES OF LABORATORY ANIMALS:

Rabbit, Guinea pig & Mouse

IX - DEMONSTRATION OF SLIDES & INSTRUMENTS

The following materials are to be procured for the conduct of practical classes.

i. SLIDES

1. Staphylococci
2. Streptococci
3. Gonococci
4. M. tuberculosis
5. M. Leprae
6. C. diphtheriae
7. T. pallidum
8. C. tetani
9. Negative Staining (Pneumococci)
10. Malarial parasite
11. Microfilaria
12. Cyclops
13. Hydatid cyst wall
14. Negri Bodies
15. Molluscum contagiosum
16. Rhinosporidiosis
17. Candida
18. Cryptococcus
19. Aspergillus
21. Penicillium
22. Mucor/Rhizopus
23. Pheumococci
24. Y. pestis
25. Mycetoma – H & E Stain
26. Cestode – Segment

ii. MEDIA

1. Without Growth

Peptone Water, Nutrient broth; Nutrient agar, Blood agar, Chocolate agar, Mac-Conkey agar Wilson & Balir medium T.C.B.S., L.J. Medium Robertson Cooked meat medium Milk agar, Selenite F Broth, Blood culture Broth, Dorset egg medium & Loefflers Serum Slope.

2. With Growth:

1. Staphylococcus – albus, aureus on Nutrient agar
2. Staphylococcus – albus, aureus on milk agar
3. Potassium tellurite medium with C. diphtheria
4. L.J. with M. tuberculosis
5. Mac Conkey with LF & NLF

6. Wilson & Blair with growth
7. TCBS with growth
8. Proteus – on Nutrient agar and swarming on Blood agar
9. Sugar fermentation – Indole – Negative & Positive
10. Urease – Negative & Positive
11. Citrate - Negative & Postive
12. Sabouraud’s dextrose agar with Candida / Aspergillus
13. Sabourauds Dextrose agar with any Dermatophyte.

iii. LIST OF INSTRUMENTS

1. Seitz filter
2. Candle filter
3. Macintosh filter’s jar
4. VDRL slide
5. Widal slide
6. Sterile swab
7. Tuberculin syringe
8. Microtitre plate
9. Inoculation loop
10. Pasteur pipette.

IV. LIST OF SPECIMENS

1. Roundworm
2. Hookworm
3. Whip worm
4. Tapeworm
6. Hydatid cyst
7. Embryonated egg
8. Suckling mouse
9. Guinea worm

V. EXPERIMENTAL ANIMALS:

1. Rabbit
2. Guinea pig
3. Mouse

X - INTEGRATED TEACHING:

Serial Number	Topics	Collaborating Departments
1	Enteric fever	Medicine, Paediatrics
2	Cholera	Medicine, Paediatrics, Community Med
3	HIV & AIDS	Medicine, Paediatrics, OBG, Dermatology
4	Tuberculosis	Chest and TB, Medicine, Community

		Med
5	Hospital infection & Control Measures	Anesthesia
6	Malaria	Pathology, Paediatrics, Community Medicine, Medicine
7	Bio-medical waste management	Community Medicine, Surgery, Anesthesia.
8	Viral hepatitis	Medicine, Paediatrics
9	Leprosy	Dermatology, Community Med
10	Bacterial Drug resistance	Medicine, Surgery, Pharmacology.

XI. INNOVATIVE TEACHING METHOD

The students are motivated to present seminar on short topic for 15 minutes and to prepare models and Flow charts so as to facilitate better understanding the structure of micro organisms and their life cycle.

Seminars

1. Normal microbial flora
2. Monoclonal antibodies
3. Non sporing anaerobes
4. Miscellaneous Bacteria – I
5. Miscellaneous Bacteria – II
6. Miscellaneous Viruses
7. Trematodes (except schistosomes)
8. Oncogenic viruses
9. Mycotoxicosis, otomycosis and oculomycosis
10. Larva migrans

Following topics would be covered during practical hours as group discussion (Interactive learning process)

Tutorial

1. Collection & transportation of sample
2. ABST
3. Biomedical waste management
4. Immunoprophylaxis
5. Bacteriology of Water, milk air
6. Recent advances in diagnostic microbiology
7. Lab diagnosis of Parasitic infection

8. Lab diagnosis of Fungal infection
9. National programs
10. Standard Precaution

Group Discussion

1. Blood stream Infection
2. Respiratory Tract Infections
3. Meningitis
4. Urinary Tract Infections
5. Sexually Tract Infections
6. Diarrhea and food poisoning
7. Skin and soft Tissue Infections
8. Pyrexia of Unknown origin
9. Zoonoses
10. Nosocomial Infections

TEACHING SCHEDULE

S.NO	DATE	TOPIC	HOURS	TLM
1.		Historical Introduction		
2.		Morphology Of Bacteria-I (Bacterial Anatomy – Cell Wall, Cytoplasmic Membrane, Cytoplasm, Ribosomes, Mesosomes, Intra Cytoplasmic Inclusions, Nucleus)		
3.		Morphology Of Bacteria-Ii (Capsule, Flagella, Fimbria, Spore, Home Work – L Forms)		
4.		Physiology Of Bacteria		
5.		Bacterial Genetics-I (Up To Transduction)		
6.		Bacterial Genetics-Ii (Lysogenic Conversion, Congugation, Genetic Mechanism Of Drug Resistance)		
7.		Bacterial Genetics-Iii (Transposable Genetic Elements, Molecular Genetics)		
8.		Normal microbial flora		SEMINAR
9.		Infection – I (Introduction Up To Methods Of Transmission)		
10.		Infection – Ii (Virulance Factors, Home Work Types Of Infectious Diseases)		
11.		Immunity – I (Introduction - Innate Immunity)		
12.		Immunity – Ii (Acquired Immunity, Local & Herd Immunity)		
13.		Antigen		
14.		Antibodies – I (Introduction - Structure Of		

		Immunoglobulin)		
15.		Antibodies – Ii (Immunoglobulin Classes & Abnormal Immunoglobulins)		
16.		Complement		
17.		Antigen – Antibody Reactions – I (Introduction & Precipitation Reactions)		
18.		Antigen – Antibody Reactions – Ii (Agglutination + Complement Fixation Reactions)		
19.		Antigen – Antibody Reactions – Iii (Neutralization, Opsonization, Ria, Elisa, Home Work Chemiluminescence Assay)		
20.		Antigen – Antibody Reactions – Iv (Immunofluorescence, Immuno- Chromatography, Immunoelectronmicroscopy, Blotting Techniques)		
21.		Structure & Function Of Immune System – I (Introduction, Cells Of Lymphoreticular System)		
22.		Structure & Function Of Immune System – Ii (Null Cells, Phagocytic Cells, Mhc)		
23.		Monoclonal antibodies		SEMINAR
24.		Immune Response – I (Humoral Immune Response, Factors Influencing Antibody Production, Home Work – Monoclonal Antibodies)		
25.		Immune Response – Ii (Cmi & Detection Of Cmi, Immunological Tolerance, Home Work- Theories Of Immune Response)		
26.		Hypersensitivity – I (Introduction - Type I)		
27.		Hypersensitivity – Ii (Type Ii, Iii, Iv, Home Work- Type-V)		
28.		Autoimmunity – Introduction, Mechanism, Pathogenesis, Home Work Autoimmune Diseases And Immunodeficiency Disorders		
29.		Immunology Of Transplantation & Malignancy		
30.		Staphylococcus – I (Classification, Morphology - Lab Diagnosis Of S Aureus)		
31.		Staphylococcus Ii (Mrsa, Vrsa, Cons)		
32.		Streptococcus – I (Classification, Morphology - Pathogenesis Of S. Pyogenes)		
33.		Streptococcus – Ii (Lab Diagnosis Of S. Pyogenes + Group D, Viridans Streptococci + Other Groups)		
34.		Pneumococcus		
35.		Neisseria Meningitidis		
36.		Neisseria Gonorrhoeae		
37.		Corynebacterium – I (Morphology – Pathogenesis)		
38.		Corynebacterium – Ii (Lab Diagnosis Including Virulence Test, Prophylaxis, + Other Pathogenic Corynebacteria + Diphtheroids)		

39.	Bacillus – I (Bacillus Anthracis)		
40.	Bacillus – Ii (Anthracoïd Bacilli + B. Cereus)		
41.	Clostridium – I (Classification, General Features + C. Perfringens)		
42.	Clostridium - II (C. Tetani)		
43.	Clostridium - III (C.Botulinum + C. Difficile)		
44.	Nonsporing Anaerobes		SEMINAR
45.	Enterobacteriaceae – I (Classification + E. Coli)		
46.	Enterobacteriaceae – II (Klebsiella , Proteus [Home Work – Citrobacter, Enterobacter)		
47.	Enterobacteriaceae -III Shigella		
48.	Enterobacteriaceae – Iv - Salmonella I – (Classification – Pathogenesis.)		
49.	Salmonella – Ii (Lab Diagnosis, Food Poisoning)		
50.	Yesinia (Home Work- Pasteurella, Francisella)		
51.	Vibrio – I (Classification – Pathogenesis)		
52.	Vibrio – Ii (Lab Diagnosis Of Cholera + Halophilic Vibrios)		
53.	Pseudomonas		
54.	Haemophilus		
55.	Bordetella		
56.	Brucella		
57.	Mycobacterium Tuberculosis – I (Morphology – Pathogenesis)		
58.	Mycobacterium Tuberculosis – Ii (Lab Diagnosis , Prophylaxis, Mdr, Xdr, Tdr, Rntcp)		
59.	Non – Tuberculous Mycobacteria		
60.	M.Leprae		
61.	Spirochetes – I (Classification , T. Pallidum – Morphology – Pathogenesis)		
62.	Spirochetes – Ii (Laboratory Diagnosis + Non-Venereal Treponematoses)		
63.	Spirochetes – Iii (Borellia)		
64.	Spirochetes – Iv (Leptospira)		
65.	Mycoplasma		
66.	Actinomycetes		
67.	Miscellaneous Bacteria – I (Listira Monocytogens, Alkaligens Fecalis, Klebsiella Granulomatis, Ascinetobacter)		SEMINAR
68.	Miscellaneous Bacteria – II (Campylobacter, Helicobacter, Legionella, Gardenella)		SEMINAR
69.	Rickettsiaceae-I (Classification, Rickettsia)		
70.	Rickettsiaceae-Ii (Orienta, Coxiella, Bartonella)		
71.	Chlamydiae		
72.	General Properties Of Viruses – I (Characteristics, Classification, Morphology-Multiplication)		
73.	General Properties Of Viruses – Ii (Cultivation Including Viral Assay, Lab Diagnosis Of Viral		

		Infections)		
74.		Virus – Host Interactions – (Pathogenesis Of Viral Infection, Host Response To Viral Infection, Home Work – Antiviral Agents)		
75.		Bacteriophage		
76.		Poxviruses + Adenoviruses		
77.		Herpes Viruses – I (Classification, Morphology – Lab Diagnosis Of Hsv)		
78.		Herpes Viruses – Ii(Virecella, Cmv, Ebv, Home Work Hsv Types 6,7,8.)		
79.		Picornaviruses- I (Polio Virus)		
80.		Picornaviruses- Ii(Coxsackie, Echo, Rhino)		
81.		Orthomyxovirus		
82.		Paramyxoviruses		
83.		Arboviruses – I (Classification, Chikugunya, Je, Kfd)		
84.		Arboviruses – Ii (Dengue Home Work -Other Arboviruses)		
85.		Rhabdoviruses – I		
86.		Hepatitis Viruses – I (Hav, Hcv, Hev, Home Work Hgv)		
87.		Hepatitis Viruses – Ii (Hbv, Hdv)		
88.		Hiv – I (Morphology – Pathogenesis Of Hiv-1 &2)		
89.		Hiv – Ii (Laboratory Diagnosis Including Laboratory Monitoring Of Hiv Infection, Post Exposure Prophylaxis		
90.		Miscellaneous Viruses – I (Hpv, Rubella)		SEMINAR
91.		Miscellaneous Viruses – II (Filo Viruses, Corona Viruses & Rota Virus + Other Viruses Causing Diarrhea)		SEMINAR
92.		Oncogenic Viruses + Slow Viral Diseases		
93.		Mycology – I (Characteristics Of Fungi, Classification, Laboratory Diagnosis Of Fungal Diseases+ Classification Of Mycosis+ Surface Mycosis, Home Work _ Antifungal Agents)		
94.		Mycology – Ii (Cutaneous Mycosis - Dermatophytes)		
95.		Mycology – Iii (Mycetoma, Sporotrichosis, Rhinosporidiosis)		
96.		Mycology - Iv (Systemic Mycosis)		
97.		Mycology - V –Candida + Cryptococcosis		
98.		Mycology – Vi (Aspergillosis, Penicilliosis, Mucormycosis, P. Jirovecii, Home Work – Otomycosis, Oculomycosis, Mycotic Poisoning)		
99.		Mycotoxicosis, otomycosis and oculomycosis		SEMINAR
100.		Introduction To Parasitology		
101.		E.Histolytica – I (Up To Pathogenesis)		
102.		E.Histolytica – Ii (Lab Diagnosis + Pathogenic		

		Free Living Amoebae)		
103.		Giardia + Trichomonas + B.Coli		
104.		Leishmania – I (Life Cycle- Pathogenesis)		
105.		Leishmania – Ii (Lab Diagnosis + -----Home Work-Trypanosoma)		
106.		Malarial Parasite – I		
107.		Malarial Parasite – Ii		
108.		Malarial Parasite – Iii		
109.		Toxoplasma		
110.		Intestinal Coccidian Parasites		
111.		Introduction To Cestodes + D.Latum ,H.Nana		
112.		Taenia Saginata,Taenia Solium		
113.		E. Granulosus		
114.		Schistosoma, F.Hepatica		
115.		Trematodes (except schistosoma)		SEMINAR
116.		Nematodes – A Lumbricoides		
117.		Hookworm, Larva Migrans		
118.		E.Vermicularis, T Trichuria		
119.		Larva migrans		SEMINAR
120.		S.Stercoralis, T Spiralis		
121.		Filarial Worms – I		
122.		Filarial Worms – Ii		
123.		Filarial Worms – Iii		
124.		Guinea Worm,		
125.		Laboratory Diagnosis Of Parasitic Diseases		

DISTRIBUTION OF PRACTICAL CLASSES OF II M.B.B.S. STUDENTS

Sl.No	Practicals	Portion to be covered	Teaching method	Teaching hours
1	Introduction	Medical Microbiology Dept of Microbiology –various sections General Instructions		3
2	Microscopy – Part – I	(Introduction to microscopy, Parts of Compound Microscope, Complete Compound Microscope)	Briefing & demo	3
3	Microscopy – Part – II	Types of Microscopes, Principle and uses - Dark ground Microscopy - Phase contrast microscopy - Fluorescent Microscopy - Electron Microscopy	Briefing & demo	3
4		Collection & transportation of sample	Tutorial	3
5	Sterilization Part – I	Classification, up to dry Heat Sterilization (Complete) <u>Demonstrate</u> Flaming, Red hot, Hot air oven	Briefing & <u>Demonstration</u>	3
6	Sterilization	Moist heat	Briefing &	3

	Part – II	Sterilization method <u>Demonstrate</u> Water bath, Inspissation, Steamer, Autoclave	<u>Demonstration</u>	
7	Sterilization Part – III	Filtration, Radiation <u>Demonstrate</u> Seitz filter, Candle filter, Syringe filter, sintered glass filter ,HEPA filter , UV: lamp etc	Briefing & Demonstration	3
8	Sterilization Part – IV	Chemical Sterilization and disinfection <u>Demonstrate</u> Alcohol, formalin, gluteraldehyde, iodine, soaps, sodium hypochlorite, phenol, dyes, dettol, savlon etc.	Briefing & Demonstration	3
9	Demonstration of sterilizing instruments & disinfectants. visit to CSSD		Demonstration	3
10		Respiratory Tract Infections	Group discussion	3
11		Bacteriology of Water, milk air	Tutorial	3
12	Culture media – I (Briefing) Simple media, enriched media	Introduction Classification simple media up to enriched media Nutrient broth Peptone water Nutrient Agar Blood agar Chocolate agar Milk agar Loefflers serum slope Glucose broth BHI	Briefing & Demonstration	3
13	Enrichment medium, selective and differential medium	Describe Enrichment medium-APW, Bile Broth, Tetrathionate Broth, Selenite F Broth Selective Medium -PT, LJ, WBBS, TCBS, SDA	Briefing & Demonstration	3
14	Briefing - Differential ,Transport media, Anaerobic media	-Mac Conkeys Agar, Blood agar, WB, TCBS - APW, PIKES, Stuarts, VR Medium, Sach's buffered glycerol saline, RCM , Thioglycolate broth	Briefing & Demonstration	3
15	Culture methods	Aerobic & Anaerobic	Briefing & Demonstration	3
16	Methods of	Biochemical reactions	Briefing &	

	identification of bacteria		Demonstration	3
17	Demo. Of Culture media		Briefing & Demonstration	3
18	Demo. Of Culture methods & biochemical tests		Briefing & Demonstration	3
19		Skin and soft Tissue Infections	Group discussion	3
20	Hanging drop preparation		Briefing and Demonstration	3
21	Simple staining		Briefing and Demonstration	3
22		Recent advances in diagnostic microbiology	Tutorial	3
23	Gram staining & Practical		OSPE	3
24		Antibiotic Sensitivity Testing	Tutorial	3
25	Demo of characteristics of staphylococci & streptococci		Briefing and Demonstration	3
26		Standard Precautions	Tutorial	3
27	Serological reactions		Briefing	3
28	Serological reaction		Demonstration	3
29		Immunoprophylaxis	Tutorial	3
30	ZN staining		Briefing & Practical	3
31		Meningitis	Group discussion	3
32	E. Coli, Klebsiella, proteus in the form of applied exercises		Briefing and Demonstration	3
33		Urinary Tract Infections	Group discussion	3
34	Characteristics of salmonella in		Briefing and	3

	the form of applied exercises		Demonstration	
35		Pyrexia of Unknown origin	Group discussion	3
36	Characteristics of Vibrio and Pseudomonas in the form of applied exercises		Briefing and Demonstration	3
37		Diarrhea and food poisoning	Group discussion	3
38		Biomedical waste management	Tutorial	3
39	Demo of Bacteriology Slides, Parasitology slides and specimens		Demonstration	3
40		Zoonoses	Group discussion	3
41		Lab diagnosis of Parasitic infections	Tutorial	3
42	Mycology Virology & expt. Animals.	Applied exercises case study	Demonstration	3
43		Lab diagnosis of Fungal infections	Tutorial	3
		Blood stream Infections	Group discussion	3
44	Parasitology life cycles record corrections		Self study	3
45		Sexually Transmitted Infections	Group discussion	3
		National programs	Tutorial	3
47		Nosocomial Infections	Group discussion	3

TERM WISE DISTRIBUTION OF THEORY

PORTIONS III TERM:

GENERAL BACTERIOLOGY, IMMUNOLOGY & SYSTEMATIC BACTERIOLOGY (COCCI)

IV TERM

REMAINING SYSTEMATIC BACTERIOLOGY & PROTOZOOLOGY

VI TERM

HELMINTHOLOGY, VIROLOGY, MYCOLOGY & APPLIED MICROBIOLOGY.

SCHEME OF EXAMINATION

INTERNAL ASSESSMENT

It shall be based on evaluation of assignment, preparation of seminar, clinical presentation Day to Day Assessment, MCQ tests. Regular periodic examinations should be conducted throughout the course. Although the question of number of examinations is left to the institution, there should be a minimum of at least three (3) sessional examinations during Phase – II of the course and average of best two examination marks should be taken into consideration while calculating the marks of the internal assessment. Day to day records should be given importance in the internal assessment. Proper record of the work should be maintained which will be the basis of the basis of all students' internal assessment and should be available for scrutiny.

THEORY: 60 Marks

Minimum of three examinations are recommended. The examination preceding the University examination will be similar to the University examination and the total marks would be 200. Average marks of best of two notified internal examinations should be reduced to 60 and should be sent to the University.

PRACTICAL: 20 Marks

A minimum of three practical tests is to be conducted one at the end of each term Average marks of the best of the two of three terminal examinations shall be reduced to 20 marks and shall be sent to the University.

UNIVERSITY EXAMINATION:

A. WRITTEN PAPER: 200 Marks

There shall be two theory papers of 100 marks each and duration of each paper will be of 3 hours. The pattern of questions would be of three types.

B. PRACTICAL EXAMINATION: 80 Marks

It shall carry 80 marks. The distribution of marks for different components are:

Spotters	10
Gram's Stain	15
Special (ZN or Alb) Stain	15

Parasitology (Stool Examn)	15
Clinical Bacteriology	15
Clinical Virology (Case study) or	10
Clinical Mycology (Slide & Culture)	

The distribution of topics and weightage of marks for University examination is as under Paper I: 100 Marks

General Bacteriology	20 Marks
Immunology	30 Marks
Systemic Bacteriology	50 Marks

Paper II: 100 Marks

Virology	30 Marks
Parasitology	40 Marks
Mycology	20 Marks
Applied Microbiology	10 Marks

The topics assigned to the different papers are generally evaluated under those-sections, However a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.

C. VIVA VOCE EXAMINATION: 40 Marks

The Viva – Voce Examination shall carry 40 marks and all examiners will conduct the Viva Voce.

Distribution of Topics & Marks

General Bacteriology & Immunology	10 Marks
Systematic Bacteriology	10 Marks
Virology & Mycology	10 Marks
Parasitology	10 Marks

Total **40 Marks**

RECOMMENDED BOOKS (Recent Editions)

1. Ananthanarayan : (Ananthanarayan and Jayaram Paniker's) Textbook of Microbiology, Et. & Orient Longmen Ltd., Chennai.
2. Textbook of Microbiology (Prof. C.P.Baveja) Arya publications New Delhi, Fourth edition.
3. Textbook of Microbiology (Dr. D.R. Arora) CBS publications New Delhi, third edition.
4. Jawetz (Melnick) et al, Medical Microbiology, ed Z Appleton and Lange, USA.
5. Chatterjee (KDC), Parasitology, Chatterjee Medical Publishers, Clacutta.
6. Paniker (C.K.Jayaram), Text book of Medical Parasitology, Jaypee, New Delhi.
7. Textbook of Medical Parasitology by P. Chakraborty new central book agency Ltd. Kolkata

REFERENCE BOOKS:

1. Green wood, Medical Microbiology, Ed-15 Churchill Livingstone.
2. Roitt (Ivan.M), Essential Immunology, Ed.6, ELBS, Hong Kong.
3. MIMS (Cedric, Playfair) et al, Pathogenesis of Infectious diseases, Academic Press, London.
4. STITES (Terr and Parslow), Medical Immunology, Appleton and Lange USA.
5. MENDELL (Donerglas Aan Benett), Principles and Practice of Infections diseases, Churchill Livingstone
6. BAILEY AND SCOTT, Diagnostic Microbiology, Mosby Publishers
7. MACKIE & MACARTNEY – Vol II (Collee & Duguid) et al, Churchill Livingstone.
8. Basic Laboratory Procedures in Medical Parasitology, WHO.
9. Basic Laboratory Procedures in Medical bacteriology WHO.

DEPARTMENT OF FORENSIC MEDICINE & TOXICOLOGY

CURRICULUM

Goal

The broad goal of the teaching undergraduate student in Forensic Medicine is to produce a physician who is well informed about medico legal responsibilities in practice of medicine. He/She acquires knowledge of law in relation to medical practice, medical negligence and respect for codes of medical ethics.

Objectives

Knowledge

At the end of the course, student should be able to:

1. Identify the basic medico legal aspects of hospital and general practice
2. Define the medico legal responsibilities of a general physician while rendering community service either in a rural primary health centre or an urban health center.
3. Be able to identify, examine and prepare report or certificate in medico legal cases/situations in accordance with the law of land.
4. Able to perform medico legal postmortem and interpret findings and results of other relevant investigations to logically conclude the cause, manner and time since death.
5. Be aware of medical ethics, etiquette, duties, rights, medical negligence and legal responsibilities of the physicians towards patient, profession, society, state and humanity at large.
6. Be aware of relevant legal / court procedures applicable to the medico legal / medical practice

Skills

1. Make observations and logical inferences in order to initiate enquiries in criminal; matters and medico legal problems.
2. Diagnose and treat common emergencies in poisoning and manage chronic toxicity.
3. Make observations and interpret findings at postmortem examination.
4. Observe the principles of medical ethics in the practice of his profession
5. Be able to preserve and dispatch specimens in medico legal / postmortem cases and other concerned materials to the appropriate government agencies for necessary examination.

Integration

Department shall provide an integrated approach towards allied disciplines like Pathology, Radiology, Forensic Sciences, hospital administration etc. to impart training regarding medico legal responsibilities of physicians at all levels of health care. Integration with relevant disciplines will provide scientific basis of clinical toxicology e.g. medicine, pharmacology, etc.

1. SUDDEN DEATH:

- Clinical features by (Medicine)
- Histopathological examination of Heart by (Pathology)
- Postmortem findings and Medico legal importance of sudden death (FMT)

Coordinating Department: **Medicine**

2. SUSPECTED UNKNOWN COMPOUND POISONING:

- Clinical features and management of SUCP by (Medicine)
- Detection and information about poisons by (Forensic Medicine & Toxicology)

Coordinating Department: **Medicine**

3. MECHANICAL INJURY:

- Appearance and depth of various wounds produce by physical violence by (Surgery)
- Medico legal Importance of various wounds by (Forensic Medicine & Toxicology)

Coordinating Department: **Surgery**

4. BURNS:

- Appearance of burns injuries and management by (Surgery)
- Medico legal aspect of burn injury by (Forensic Medicine & Toxicology)

Coordination Department: **Surgery**

5. POCSO ACT:

- Genital examination in case of sexual violence against women by (OBG)
- Documentation and submission of data to the court of law by (Forensic Medicine & Toxicology)
- Counseling of victim as well as accused by (Psychiatry)

Coordination Department: **OBG**

COURSE CONTENTS

THEORY

I. Forensic medicine:

Must know

1. History of Forensic Medicine, Definition of forensic medicine and medical jurisprudence, Medical Etiquette.
2. Courts in India and their powers: Supreme Court, High Court, Sessions Court, Additional sessions court, magistrate's court.
3. Court procedures : Summons, conduct money, oath, affirmation, perjury, types of witness, types of examination, recording evidence, court questions, conduct of doctor in witness box, medical examiner system.
4. Medical certification and medico legal reports including dying declaration.
5. Death:
 - a. Definition, types: somatic, cellular and brain death.
 - b. Natural and unnatural death.
 - c. Presumption of death and survivorship.
 - d. Suspended animation.
 - e. Death certification, cause of death as per international classification of diseases – WHO guidelines.
6. Changes after death:
 - a. Cooling of body, Lividity, Rigor mortis, cadaveric spasm, cold stiffening and heat stiffening.
 - b. Putrefaction, mummification, adipocere and maceration.
 - c. Estimation of time of death.
 - d. Embalming.
7. Inquest by police and magistrate.
8. Identification.
 - a. Definition, corpus delicti
 - b. Identify of living persons; race, age, sex, religion, complexion, stature.
 - c. Identification of criminals, unknown persons, dead bodies and remains of persons by: hair fiber, teeth, anthropometry, dactylography, foot prints, scars, tattoos, poroscopy, DNA finger printings, Super-imposition.
9. Examination of mutilated human remains; Skeletal remains; and exhumation.
10. Medico legal autopsies :
 - a. Definition of a medico legal post mortem.
 - b. Difference between pathological and medico legal post mortem.
 - c. Objectives, procedures, formalities of medico legal autopsies.
 - d. Obscure autopsy
 - e. Special procedures in suspected poisoning.
 - f. Precautions in autopsy of HIV infected body, radiation injury.

11. Mechanical injuries and wounds:
 - a. Definition, classification and differentiation of abrasion, contusion, laceration, chop wounds, incised wounds, stab wounds.
 - b. Accidents due to vehicles; Primary and secondary impact injury crush syndrome, reconstruction of accidents, railway injuries.
 - c. Differences between ante mortem and postmortem injuries.
 - d. Weapons; weapons, dangerous weapons and elementary ballistics.
 - e. Wounds due to weapons; Injuries by dangerous weapons, fire arm wound blast injuries, stab wounds, incised wound, defense cuts, hesitation cuts self inflicted injuries, fabricated wounds.
 - f. Workman's compensation act.
 - g. Justifiable homicide, culpable homicide and grievous injury.
12. Examination of an injury case:
 - a. Differences between accidental; suicidal and homicidal injuries.
 - b. Types of injuries: simple and grievous.
 - c. Wound as a cause of death: primary, secondary.
 - d. Situation and character of wounds: number, direction, extent and age of injury.
 - e. Injuries of various sites.
 - f. Head: Scalp wounds, fracture of skull, coup, contra coup injuries.
 - g. Intracranial haemorrhages, its location and extent. Injury to brain, spinal cord, Thoracic, Abdominal Pelvic viscera,

Wound Certification.

1. Injuries due to physical agents, and their medicolegal importance; cold, heat burns, electricity and lightning.
2. Asphyxial deaths: definitions, causes, types, post mortem appearance and medico legal significance of suffocation, drowning, hanging, throttling, strangulation. Traumatic asphyxia, drowining, Lynching, judicial hanging, bansdola.
3. Death due to malnutrition, neglect.
4. Dowry deaths.
 - a. Virginity: Definition and signs. Defloration
 - b. Sexual Offences: Rape, Definition, examination of victim and the accused in case of rape, gang rape, custodial rape. Incest, Unnatural Offences – Tribdism, Bestiality, Buccal Coitus, Sodomy.
5. Legitimacy, paternity, disputed paternity, medicolegal significance of impotence. Sterility and artificial insemination; supper-foetation and super-fecundation; atavism; sterilization.
6. Pregnancy and delivery: Pregnancy: signs of pregnancy in the living and in the dead, Delivery: signs of recent and remote delivery in the living and in the dead; Abortion: natural and artificial therapeutic miscarriage; complications of abortion; investigation in deaths due to abortion. Medical termination of pregnancy act of 1971.
7. Infanticide: Definition and Medico legal consideration: viability; determination of the age of the foetus' method of demonstration of centres of ossification rule of Haase,

- signs of live birth; Hydrostatic test. Maceration, post – mortem finding to differentiate still birth from a live birth. Battered Baby syndrome and Munchausen syndrome by proxy. Sudden infant death and cot death, Precipitate labour.
8. Biological fluids: examination, preservation, dispatch and identification of blood stains by micro chemical, spectroscopic and precipitation test. Blood grouping in disputed paternity; group specific substances;. Hazards of blood transfusion.
 9. Seminal stains: examination, identification, collection, preservation, dispatch.
 10. Bio-medical Waste: Types, potential risks and their safe management.

Desirable to know

Brief update on recent advances: HLA typing, DNA typing.

II. FORENSIC PSYCHIATRY

Must know

1. Definition, types of mental disorders, lucid interval.
2. Mental Health Act (1987).
3. Diagnosis of Mental illness and feigned mental illness.
4. Testamentary capacity, restraint, insanity with reference to civil and criminal responsibilities, doctrine of diminished responsibility, McNaughten’s rule.

III. MEDICAL JURISPRUDENCE

1. Indian Medical Council and State Medicals Councils: their disciplinary control
2. Indian Medical Register rights and privileges of egistered medical practitioner, penal erasure, infamous conduct, and disciplinary committee.
3. Code and law of medical ethics, unethical practice, dichotomy, consumer protection act
4. Professional secrecy, privileged communication.
5. Malpractice; civil, criminal and ethical.
6. Consent, negligence, vicarious liability, the doctrine of Res Ipsa Loquitur, contributory negligence. *Consumer Protection Act*.
7. Duties of a medical practitioner towards his patient and the society.
8. Human organ Transplantation Act of 1994.
9. PNDT Act. (Revised 1994)
10. Sex determination by Amniocentesis.
11. Euthanasia.
12. Torture medicine
13. The Biomedical Waste (Management & Handling) (Second Amendment) Rules, 2000.

IV. TOXICOLOGY

Must know

1. General aspects of poisoning:
Duties of doctor in cases of poisoning, medicolegal autopsy in poisoning, preservation and dispatch of viscera for chemical analysis. Role of Forensic Science laboratory. Laws related to poisons.
2. Types of poison, diagnosis, principles of therapy and medico legal aspects of:
 - a. Corrosive poisons; strong mineral acids like carbolic acid, oxalic acid, Sulphuric acid, Nitric acid, Hydrochloric acid, Alkalies.
 - b. Metallic poisons: Lead, Mercury, Copper, Arsenic.
 - c. Animal poisons: Snakes, Scorpions, Bees, Wasps.
 - d. Deliriant: Datura, Cannabis and Cocaine
 - e. Somniferous agents: Opium, Morphine and Pethidine
 - f. Inebriants: Methyl and ethyl alcohol.
 - g. Gaseous poisons: Carbon monoxide, carbon dioxide, War gases.
 - h. Anaesthetic agents: Chloroform and ether.
 - i. Cardiac poisons: Aconite, Cerebra thevatia and nerium odorum, Oleanders, Hydrocyanic acid.
 - j. Miscellaneous: Aspirin, Paracetamol, Barbiturates, Diazepam and Antihistamines
 - k. Insecticides: Organophosphorous compound, Endrin, Kerosene, turpentine, Rodenticides.
 - l. Food poisoning: Botulism.
 - m. Organic vegetables: Abrus, Calotropis.

Desirable to know

- a. Inorganic non metallic poisons: phosphorous.
- b. Metallic poisons: Antimony, Nitrites and Arsenic
- c. Vegetable Alkaloids.
- d. Spinal poisons : strychnine
- e. Paralytic agents.
- f. War gases and industrial gases : MIC
- g. Sedatives; Chloral hydrate and Bromides.
- h. Mechanical Poisons.
- i. Drug Dependence.

PRACTICALS

1. Demonstration of ten medico legal autopsies
2. Age estimation from bones, x-rays, dentition
3. Injuries and weapons
4. Examination of intoxicated persons
5. Possible videotape of examination of victim and accused in sexual offences
6. Specimens of poisons

Desirable to know

OSPE & MCQ Test.

SKILLS

1. Examine & prepare certificates in the following medico-legal situations:
 - a. injured patient
 - b. sexual offences
 - c. determination of age
 - d. intoxicated patient
2. Prepare proper certificates of birth and death.
3. Prepare dying declaration
4. Give evidence in a court of law as an expert witness collect and do proper labeling, preservation and dispatch of medico-legal specimens
5. Witness and record the finding and issue a report for a medico legal autopsy
6. Diagnose and manage common acute and chronic poisonings

PRACTICAL EXERCISES

1. Medico Legal Autopsies – Witnessing and recording (10 cases)
2. Age estimation of an individual by Physical, Dental and Radiological examination.
3. Examination of skeletal remains
4. Study of:
 - a. Lethal Weapons
 - b. Wet specimen/models/Photography/Micro slides – Like sperms, Diatoms, Hairs, Human & Animal RBCs.
 - c. Poisons
5. Medical certificates/ Medico-legal reports, Physical fitness, sickness and death certificates, injury report, drunkenness, sexual offences.
6. Students should be taken to courts whenever possible to acquaint themselves with the court proceedings.

Note: Practical Exercises conducted shall be entered in the practical record book edited and published by Karnataka Medico legal society.

TEACHING HOURS

III term – 1 hr Theory / week

IV term – 1 hr Theory & 1 Practical / week

V term – 2 hrs Theory & 1 Practical / week

The course will be for 18 months in III, IV and V terms

Sl. No	No of Classes	Topics
01	01	Introduction to Forensic Medicine
02	03	Legal Procedure
03	04	Thanatology
04	02	Medico legal Autopsy
05	03	Identification
06	04	Medical Law & Ethics
07	03	Mechanical Injuries
08	03	Firearms,
09	03	Thermal Injuries
10	03	Regional Injuries
11	03	Medico legal aspects of wounds
12	03	Mechanical Asphyxia
13	01	Drowning
14	02	Sex related offences, Rape, Pasco Act Unnatural sex offences Perversions
15	02	Impotency, Sterility, Virginity
16	01	Pregnancy, Delivery
17	01	Abortions and MTP Act
18	02	Infanticide
19	03	Forensic Psychiatry,
20	03	General Principles of Toxicology
21	02	Corrosive Poison
22	02	Inorganic Irritants
23	03	Plant Poisons & Animal Poison

24	03	Agricultural Irritant Poison
25	03	Cerebral, Stimulant, Depression, Delirient (Datura, Cannabis, Cocaine & Inebriant Poison)
26	01	Somniferous Poison, Drug addiction dependent.
27	01	Spinal Poison
28	01	Cardiac Poison
29	03	Asphyxiants
30	01	Food Poisoning

SCHEME OF EXAMINATION

INTERNAL ASSESSMENT

It shall be based on evaluation of assignment, preparation of seminar, clinical presentation etc., (see Annex – I for examples). Regular periodic examinations should be conducted throughout the course. Although the question of number of examinations is left to the institution, there should be a minimum of at least three (3) sessional examination marks should be taken into consideration while calculating the marks of the internal assessment. Day to day records should be given importance in the internal assessment.

Proper record of the work should be maintained which will be the basis of all students internal assessment and should be available for scrutiny.

THEORY: 30 Marks

Minimum of three examinations are recommended. The examination preceding the University examination will be similar to the University Examination. The total marks would be 30. Average marks of best of two notified internal examinations should be reduced to 30 and should be sent to the University.

PRACTICALS: 10 Marks

Internal Assessment examination for Practicals and allotment of marks for records will be as follows: the total of 10 marks will be first increased notionally to 50. Out of the 50 marks, 40 will be allotted to terminal practical tests and 10 marks for records. Four practical tests shall be conducted each carrying 10 marks. The marks obtained in the four practical tests and records would be reduced to 10 and sent to the University.

UNIVERSITY EXAMINATION:**A. WRITTEN PAPER: 100 Marks**

There shall be one theory paper of 100 marks. The pattern of questions would be of three types.

Types of Questions	Number of questions	Marks for each question	Total
Long Essay	2	10	20
Short Essay	10	5	50
Short Answer	10	3	30
Total Marks			100

The distribution of topics and weightage of marks for University examination is as under*:

Forensic Medicine (I, II & III): 80 Marks

Toxicology: 20 Marks

I-Forensic Medicine 1. Introduction 2. Legal Procedure 3. Medical law & Ethics 4. Identification III - Medical Jurisprudence	12 Marks
5. Medico legal Autopsy 6. Deaths and its causes 7. Postmortem changes 8. Mechanical Injuries	12 Marks
9. Regional Injuries 10. Medico legal aspects of wounds	12 Marks

11. Thermal Death	
12. Starvation 13. Mechanical Asphyxia 14. Anesthetic and operative deaths 15. 15. Impotence and Sterility	12 Marks
16. Virginity, Pregnancy and Delivery 17. Abortion 18. Sexual Offences	10 Marks
19. Infant Death 20. Blood stains 21. Artefacts 22. Forensic Science laboratory	12 Marks
II – Forensic Psychiatry	10 Marks
IV- Toxicology	20 Marks

B. PRACTICAL EXAMINATION: 40 Marks

This will carry 40 Marks. The distribution of marks for different components are:

Age estimation	-	10 Marks
X Rays / Bones	-	10 Marks
Autopsy questions	-	05 Marks
Spotters	-	10 Marks
Medical certificates	-	05 Marks

C. VIVA-VOCE EXAMINATION: 20 Marks

This will carry 20 marks. All the examiners will examine the candidates.

RECOMMENDED BOOKS:

1. Narayana Reddy K. S., The Essentials of Forensic Medicine & Toxicology, 20th Edition, 2001, Published by K. Suguna Devi, Hyderabad.
2. Apurba nandy, Principles of Forensic Medicine, 2nd Edition, 2001, Pages 606, Published by New Central Book Agency.
3. Parikh C. K., Parikh's Textbook of Medical Jurisprudence and Toxicology, 7th Edition, 2001, CBS. Publishers, Bangalore.
4. Guharaj P. V., Forensic Medicine, Rs. 140/-, Orient Longman Limited
5. C.A. Franklin, Midi's Medical, jurisprudence and Toxicology, 21st Edition, Rs. 180/- Published by M. Tripathi Private Limited, Bombay.
6. Parikh C.K., Medico Legal Post Mortem in India, Rs. 230/- Published by Medical Publication.
7. Keith Simpson, Bernard Knight, forensic Medicine, Ninth Edition, 1985, ELBS.
8. Pillay V.V., Text book of Forensic Medicine, Paras Publication, III edition, 2004.
9. Text book of Forensic Medicine & Toxicology, Principles & Practice 6th Ed by Krishan Vij, Publisher: Elsevier Health Science.

* Specification mentioned such as edition, number of pages, cost etc., subject to change with newer edition.

DEPARTMENT OF PHARMACOLOGY

CURRICULUM

Goal

The broad goal of the teaching of undergraduate students in Pharmacology is to inculcate a rational and scientific basis of therapeutics.

Objectives

Knowledge

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

1. Describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs.
2. List indications, contraindications, interactions and adverse reactions of commonly used drugs.
3. Inculcate the use of appropriate drug in a particular disease with considerations to the cost, efficacy and safety for
 - i. individual needs
 - ii. mass therapy under national health programmes
4. List the drugs of dependence and their management
5. Classify environmental and occupational pollutants and state the management issues
6. Prescription of drugs in special medical situations such as pregnancy, lactation, infancy and old age.
7. Integrate the concept of rational drug therapy in clinical pharmacology
8. State the principles underlying the concept of 'Essential Drugs'
9. Evaluate the ethics and modalities involved in the development and introduction of new drugs.

Skills

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

1. Prescribe drugs for common ailments
2. Recognize adverse reactions and interactions of commonly used drugs
3. Observe experiments designed for study of effects of drugs, bioassay and interpretations of the experimental data.
4. Scan information on common pharmaceutical preparations and critically evaluate drug formations.

a) Affective domain

1. The knowledge gained by students and their application in medical practice is assessed by conducting tutorials, viva voce, MCQ & theory tests periodically.
2. Students are also made to visit the wards and follow up the patients for the therapeutic benefit following the treatment& also report any adverse drug events.

b) Integration

Practical knowledge of use of drugs in clinical practice will be acquired through integrated teaching with clinical departments and pre-clinical departments.

COURSE CONTENTS & TEACHING HOURS**THEORY:****(120-130 hours)**

Theoretical coverage of various aspects of pharmacology will be covered in lectures, tutorials, group discussions, student seminars, self study topics etc. Spread over the three terms of 6 months each. Stress to be given for the basic principles and pharmacotherapeutic basis for clinical use of drugs. The term wise distribution of topics is as given below:

General Pharmacology:

A: General Pharmacology			18 hr
Must to know	Desirable to know	Nice to know	
Introduction , Pattern of Theory Exam, Calculation	History of Pharmacology	Clinical Pharmacokinetics & Pharmacodynamics	
Definitions & sources of drug,	Methods to prolong duration of action of drugs	Drug interactions	
Routes of drug administration.	Non receptor mediated drug action.	Clinical Pharmacology.	
Absorption of drugs.	Factors modifying the effects of drugs		
Bioavailability & distribution of drugs.			
Factors affecting absorption & bioavailability.			
Metabolism of drug-I			
Metabolism of drug-II			
Excretion of drugs.			
Mechanism of drug action-receptor mediated			
Adverse drug reactions			
B: Autonomic Nervous System			11hrs
Must to know	Desirable to know	Nice to know	
Introduction & Adrenergic System	Non-Catecholamines	Cholinergic Blocking Drugs – II & Ganglion Stimulating/Blocking Drugs	
Catecholamines	Skeletal Muscle Relaxants		
Alpha Adrenergic Blocking Drugs			
Beta Adrenergic Blocking Drugs			
Cholinergic drugs			
Anti-cholinesterase Agents			

Cholinergic Blocking Drugs -I		
Drug Therapy of Parkinsonism & Other neurodegenerative disorders		
C: C.V.S.		09 hrs
Must to know	Desirable to know	Nice to know
Introduction to CVS & Digitalis	Pharmacotherapy of Cardiac Arrhythmias-I	Hypo lipedemic Agents
Digitalis & Pharmacotherapy of Cardiac Failure	Pharmacotherapy of Cardiac Arrhythmias-II	
Vasodilator Drugs & Pharmacotherapy of Angina Pectoris		
Pharmacotherapy of Hypertension		
Pharmacotherapy of Hypertension -II		
Pharmacotherapy of shock		
D: DIURETICS & ANTIDIURETICS		02 hrs
Must to know	Desirable to know	Nice to know
Diuretics		Diuretics & Anti-Diuretic Drugs
E: Biogenic Amines & Polypeptides		04 hrs
Must to know	Desirable to know	Nice to know
Histamine and Antihistaminic Drugs	Prostaglandins & Cytokines	
5-Hydroxytryptamine & Antagonists		
Angiotensin , Kinins, leukotrienes,		
F:CENTRAL NERVOUS SYSTEM INCLUDING LOCAL ANAESTHETICS 18 hrs		
Must to know	Desirable to know	Nice to know
Introduction to CNS & alcohol.	Inhalational G A age	Drugs used in Mania
Local anaes thetics	I.V. Anaesthetic agent	Drug therapy of Gout. & Rheumatoid Autocoids
Sedatives,& Hypnotics-I	Pre-anaesthetic Medication	
Sedatives,& Hypnotics -II ,Pharmacotherapy of Insomni	Anti-depressants -I	
Drugs effective in Convulsive Disorders-I	Anti-depressants-II	
Drugs effective in Convulsive Disorders -II	Anti-Psychotic s	
Opioid analgesics-I		
Opioid analgesics -II		
NSAIS's-I		
NSAID's-II		
G : Blood & Blood forming organs:		05 hrs
Must to know	Desirable to know	Nice to know
Drugs Effective in Iron Deficiency Anemias	Coagulants & Anticoagulants	Fibrinolytics & Antiplatelet drugs
Drugs Effective in Megaloblastic Anemias		Antiplatelet drugs

H: CHEMOTHERAPY -I		
15 hrs		
Must to know	Desirable to know	Nice to know
Introduction	Chemotherapy of Fungal Infection	Chemotherapy of Malignancy-I
Sulfonamides & Cotrimoxazole.		Chemotherapy of Malignancy-II
Beta lactams: Penicillins -I		Chemotherapy of Malignancy-III
Beta lactams: Penicillins -II		Bacterial resistance
Beta lactams: Cephalosporins & Others		
Aminoglycosides		
Macrolides & other Antibiotic		
Broad spectrum Antibiotics: Tetracyclines, Chloramphenicol		
Fluroquinolones & Chemotherapy of Urinary Tract Infections		
Chemotherapy of Sexually Transmitted Diseases		
Chemotherapy of Tuberculosis-I		
Chemotherapy of Tuberculosis-II		
Chemotherapy of Leprosy		
Chemotherapy of Malaria-I		
Chemotherapy of Malaria-II		
Chemotherapy of Amoebiasis & other Protozoal Infections		
Chemotherapy Viral Infections-I		
Chemotherapy Viral Infections-II		
Chemotherapy of Helminthiasis		
J: ENDOCRINES		
15 hrs		
Must to know	Desirable to know	Nice to know
Thyroid & Anti thyroid Drugs-I	Introduction & Anterior Pituitary Hormones	Ovulation Inducing Drugs
Thyroid & Anti thyroid Drugs-II	Management of Diabetes mellitus	Androgens, Anabolic Steroids & Anti androgens
Insulin -I		Calcium, Phosphorus, Magnesium & Fluoride Metabolism, Parathyroid & Vit -D
Insulin -II		
Oral Anti diabetic Drugs		
Adrenal Cortico Steroids -I		
Adrenal Cortico Steroids -II & Gonadotropins		
Estrogens & antiestrogens		
Progestins & antiprogestins		
Oral Contraceptive Pills		

K: RESPIRATORY SYSTEM		02 hrs
Must to know	Desirable to know	Nice to know
Pharmacotherapy of Bronchial Asthma	Pharmacotherapy of Cough & Mucolytics	
L: G.I.T.		04 hrs
Emetics, & Anti emetics	Digestives, Carminatives & Appetite suppressants	
Pharmacotherapy of Peptic Ulcer		
Pharmacotherapy of Constipation		
M: DRUGS ACTING ON UTERUS		01 hr
Must to know	Desirable to know	Nice to know
	Uterine stimulants & relaxants	
N: MISCELLANEOUS:		06 hrs
Must to know	Desirable to know	Nice to know
	Enzymes in Therapy	Metals and their antagonists
	Vitamins and Antioxidants	Immuno modulators
		Drugs, Pregnancy and the Newborn
		Gases : Therapeutic and Toxic
O ESSENTIAL DRUGS & RATIONAL USE OF DRUGS		02 hrs
Must to know	Desirable to know	Nice to know
		Pharmacovigilance & Pharmacoeconomics

PRACTICALS:

148 – 150 hrs

The practical training should be made need based. It should be relevant to the future function of a basic doctor as well as make the student to understand some of the theoretical knowledge imparted to them through lectures. Some of the experiments in the experimental laboratory may be done by the students themselves while others can be demonstrated depending upon the local conditions.

PRACTICAL PHARMACY

Mixtures, percentage solutions, ointments, paints, paste, powders, liniments etc. At least one exercise on each of these type of preparations to be done by the students. Exercises done in these are to be asked as practical exercise at the qualifying examination.

1. The students should be trained to identify, handle and explain the use of various dosage forms to the patient.
2. Students should be trained to interpret the label of commercial preparations.

3. Practicals are conducted as follows:
4. Dosage forms: I, II & III
5. Calculating dosage and percentage of solutions.
6. Counseling for different dosage forms.

EXPERIMENTAL PHARMACOLOGY

Experiments designed to elucidate and demonstrate some basic principles like mechanism of drug action, drug antagonism, drug interactions etc. are demonstrated and some done by the students.

Some of the exercise listed below may be suitably utilized / modified for the above purpose.

1. Difference in Onset & duration of actions of drugs given by different routes- Rat.
2. Mydriatic, miotic and local anaesthetic effects on rabbit pupil.
3. Demonstration of animal experiment using computer aided Simulation is included in place of isolated tissue.
4. Convulsant and anticonvulsant effect in rats (Demo.)
5. *Frog heart preparation to show effect of autonomic drugs on ions (Demo.)- Deleted*
6. *Frog rectus preparation to show neuromuscular drugs action (Demo.)- Deleted*

NOTE: Scheme for OSPE

- i) *Identification of drug on the basis of Rabbits pupillary size & reflex*
- ii) *Identification of drug by chemical test and its therapeutic application.*
- iii) *Therapeutic problem*
- iv) *Interpretation of graph on the basis of Pharmacological action of a drug.*
- v) *Identification of adverse drug reaction & drugs causing it.*
- vi) *Preparation of 5% Dextrose or 0.9% Nacl .*

BIOCHEMICAL PHARMACOLOGY:

Identification of the nature of drug. eg: Alkaloids, Glycosides, Steroids, Iodides and Salicylates.

1. Clinical Pharmacology:
 - a. Clinical problem solving exercises oriented toward drug interaction,
 - b. Rational drug therapy including WHO essential drugs.
 - c. Prescription writing for common clinical conditions.
 - d. Criticize, correct and rewrite the given prescriptions (Therapeutic & drug interactions oriented).
 - e. oriented).
 - f. Case studies to study rational therapeutics.
 - g. Analysis of rationality of fixed dose combinations.
 - h. Critical evaluation of promotional drug literature.
 - i. Getting conversant with source of drug information.
 - j. Exercises on Pharmacovigilance and Pharmacoeconomics.

CLINICAL PHARMACOLOGY AND RATIONAL DRUG USE

Must know

1. Principles of prescription writing.
2. Prescriptions of common disorders.
3. Essential drug concept.
4. Drug in children and pregnancy (perinatal pharmacology)
5. Drugs in geriatrics.
6. Drug- drug interactions (with specific examples)
7. Drug resistance
8. ADR monitoring and reporting

Desirable to know

1. Therapeutic drug monitoring
2. Clinical use of drugs in hepatic and renal failure.

BIO-MEDICAL WASTE: TYPES, POTENTIAL RISKS AND THEIR SAFE MANAGEMENT.

SKILLS

1. Plan and institute a line of treatment which is need based, cost effective and appropriate for common ailments taking into consideration:
 - a. Patient
 - b. Disease
 - c. Socioeconomic status
 - d. Institutional/ governmental guideline.
1. Identify irrational prescriptions and explain their irrationality.
2. Persuade patients to stick to therapeutic recommendations especially with reference to dosage and duration of therapy and monitor compliance.
3. Warn patients about important side effects of drugs without alarming them.
4. Recognize drug induced untoward effects and take appropriate steps

COMMON AREAS FOR INTEGRATED TEACHING OF PHARMACOLOGY

Sl. No.	Area	Collaborating Department
1.	Drugs in anaesthetic practice	Anesthesiology
2.	Drug therapy of psychiatric disorders	Psychiatry
3.	Principles of rational use of drugs	Medicine, Pediatrics, Surgery, Obst. & Gynae.
4.	The concept of essential drug	Community Medicine
5.	Therapy of hypertension	Medicine and Physiology
6.	Management of diabetes & its complications	Medicine, Physiology & Surgery
7.	Therapy of peptic ulcer	Medicine, Physiology, Surgery
8.	Therapy of CCF	Medicine

9.	Therapy of Asthma	Medicine
10.	Therapy of Malaria	Medicine & Microbiology
11.	Therapy of tuberculosis	Medicine & Microbiology
12.	Antimicrobial Prophylaxis	Gen.Surgery,OBG & Microbiology
13.	Anti-Retroviral Therapy	Microbiology,Medicine,OBG,Pediatrics
14.	<i>Therapy of Leprosy</i>	<i>Medicine & Microbiology - Deleted</i>

In theory class Audio visual aids like LCD (power point) Smart Board will be used. Where as in practical classes important videos will be shown.

One of the expt. practical will be conducted in the form of OSPE.

INNOVATIVE TEACHING METHODS

Students are asked to follow up the patients admitted in our teaching hospital to assess the therapeutic benefit received by them after the treatment

Students are asked to write down the medications received by the patients during their stay in the hospital. They have to refer the text books and write the known adverse effects of those drugs. They have to go back to the patient and mention if they have suffered from any of those adverse effects.

Similarly they have to write adverse effects of drugs taken by them or their parents during their course of study in pharmacology. This will make them understand the importance of monitoring adverse events of drugs.

Students have to estimate the total cost of drugs taken by the patients admitted in our hospital. They have to find out the cost of similar drugs having the same contents and quality & compare with the drugs prescribed to patients. This will expose them to the concept of Pharmacoeconomics and prescribe drugs available at lower cost.

SCHEME OF EVALUATION

Theory papers two of 100 marks each. Practical examination of 80 marks

Internal assessment theory -60 marks Practical 20 marks

Viva voce examination 40 marks Total marks= 400

INTERNAL ASSESSMENT: (IA)

Theory: 50 marks for Term end examination & 10 marks for day today assessment

Theory IA marks (50) based on marks scored in two (best) of three term end examinations

Day today assessment: marks scored in other tests, viva voce, participation in seminars, tutorials & other assignments.

Practical IA marks (20) based on all 3 term end examinations (15) & practical record book (05)

A student has to score a minimum of 35 % marks to be eligible to appear for examination.

MCQs will be included in all the term ending examinations including preliminary exam.

UNIVERSITY EXAMINATION

A) WRITTEN PAPER: 200 MARKS.

There shall be two theory papers of 100 marks each and duration of each paper will be of 3 hours.

Type of Questions	Number of questions	Marks for each question
Essay type questions	2	10
Short Essay types questions	10	5
Short answer questions	10	3

Distribution of chapters/ topics for paper I & II with weightage of marks for University Examination is given below:

Paper I:**100 Marks:**

- | | |
|--|-----------|
| 1. General Pharmacology including clinical pharmacology | 15 Marks. |
| 2. Central Nervous System & Local Anaesthetics | 25 Marks. |
| 3. Autonomic Nervous System including Parkinsonism,
Skeletal Muscle Relaxants | 25 Marks |
| 4. Cardio Vascular System | 20 Marks |
| 5. Blood and Pharmacotherapy of shock | |
| 6. Diuretics and Antidiuretics | 15 Marks. |

Paper II:**100 Marks.**

- | | |
|--|-----------|
| 1. Chemotherapy | 40 Marks. |
| 2. Endocrines (Hormones) | 20 Marks. |
| 3. Gastro Intestinal System | 10 Marks. |
| 4. Autocoids | 10 Marks. |
| 5. Respiratory System | |
| 6. Chelating agents | 10 Marks. |
| 7. Immunosuppressives | |
| 8. Drugs used in GOUT & Rheumatoid Arthritis | |
| 9. Vitamins | |
| 10. Enzymes in Therapy | 10 Marks. |
| 11. Drugs acting on Uterus | |
| 12. Antiseptic and Disinfectants | |

B. PRACTICAL EXAMINATION: I & II (Three hours)**80 Marks.**

Distribution of Marks for Practical Examination

Practical I

40 Marks

Spotters

10 Marks

Prescriptions (1) C.C.R. (1)

10 Marks

Practical Pharmacy Exercise 20 Marks.

PRACTICAL: II 40 Marks.

- i) Rabbit eye : identification of drugs
- ii) Routes of drug administration (Rat)
or
- iii) Biochemical pharmacology: Identification of nature of drug. 20 Marks
Interpretation of Graph 10 Marks
Clinical Pharmacology Problems (2) 10 Marks

C.VIVA- VOCE EXAMINATION: 40 Marks.

All the four examiners will examine all the candidates

Distribution of Marks for Viva Voce Examination

- 1. General Pharmacology, CNS, local anaesthetics, Biogenic amines and polypeptides, Gout and rheumatoid arthritis. 10 Marks.
- 2. ANS, Parkinsonism, CVS, Blood and Blood forming organs, Hypolipemic agents, Diuretics. 10 Marks
- 3. Endocrines, GIT, Uterus, Respiratory System. 10 Marks
- 4. Chemotherapy, Antiseptics and Disinfectants, Chelating agents, Vitamins, Immunopharmacology. 10 Marks

RECOMMENDED BOOKS

Theory

- 1. R.S.Satoskar, N N Rege, S.D. Bhandarkar, Pharmacology and Pharmacotherapeutics, 24th Edition (2015), Elsevier India.
- 2. K.D.Tripathi, Essentials of Medical Pharmacology, 7th Edition (2013), M/s Jaypee Medical Publishers Pvt.Ltd.
- 3. Katzung, Basic and Clinical Pharmacology, 13th Edition,(2015) Lange Medical Books, McGrawHill Medical Publishing Division India
- 4. H.P.Rang, J.M.Ritsee,R J Flower,G.Henderson, Rang & Dale's Pharmacology, 8th Ed. (2016)Elsevier India.
- 5. L.L.Brunton, B. Chabher B Knollman,Goodman & Gilman's The Pharmacological Basis of Therapeutics, 12th Edition (2011) McGrawHill Medical.

REFERENCE BOOKS:

Goodman & Gilman, The Pharmacological basis of Therapeutics, 12th Edition (International Edition), Toel G., Hardman Lee E.Limbird.

PRACTICAL

1. R.D.Budhiraja, Manual of Practical Pharmacy, M/s popular Prakashana, Mumbai -34.
2. S.K.Kulkarni, Practical Pharmacology Vallabha Publication/Prakashan.
3. B.P.Jaju, Pharmacology Practical Exercise Book, Jayapee Brothers.
4. Ravinder Rao, Hand Book of Practical Pharmacology. Jayapee Brothers.

SECTION IV

MEDICAL ETHICS

INTRODUCTION

Medical ethics is a systematic effort to work within the ethos of medicine, which has traditionally been service to sick.

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. Doctor and health professionals are confronted with many ethical problems. It is, therefore necessary to be prepared to deal with these problems.

In keeping with its goal to improve quality of education, BLDE University, recommends introduction of medical ethics in the regular teaching of M.B.B.S. course beginning from first year and continuing till internship.

OBJECTIVES

The objectives of teaching medical ethics should be to enable to students develop the ability to:

1. Identify underlying ethical issues and problems in medical practice.
2. Consider the alternatives under the given circumstances, and
3. make decisions based on acceptable moral concepts and also traditions practices.

	Course Content	Department	Hours
1	Introduction to Medical Ethics What is Ethics? What are values and norms Relationship between being ethical and human fulfilment? How to form a value system in one's personal and professional life? Hemmans, Heteronomous Ethics and Autonomous Ethics Freedom and Personal Responsibility	Pathology	2
2	Definition of Medical Ethics	Pathology	2

	<p>Difference between medical ethics and bioethics</p> <p>Major Principles of Medical Ethics</p> <p>Beneficence = fraternity</p> <p>Justice = equality</p> <p>Self determination (autonomy) = liberty</p>		
3	<p>Perspectives of Medical Ethics</p> <p>The Hippocratic oath</p> <p>The Declaration of Helsinki</p> <p>The WHO Declaration of Geneva International code of Medical Ethics (1983)</p> <p>Medical Council of India Code of Ethics</p>	Physiology	2
4	<p>Ethics of the Individual</p> <p>The patient as a person</p> <p>The Right to be respected</p> <p>Truth and Confidentiality</p> <p>The Autonomy of decision</p>	Surgery	2
	<p>The concept of disease, health and healing</p> <p>The Right to health</p> <p>Ethics of Behaviour modification</p> <p>The Physician Patient relationship</p>	Community Medicine	2

	Organ donation		
5	<p>The Ethics of Human life</p> <p>What is human life?</p> <p>Criteria for distinguishing the human and the non-human</p> <p>Reasons for respecting human life</p> <p>The beginning of human life</p> <p>Conception, Contraception</p> <p>Abortion</p> <p>Prenatal sex-determination</p> <p>In vitro Fertilisation (IVF)</p> <p>Artificial Insemination by Husband (AIFI)</p> <p>Artificial insemination by Donor (AID)</p> <p>Surrogate motherhood</p> <p>Semen Intrafallopian Transfer (SIFT)</p> <p>Gamete Intrafallopian Transfer (GIFT)</p> <p>Zygote Intrafallopian Transfer (ZIFT)</p> <p>Genetic Engineering</p>	OBG	6
6	<p>The Family and Society in Medical Ethics</p> <p>The Ethics of human sexuality</p> <p>Family Planning perspectives</p>	Medical Education Department	6

	<p>Prolongation of life</p> <p>Advanced life directives — The Living Will</p> <p>Euthanasia</p> <p>Cancer and Terminal Care</p>		
7	<p>Death and Dying</p> <p>Use of life-support systems</p> <p>Death awareness</p> <p>The moment of death</p> <p>Prolongation of life</p> <p>Ordinary and extraordinary life support</p> <p>Advanced life directives</p> <p>Euthanasia — passive and active</p> <p>Suicide — the ethical outlook</p> <p>The right to die with dignity</p>	Anaesthesia	4
8	<p>Professional Ethics</p> <p>Code of conduct</p> <p>Contract and confidentiality</p> <p>Charging of fees, Fee-splitting</p> <p>Prescription of drugs</p> <p>Over-investigating the patient</p> <p>Low cost drugs, vitamins and tonics</p> <p>Allocation of resources in health care</p>	Surgery	4
9	<p>Research Ethics</p>	Pharmacology	4

	Animal and experimental research Human experimentation Human volunteer research Informed Consent, Drug trails		
10	Ethical work-up of cases Gathering all scientific factors Gathering all human factors Gathering all value factors Identifying areas of value conflict setting of priorities Working out criteria towards decisions	All clinical departments	6
		Total hours	40

TEACHING / LEARNING EXPERIENCE

Classroom teaching would focus on professional relationship, patient-doctor relationship, issues at the beginning and end of life, reproductive technologies, resource allocation and health policy. It will also deal with values, ethical concepts and principles.

Clinical ethics must be taught as part of bedside teaching group discussions, case studies, problem analyzing and problem solving exercises may also be employed.

Demonstrating by example, how to identify and resolve a particular problem

Increasing the awareness and knowledge of students of the value dimensions of interactions with the patients, colleagues, relations and public.

Fostering the development of skills of analysis, decision making and judgment.

Making the students aware of the need to respect the rights of the patient as also duties and responsibilities of the doctor.

Recommended distribution of Teaching hours in different phases of MBBS Course

Total Teaching Hours : 40

Phase I : Preclinical Period – 6 hours

2 hours each by Anatomy, Physiology, Biochemistry during 1 year.

Phase II : Paraclinical Period - 6 hours

2 hours each from Pharmacology, Pathology and Microbiology.

Phase III : Community Medicine – 4 hours

2 hours each from Ophthalmology and ENT – 4 hours.

2 hours each in two terms from Medicine, Surgery, and OBG = 12 hours

8 hours from other clinical departments.

N.B.: The teaching of Medical Jurisprudence by the department of Forensic Medicine will continue as before.

5. EVALUATION

At least one short answer question may be asked on medical ethics appropriate to the subject in all major subjects in the university question paper. A few questions may be asked during viva voce examination.

6. RECOMMENDED READING

1. Francis C. M., Medical Ethics, 2nd Edn, 2004, Jaypee Brothers, New Delhi, Rs. 25/-
2. Ethical Guidelines for Biomedical Research on Human Subjects, Indian Council of Medical Research, New Delhi, 2000.

SECTION - V

ANNEXURE - I

Different Methods Recommended for Internal Assessment by MCI

The Medical Council of India has given some examples of methods for internal assessment of student, which may be followed by the colleges. They are;

Credit for preparation and presentation of seminars by students

1. Preparation of clinical case for presentation.
2. Clinical case study / problems solving exercises.
3. Participation in project for health care in the community
4. Proficiency in conducting a small research project or assignment.
5. Multiple choice questions (MCQ) test after completion of a chapter / system.

Each item shall be objectively assessed and recorded. Some of the items can be assigned as homework/vacation work.

ANNEXURE - II

CATEGORIES OF BIO-MEDICAL WASTE

SCHEDULE-I

(See Rule 5)

**Waste Category No.	Waste Category ** Type	Treatment & Disposal ** Options
Category No. 1	Human Anatomical Waste (human tissues, organs body parts)	Incineration ^o / deep burial*
Category No.2	Animal waste (animal tissues, organs, body parts, carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, colleges discharge from hospitals, animal houses)	Incineratin ^o / deep burial*

Category No.3	Microbiology & biotechnology Waste (wastes from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures.)	Local autoclaving/micro-waving/incineration ^o
Category No.4	Waste sharps (needles, syringes, scalpels, blades, glass etc., that may cause puncture and cuts. This includes both used and unused sharps)	Disinfection (Chemical treatment ^{oo} /auto claving/ micro-waving and mutilation/shredding ^{aa})
Category No.5	Discarded Medicines and Cytotoxic drugs (waste comprising of outdated, contaminated and discarded medicines)	Incineration ^o /destruction and drugs disposal in secured landfills
Category No.6	**Soiled Waste (items contaminated with blood and body fluids including cotton, dressings, soiled plaster casts, liners, beddings, other material contaminated with blood)	Incineration ^o autoclaving/micro-waving
Category No.7	Solid Waste (Waste generated from disposable items other than the waste**sharps such as tubings, catheters, intravenous sets, etc.)	Disinfection by chemical treatment ^{oo} autoclaving/micro-waving and mutilation/shredding ^{aa}
Category No.8	Liquid Waste (waste generated from laboratory and washing, cleaning, housekeeping and disinfecting activities)	Disinfection by chemical treatment ^{oo} and discharge into drains
Category No.9	Incineration Ash (ash from incineration of any bio-medical waste)	Disposal in municipal landfill
Category No.10	Chemical Waste (chemicals used in production of biologicals, chemicals used in disinfectin as insecticides etc.,)	Chemical treatment ^{oo} and discharge into drains for liquieds and secured landfill for solids

** As per Bio-Medical Waste (Management & Handling) (Second Amendment) Rules, 2000, dated 2nd June, 2000.

oo Chemicals treatment using at least 1% hypochlorite solution or any other equivalent chemical reagent. It must be ensured that chemical treatment ensures disinfection.

aa Mutilation/shredding must be such so as to prevent unauthorized reuse.

o There will be no chemical pretreatment before incineration. Chlorinated plastics shall not be incinerated.

* Deep burial shall be an option available only in towns with population less than five lakhs and in rural areas.

COLOUR CODING AND TYPE OF CONTAINER

FOR DISPOSAL OF BIO-MEDICAL WASTES

SCHEDULE – II

(See Rule 5)

Colour Coding	Type of Container	Waste Category	Treatment Options as per Schedule-I
Yellow	Plastic bag	Cat. 1, Cat.2, Cat.3, Cat.6.	Incineration/deep burial
Red	Disinfected container/plastic bag	Cat.3, Cat.6, Cat.7.	Autoclaving/Micro-waving chemical Treatment.
Blue/White Translucent	Plastic bag/puncture proof container	Cat.4, Cat.7.	Auto claving/Micro-waving/Chemical Treatment and destruction/shredding
Black	Plastic Bag	Cat.5, and Cat.9 and Cat.10 (solid)	Disposal in secured landfill

Notes:

1. Colour coding of waste categories with multiple treatment options as defined in Schedule-I shall be selected depending on treatment option chosen, which shall be as specified in Schedule-I
2. Waste collection bags for waste types needing incineration shall not be made of chlorinated plastics.
3. Categories 8 and 10 (liquid) do not require containers/bags.
4. Categories 3 if disinfected locally need not be put in containers/bags.



B L D E UNIVERSITY

Ordinance Governing **MBBS Degree Course**

(REVISED CURRICULUM-2016)

Phase-III

(Part-I & Part-II)

Published by
B L D E University

[Declared as Deemed to be University u/s 3 of UGC act, 1956, vide notification No.F.9-37/2007-U.3 (A)]

The Constituent College

Shri B.M.Patil Medical College, Hospital and Research Centre

Smt.Bangaramma Sajjan Campus, Dr. B.M.Patil Road, (Sholapur Road), Vijayapura-586 103, Karnataka, India

University : Phone:+91 08352-262270, Fax:+91 8352-263306, www.bldeuniversity.ac.in, E-mail :office@bldeuniversity.ac.in

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BLDE UNIVERSITY

[Declared as Deemed-to-be- University u/s 3 of UGC Act, 1956 vide Government of India notification No. F.9-37/2007-U.3(A)]

The Constituent College

SHRI B. M. PATIL MEDICAL COLLEGE, HOSPITAL AND RESEARCH CENTRE

BLDEU/REG/GEN/2016-17/1917

September 09, 2016

NOTIFICATION

Sub: Revised Curriculum for the MBBS Degree-2016.

- Ref: 1. Medical Council of India Regulation on Graduate Medical Education, 1997 and subsequent amendments of the same from time-to-time.
2. Minutes of the meeting of the Standing Committee of Academic Council of the University held on September 7, 2016.

On approval of the Standing Committee of Academic Council the Curriculum for MBBS Degree course is approved.

The revised curriculum shall be effective from the Academic Session 2016-17 onwards, for MBBS degree course in the constituent College of the University viz. Shri B. M. Patil Medical College, Hospital and Research Centre.


REGISTRAR
REGISTRAR
BLDE University, Vijayapura.

To,
The Dean, FoM & Principal
Shri B. M. Patil Medical College,
Hospital and Research Centre,
Vijayapura.

Copy to:

- The Secretary UGC New Delhi.
- Controller of Examinations.
- Prof. & HODs of Pre, Para and Clinical Departments.
- P.S. to Hon'ble President.
- P.S. to Hon'ble Vice-Chancellor.

Smt. Bangaramma Sajjan Campus, Sholapur Road, Vijayapura - 586103, Karnataka, India.

Vision & Mission

- Excellence in all our endeavours.
- Committed to provide globally competitive quality medical education.
- Provide the best health care facilities in this backward region, in particular, to socially disadvantaged sections of the society.
- Constantly striving to become a Reputed research University with world-class infrastructure, latest tech-tools for teaching/research and adopting global best practices.

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DERMATOLOGY, VENEROLOGY AND LEPROSY

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Introduction

The revised M.B.B.S curriculum of The Medical Council of India (MCI) came into effect from May 1997 and it has undergone amendments thereof. The BLDE University has implemented the new regulations for the batches of students admitted to the M.B.B.S course from the academic year 2008-09 and onwards. Later the curriculum was revised in 2012-13. This third revision will be implemented for the batches of students admitted to the M.B.B.S Course from the academic year 2016-17 onwards.

These regulations recommend the following:

1. That every medical college should have curriculum committee which would plan curricula and instructional method which would be updated regularly.
2. That every medical college establishes a medical education unit for faculty development, preparation of learning resource materials and improved evaluation methods.
3. That every medical institution should evolve institutional objectives, which would be in consonance with the national goals (See Section II) and health policy. The institutional objectives should describe the attributes of their product.
4. That the medical curriculum should be oriented towards educating students to take up the responsibilities of physicians of first contact. The medical graduate should be capable of functioning independently in both urban and rural environment of our country and internationally.
5. That educational experience should emphasise health rather than only disease, and community orientation also instead of only hospital orientation. Population control, national health programs and family planning should also be given due emphasis. The thrust should be on common diseases rather than rare disorders.
6. Every effort should be made to provide educational experience that allows hands-on-experience both in hospital as well as in community setting. For this purpose, a comprehensive list of clinical skills that a graduate must acquire at the end of the course including internship has been prepared.
7. That there should be Shift in the role of medical teachers from mere imparting knowledge to that of a facilitator and motivator of student learning.
8. That every effort should be made to use learner oriented methods which would encourage cultivation of logical thinking, clarity of expression, independence of judgment, scientific habits, problem solving abilities, and self-directed learning.
9. Integration of ICT in teaching learning process is required and should be implemented.
10. Reduction of “didactic lectures (not more than 1/3 of total teaching hours) and increasing use of active methods of learning such as group discussion seminars, role play, field visits, demonstrations, peer interactions etc. which would enable students to develop personality, communication skills and other qualities which are necessary

11. That maximum effort should be made to encourage integrated teaching and every attempt be made to de-emphasise compartmentalization of disciplines so as to achieve horizontal and vertical integration in different phases. This can be planned by encouraging integrated teaching between traditional subject areas using a problem based learning approach starting with clinical or community cases and exploring the relevance of various preclinical disciplines in both understanding and resolution of the problem.
12. Areas which need to be addressed with due importance are:
 - a. Maternal and child health
 - b. Sanitation and water supply
 - c. Immunization and revised guidelines
 - d. Health education
 - e. IHPS standard of health at various levels
 - f. Biomedical waste disposal
 - g. Orientation to Organizational and Institutional arrangements in health care delivery
 - h. Training in documentation skills and research
 - i. History of modern medicine
 - j. Awareness regarding ethical issues and problems, analysis and competency in dealing in an acceptable manner [Medical ethics teaching should be planned at all levels with dedicated time allotment. It should be taught in all phases with appropriate clinical relevance].
13. That every effort should be made to use learner oriented methods which would encourage cultivation of logical thinking, clarity of expression, independence of judgment, scientific habits, problem solving abilities, and self-directed learning.
14. Regular periodic assessment to be done throughout the course for internal assessment. The assessment need not be limited to written tests. It should relate to other items such as maintenance of records, participation in seminars and group discussions, clinical case study, proficiency in carrying out practical or clinical skill or participation in projects and assignments (even) during vacation. These be evaluated objectively and recorded.
15. Examinations be designed with a view to assess not merely the knowledge but also practical and clinical skills, habits and values which are necessary for a graduate to carry out professional day to day work competently

BLDE University endorses these recommendations and strongly desires to implement them while conducting the MBBS course.

SECTION - I

Objectives of Medical Education

(As stated in MCI Regulations, 1997 amended up to Feb 2012)

This section contains the goals and general objectives of graduate medical education as stated in MCI Regulations, It is desired that in consonance with these national goals, each medical college should evolve institutional objectives.

I. NATIONAL GOALS:

At the end of undergraduate programme, the medical student should be able to:

1. Recognize 'health for all' as a national goal and health right of all citizens and by undergoing training for medical profession fulfill his/her social obligations towards realization of this goal;
2. Learn every aspect of National policies on health and devote himself/herself to its practical implementation;
3. Achieve competence in practice of holistic medicine, encompassing promotive, preventive, curative and rehabilitative aspects of common diseases.
4. Develop scientific temper, acquire educational experience for proficiency in profession and promote healthy living.
5. Become exemplary citizen by observation of medical ethics and fulfilling social and professional obligations, so as to respond to national aspirations.

II. INSTITUTIONAL GOALS

The undergraduate students coming out of a medical institution should:

1. Be competent in diagnosis and management of common health problems of individual and the community, commensurate with his/her position as a member of the health team at the primary, secondary or tertiary levels, using his/her clinical skills based on history, physical examination and relevant investigations;
2. Be competent to practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems;
3. Appreciate for different therapeutic modalities, be familiar with the administrations of the "essential drugs" and their common side effects;
4. Be able to appreciate the social-psychological, cultural, economic and environmental factors affecting health and develop humane attitude towards the discharging one's professional responsibilities.
5. Possess the attitude for continued self learning and to seek further expertise or to pursue research in any chosen area of medicine, action research and documentation skills.
6. Be familiar with the basic factors which are essential for the implementation of the National Health Programs including practical aspects of the following:-

- i. Family Welfare and Maternal and Child Health (MCH)
 - ii. Sanitation and water supply,
 - iii. Prevention and control of communicable and non-communicable diseases,
 - iv. Immunization,
 - v. Health Education;
 - vi. IPHS standard of health at various levels of service delivery and medical waste disposal.
 - vii. Organizational institutional arrangements
 - viii. Basic management skills in managing various aspects of health care delivery, inventory skills
7. Acquire basic management skill in the area of human resources, materials and resource management related to health care delivery, general and hospital management, principal inventory skills and counseling.
 8. Be able to identify community health problems and learn to work to resolve these by designing, instituting corrective steps and evaluating outcome of such measures.
 9. Be able to work as a leading partner in health care teams and acquire proficiency in communication skills & work in a variety of health care settings.
 10. Be competent to work in a variety of health care settings.
 11. Have personal characteristics and attitude required for professional life such as personal integrity, sense of responsibility and dependability and ability to relate to or show concern for other individuals.
 12. All efforts must be made to equip the medical graduate to acquire the detailed skills as mentioned in the Appendix B of Medical Council of India Regulations on Medical Education, 1997.

[Source: GME Regulations amended up to February 2012]

SECTION - II

REGULATIONS GOVERNING M.B.B.S. DEGREE COURSE

(Eligibility for Admission, Duration, Attendance and Scheme of Examination as per the norms laid down in the Regulations on Graduate Medical Education of Medical Council of India and the amendments thereof (till July 2016); admission to UG course - MBBS)

1. ELIGIBILITY

1.1 **Qualifying Examination**

Student seeking admission to first MBBS course:

- i) shall have passed two year Pre University examination conducted by Department of Pre University Education, Karnataka State, with English as one of the subjects and Physics, Chemistry and Biology as optional subjects. The candidate shall have passed subjects of English, Physics, Chemistry and Biology individually.

OR

- ii) shall have passed any other examination conducted by Boards / Councils / Intermediate examination established by State Governments / Central Government and recognized as equivalent to two year Pre University examination by the BLDE University / Association of Indian Universities (AIU), with English as one of the subjects and Physics, Chemistry and Biology as optional subjects and the candidate shall have passed subjects of English, Physics, Chemistry and Biology individually.

OR

- iii) shall have passed Intermediate examination in Science of an Indian University / Board / council or other recognized examining bodies with Physics, Chemistry and Biology, which shall include a practical test in these subjects and also English as compulsory subject. The candidate shall have passed subjects of English, Physics, Chemistry and Biology individually.

OR

- iv) shall have passed first year of the three year degree course of a recognized University with Physics, Chemistry and Biology including a practical test in these subjects provided the examination is an 'University Examination' provided that the candidate shall have passed subjects of English, Physics, Chemistry and Biology individually in the Pre University or other examinations mentioned in the clauses above.

OR

- v) shall have passed B.Sc. Examination of an Indian University, provided that he/she has passed the B.Sc. examination with not less than two of the following subjects: Physics, Chemistry, Biology (Botany, Zoology) provided that candidate has passed subjects of English, Physics, Chemistry and Biology individually in the qualifying examinations mentioned in clauses (i) (ii) and (iii).

Note: Candidates who have passed “Physical Science” instead of Physics and Chemistry as two separate subjects are not eligible for admission to MBBS course as per Medical Council of India Regulations vide letter MCI-37(2)/2001/Med.922 dated 14.02.2001

1.2 Marks

The selection of students shall be based on merit provided that:

- a) In case of admission on the basis of qualifying examination, a candidate for admission to MBBS course must have passed individually in the subjects of Physics, Chemistry, Biology and English and must have obtained not less than 50% marks for general category, 40% for SC, ST and OBC students taken together in Physics, Chemistry and Biology in the qualifying examination.
The minimum marks shall not be less than 45% taken together in Physics, Chemistry and Biology for physically handicapped candidates with lower limb locomotor disability of 40 to 70%.
- b) The student shall appear for All India National Eligibility cum Entrance Test [NEET] and must qualify securing valid rank.

1.3 Age: The candidate should have completed 17 years of age on or before 31st day of December of the year of admission.

DURATION OF THE COURSE

- i) Every student shall undergo a period of certified study extending over 4^{1/2} Academic years from the date of commencement of this study for the subject comprising the medical curriculum to the date of completion of the examination followed by one year compulsory rotating Internship.

The 4^{1/2} years course has been divided into three Phases.

1. **Phase – I** – 1 year, consisting of two terms of 6 months each.
 2. **Phase – II** - 1^{1/2} years, consisting of three terms of 6 months each
 3. **Phase – III** - 2 years, consisting of 4 terms of 6 months each.
- ii) The first year shall be occupied in the study of the Phase - I (Pre Clinical) subject of Human Anatomy (650 hours), Physiology including Bio Physics (480 hours), Bio

Chemistry (240 hours) and Introduction to Community Medicine (60 hours). A detailed syllabus is given in later Section.

- iii) After passing pre-clinical subjects in Phase – I, the Phase – II shall be 3 terms (1^{1/2} years), devoted to Para clinical and Clinical subjects. Para Clinical subjects shall consist of Pathology, Pharmacology, Microbiology, Forensic Medicine including Toxicology and part of Community Medicine. During this phase the clinical subjects shall be taught concurrently. The clinical subjects taught will be Medicine and its allied specialties, Surgery and its allied specialties and Obstetrics and Gynecology.
- iv) Phase – III Part-I consists of Community Medicine, ENT and Ophthalmology.
- v) Phase – III Part-II consists of Medicine& allied specialties, Pediatrics, Surgery and allied specialties, Obstetrics and Gynecology.

ACADEMIC TERMS

All candidates admitted beyond the last date stipulated by the University shall have to appear for I Professional Examination to be held subsequent to the regular examination after completion of the prescribed duration.

ATTENDANCE

Every candidate should have attendance not less than 75 % of the total classes conducted in theory, practical and clinical jointly in each calendar year calculated from the date of commencement of the term to the last working day as notified by the University in each of the subjects prescribed to be eligible to appear for the University Examination. (vide Medical Council of India Notification on Graduate Medical Education (Amendment) Regulations 2003, published in the Gazette of India Part III, Section 4, Extraordinary issued on 15th October 2003)

The Principal should notify at the college the attendance details at the end of the each term without fail under intimation to this University.

The candidate lacking in the prescribed attendance and progress in any subject(s) in theory or practical/clinical in the first appearance should not be permitted to appear for the examination in that subject(s).

Teaching Hours and Hospital Postings

Number of teaching hours allotted for various subjects are as under:

Table 1:- Theory Lectures, Demonstrations and Seminars etc.

<u>SUBJECTS</u>	<u>HOURS</u>
General Medicine -	300 hours
Pediatrics	100 hours
Tuberculosis and Chest diseases	20 hours
Psychiatry	20 hours
Skin & STD	30 hours
Community Medicine	50 hours
Anaesthesia	20 hours
General Surgery	300 hours
Orthopedics	100 hours
Ophthalmology	100 hours
Oto-Rhino-Laryngology	70 hours
Radiology (includes Radio-diagnosis & Imaging and Radiotherapy)	20 hours
Dentistry	10 hours
Obstetrics & Gynaecology - 300	300 hours

Clinical Course: Hospital Postings.

During third to ninth terms, clinical postings of three hours duration daily as specified in Table 2 is suggested for various departments, after introductory course in Clinical Methods in Medicine and Surgery of two weeks each for the whole class at the start of 3rd term.

Table 2: Hospital Postings

SUBJECT	WEEKS							TOTAL
	3 rd	4 th	5th	6th	7th	8th	9th	
Terms								
Gen. Medicine (a)	6	-	4	-	4	6	6	26
Paediatrics	-	2	-	2	2	4	-	10
TB & Chest Diseases	-	2	-	-	-	-	-	02
SKIN & STD	-	2	-	2	-	2	-	06
Psychiatry	-	-	2	-	-	-	-	02

Radiology (b)	-	-	-		2	-	-	02
Gen. Surgery (c)	6	-	4	-	4	6	6	26
Orthopedics (d)	-	-	4	4	-	-	2	10
Ophthalmology	-	-	4	4	2	-	-	10
Otorhinolaryngology	-	-	-	4	4	-	-	08
OBGY including FWP(e)	2	4	4	-	4	4	6	24
Community. Medicine	4	4	-	4	-	-	-	12
Casualty	-	-	-	2	-	-	-	02
Dentistry	-	-	-	-	2	-	-	02
Total	18	22	18	22	20	22	20	142

- a) This posting includes exposure to laboratory medicine and infectious diseases.
- b) This posting includes training in Radio-diagnosis and Radiotherapy where existent.
- c) This posting includes exposure to dressing and Anesthesia.
- d) This posting includes exposure to Rehabilitation and Physiotherapy.
- e) This includes maternity training and the 3d semester posting shall be in Family Welfare Planning.

Scheme of Examination

Internal Assessment

It shall be based on evaluation of assignment, presentation of seminar, clinical a Clinical presentation etc., (see Annex — I for examples).

Regular periodic examinations should be conducted throughout the course. Although the question of number of examinations left to the institution, there should be a minimum of at least three (3) sessional examinations during the course. One of these tests can be in the form of MCQS. One of the practical/clinical examination can be in the form of OSPE/OSCE. Average of best two examination marks should be taken into consideration while calculating the marks of the internal assessment. Day-to-day records should be given importance in the internal assessment.

Proper record of the work should be maintained, which will be the basis of internal assessment of all students and should be available for scrutiny.

Weightage for internal assessment shall be 20% of total marks in the subject.

A student must secure at least 35% of total marks fixed for internal assessment in a particular subject in order to be eligible to appear in the University Examination of that subject. (*Vide Medical Council of India Notification on Graduate Medical Education (Amendment.) Regulations 2003, published in the Gazette of India Part III, Section 4. Extraordinary issued on 15th October 2003.*)

Assistant Professor and above or Lecturer with five years of teaching experience can conduct internal assessment examination.

Theory

Minimum of three examinations is recommended. The examination preceding the University examination may be similar to the University examination. The marks allotted for internal assessment for different subjects is shown in Table 3 and 4. Average marks of best of two notified internal examinations should be reduced to the marks allotted for internal assessment for each subject and should be sent to the University.

Practical/Clinical

A minimum of one clinical test may be conducted at the end of each ward postings in all the clinical subjects. At least two ward leaving tests in Ophthalmology and Otorhinolaryngology and three ward leaving tests in Medicine, Surgery and Obstetrics and Gynecology are recommended. Average of best two examination marks should be taken into consideration while calculating the marks of the internal assessment.

Assistant Professor and above or Lecturer with five years of teaching experience can conduct internal assessment examination. The internal assessment marks of both theory and practical obtained by the candidates should be sent to the University at least fifteen days prior to the commencement of theory examination.

University Examination - Subjects and Marks

Third Professional examination - Part I: Seventh term: Ophthalmology, Otorhinolaryngology and Community Medicine.

Third Professional examination - Part 11: (Final Professional) 9th term: Medicine. Surgery, Obstetrics & Gynecology and Paediatrics.

The distribution of marks for theory and practical / clinical examination for various subjects of Phase III, Part — I and Part II are shown in Tables - 3 and 4.

Eligibility to appear in Phase III Examination

- a) A student who fails in the II professional examination shall not be allowed to appear in III professional part I examination unless he/she passes all subjects of II professional examination.
- b) Passing in III Professional - Part I examination is not compulsory before entering for 8th and 9th term training, however passing of III Professional - Part I examination is compulsory for being eligible for appearing III Professional Part II examination.

Criteria for Pass

For declaration of pass at the University examination, a candidate shall pass both in Theory and Practical/Clinical Examinations separately in the same examination, and as stipulated below:

A candidate must obtain 50% marks in aggregate with a minimum of 50% marks in Theory including viva-voce and minimum of 50% marks in Practical / Clinical, in each of the subjects.

A student has to secure marks as follows to pass in a subject:

- i) 35% in internal assessment (for eligibility to appear for University examination)*
- ii) 50% of the total marks for Theory with Orals (only externals)*
- iii) 50% of the marks of Practical / Clinical (only externals)*
- iv) 50% of the aggregate (total of externals and internals)*

A candidate not securing 50% marks in aggregate in Theory or Practical/Clinical examination in a subject shall be declared to have failed in that subject and is required to appear for both theory and Practical/Clinical again in the subsequent examination in that subject.

11. DECLARATION OF CLASS:

- a) A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 75% of marks or more of grand total marks prescribed will be declared to have passed the examination with Distinction.
- b) A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 65% of marks or more but less than 75% of grand total marks prescribed will be declared to have passed the examination in First Class.
- c) A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 50% of marks or more but less than 65% of grand total marks prescribed will be declared to have passed the examination in Second Class.

- d) A candidate passing the 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.

[Please note fraction of marks should not be rounded off for clauses (a), (b) and (c)]

12. MIGRATION

- a) Migration from one medical college another is not a right of a student. However, migration of students from one medical college to another medical college in India may be considered by Medical Council of India, only in exceptional cases on extreme compassionate grounds, provided following criteria are fulfilled. Routine migrations on other grounds shall not be allowed.
- b) Both the colleges, i.e., one at which the student is studying at present and one to which migration is sought, should have been recognized by the Medical Council of India.
- c) The applicant candidate should have passed first professional MBBS examination.
- d) The applicant candidate should submit his/her application for migration complete in all respects, to all authorities concerned within a period of one month of passing (declaration of results) the first professional Bachelor of Medicine and Bachelor of Surgery (MBBS) examination.
- e) The applicant candidate must submit an affidavit stating that he/she will pursue 18 months of prescribed study before appearing for II professional MBBS examination at the transferee medical college, which should be duly certified by the Registrar of the concerned University in which he/she is seeking transfer. The transfer will be applicable only after receipt of the affidavit.

NOTE I:

- i) Migration during clinical course of study shall not be allowed on any ground.
- ii) All applications for migration shall be referred to Medical Council of India by college authorities. No Institution/University shall allow migration directly without the approval of the Council.
- iii) Council reserves the right, not to entertain any application which is not under the prescribed compassionate grounds and also to take independent decision where applicant has been allowed to migrate without referring the same to the Council.

NOTE II: * Compassionate grounds criteria:

- i) Death of a supporting parent or guardian
- ii) Illness of the candidate causing disability
- iii) Disturbed conditions as declared by Government in the Medical College area.

13. ELIGIBILITY TO JOIN PHASE II OF THE COURSE

Only candidates who pass in all the Phase I (Pre Clinical) subjects shall be eligible to join the Phase II of the course.

Section III

Course contents for MBBS Phase III (Part 1 and Part 2)

OPHTHALMOLOGY

Goal:

The broad goal of the teaching of students in Ophthalmology is to provide such knowledge and skills to the student that shall enable him/her to practice as a clinical and as a primary eye care physician and also to function effectively as a community health leader to assist in the implementation of National programme for the prevention of blindness and rehabilitation of the visually impaired.

Objectives

Knowledge

- a. At the end of the course the student have knowledge of
 1. Common problems affecting the eye
 2. Principles of management of major ophthalmic emergencies
 3. Main systemic diseases of affecting the eye
 4. Effects of local and systemic diseases on patients vision and the necessary action required to minimize the squealed of such diseases.
 5. Adverse drug reactions with special reference to Ophthalmic manifestations
 6. Magnitude of blindness in India and its main causes
 7. National programme for control of blindness and its implementation at various levels
 8. Eye care education for prevention of eye problems
 9. Role of primary health centre in organization of eye camps
 10. Organization of primary health care and the functioning of the Ophthalmic assistant.
 11. Integration of the nation programme for control of blindness with the other national health programmes.
 12. Eye Bank Organization

- b. Skills at the end of the course students shall be able to perform are:
 1. Elicit history pertinent to general health and ocular status.
 2. Assist in diagnostic procedure such as visual acuity testing, examination of eye, Schiottz tonometry, staining for corneal pathology confrontation Perimetry, subjective refraction including correction of presbyopia and aphakia, direct ophthalmoscopy and conjunctival smear examination and cover test.
 3. Diagnose and treat common problems affecting the eye.
 4. Interpret ophthalmic signs in relation to common systemic disorders

5. Assist / observe therapeutic procedures such as sub conjunctival injection, corneal conjunctival foreign body removal, carbolic cautery for corneal ulcers, nasolacrimal test syringing and tarsorrhaphy
6. Provide first aid in major ophthalmic emergency
7. Assist to organize community surveys for visual check up.
8. Assist to organize primary eye care service through primary health centres.
9. Use effective means of communication with public and individuals to motivate for surgery in cataract and for eye donation
10. Establish rapport with his seniors colleagues and para medical workers so as to effectively function as member of the eye care team.

c. Integration the under graduate training in ophthalmology will provide an integrated approach toward disciplines' especially neurosciences. Otorhino-laryngology. General surgery and General Medicine.

Examination skills

Sl. No.	Skills	Able to perform independently	Able to perform under guidance	Assist	Observe
1	Visual acuity test and use of pinhole(including light projection)	✓			
2	Color vision test	✓			
3	Visual field by confrontation	✓			
4	Harschberg rest to detect obvious squint	✓			
5	Examination of ocular movements	✓			
6	Assessment of corneal sensation	✓			
7	Flourescein staining to identify corneal abrasion		✓		
8	Assessment of anterior chamber depth	✓			
9	Papillary size and reaction	✓			
10	Distant direct ophthalmoscopy pupils to diagnose lens opacities		✓		
11	Method of direct ophthalmoscopy		✓		
12	Schiotz's tonometry	✓			

13	Regurgitation for NLD block.				✓
14	Syringing				✓
15	Instillation / ointment	✓			
16	Irrigation of conjunctiva	✓			
17	Applying an eye patching	✓			
18	Epilation of cilia	✓			
19	Eversion of upper eye lid	✓			
20	Use of lid retractors to examine the eye of child			✓	
21	Digital tonometry	✓			
22	Removal of foreign body				✓
23	Entropion surgery				✓
24	Cataract surgery				✓
25	Glaucoma surgery				✓
26	Keratoplasty				✓
27	Chalazion/ styne				✓
28	Tarsorrhaphy				✓
29	Phoria/tropia / BSV, preliminary knowledge of cranial nerves II,III,IV,VI	✓			
30	Assessment of opacity in the media		✓		

Course Contents:

Theory

I. Introduction

II. Basic Sciences

1. Anatomy:
 - Development of the eye.
 - Coats of the eye
 - Blood supply, Nerve supply of the eye
 - Pupillary pathways, Visual pathways
 - Extra – Ocular muscles. Ocular motor nerves

2. Physiology: Physiology of vision.
Tear film
Aqueous humor formation.
3. Pharmacology: Ophthalmic preparation and routes of administration.
Antibiotics, Antivirals and Anti- Fungal drugs.
Cycloplegics, antiglaucoma drugs.Anti-VEGF, Anti-metabolite:
Mitomycin-C, 5 Fluorouracil, cyclosporine-A.
4. Pathology: Histopathology of Retinoblastoma, Malignant
melanoma. squamous cell carcinoma etc.
5. Elementary Optics: Reflection, refraction, Optical system of Normal
eye, Reduced eye, Strum's conoid, Estimation of
Refraction.

III. DISEASE OF THE EYE

1. CONJUNCTIVA

Must Know

Acute infective conjunctivitis: Bacterial conjunctivitis- purulent conjunctivitis,

Ophthalmia neonatorum: Membranous conjunctivitis

Chlamydial conjunctivitis- Trachoma.

Viral conjunctivitis.

Allergic conjunctivitis: Simple, Phlyctenular, Conjunctival Degenerations:

Pterygium, pinguecula, Concretions.

Desirable to Know

Chronic conjunctivitis, Inclusion conjunctivitis,

Mucocutaneous diseases affecting conjunctiva.

Nice to Know

Pseudomembranous conjunctivitis, Conjunctival tumours.

2. CORNEA

Must Know

Corneal ulcer: Etiology, clinical features, complications and treatment of bacterial,

Viral and fungal corneal ulcers.

Vitamin A deficiency and keratomalacia.

Exposure Keratitis,

Neuroparalytic keratitis,

Interstitial keratitis: Aetiology, Clinical features and treatment.

Basics of Eye donation and Keratoplasty.

Desirable to Know

Other forms of deep keratitis, Keratoconus, Kerato - refractive surgery.

Nice to Know

Degenerations and dystrophies of cornea.

3. SCLERA

Must Know

Clinical features and differential diagnosis, investigations and treatment of Episcleritis and Scleritis.

Desirable to Know

Scleromalacia perforans, Blue sclera.

Nice to Know

Staphyloma & its classification.

4. UVEAL TRACT

Must Know

Classifications of Uveitis

Acute anterior uveitis - Aetiology, clinical features, complications differential

Diagnosis and management.

Purulent uveitis: Endophthalmitis, Pan Ophthalmitis.

Desirable to Know

Association of systemic disease in uveitis, Chronic uveitis, cyclitis, Posterior uveitis

Nice to Know

Degenerative changes in the tract, Congenital anomalies- coloboma of Iris and Choroid.

5. LENS

Must Know

Classification of cataract

Senile cataract: Aetiology, clinical features and evaluation. Differential diagnosis from open angle glaucoma. Surgical management of cataract, and complications of cataract surgery.

Aphakic corrections Intra – ocular lens implantation, Congenital cataract –types.

Awareness of Amblyopia, assessment and early reference.

Degeneration and opacities

Desirable to Know

Other forms of cataract – complicated, Traumatic, Metabolic, Toxic and after cataract.

Recent advances in cataract surgery - phacoemulsification

Nice to Know

New IOLs, Phakonit, LASER cataract surgery.

6. VITREOUS

Vitreous detachment, Asteroid hyalosis, Synchrony scintillans,

Vitreous haemorrhage – causes and treatment.

Nice o Know

Vitrectomy and its indication.

7. GLAUCOMA

Must Know

Classification

Angle closure glaucoma : Risk factors, mechanism' clinical features and management

Open angle glaucoma : Risk factors, cardinal signs, medical and surgical treatment.
Differential diagnosis from cataract.

Congenital glaucoma : Clinical features and management .

Desirable to Know

Secondary glaucomas – Lens induced, Inflammatory, Neovascular, Traumatic, Intraocular tumours, steroid induced.

Nice to Know

Goniotomy, Trabeculectomy, Filtering surgeries, Glaucoma drainage devices.

8. RETINA

Must Know

Fundus changes in; Diabetes mellitus, Hypertension, Toxemia of pregnancy, Renal diseases, Haematological diseases, AIDS, Myopia.

Diabetic Retinopathy: Risk factors, assessment and treatment, role of Laser Photo-coagulation.

Retinal vascular diseases: CRAO, CRVO, Eale's disease.

Retinal detachment: Risk factors, clinical features, treatment.

Desirable to Know

Retinal degeneration: Retinitis pigmentosa, Familial lipid degenerations

Retinal infections: Toxoplasma, Toxocara, CMV.

Nice to Know

CSR, ARMD, Phacomatosis.

9. OPTIC NERVE

Must Know

Papilloedema: Aetiology and fundus picture differential diagnosis from papillitis

Papillitis: Aetiology and fundus picture, Retrobulbar neuritis Optic atrophy – primary, secondary, Vascular, Glaucomatous.

Desirable to Know

Toxic amblyopia, optic nerve coloboma.

Nice to Know

Hereditary Optic atrophy.

10. INTRA – OCULAR TUMOURS

Retinoblastoma- Classification and Histopathology, Clinical features and treatment, differential diagnosis of leucocoria

Malignant melanoma – Classification and Histopathology , Clinical features and treatment.

11. SQUINT

Classification

Differentiation of paralytic and non-paralytic squint, types, aetiology, assessment and principles of management of concomitant squint.

Awareness of Amblyopia, assessment & early reference.

Nice to Know

Paralytic squint.

12. ORBIT

Causes of Epiphora

Aetiology, clinical features and treatment of Orbital cellulitis and cavernous sinus

Thrombosis Common tumours of the orbit.

13. LACRIMAL SYSTEM

Causes of Epiphora

Aetiology, clinical features, complications and Management of congenital and acquired acute and chronic Dacryocystitis

Dry Eye – Diagnosis and management

14. LIDS

Inflammations – Blepharitis, Hordeolum

Anomalies in the position – Trichiasis, entropion, Ectropion, Symblepharon, Ankyloblepharon, Lagophthalmos, ptosis, Tumours of the lids.

15. REFRACTIVE ERRORS

Must Know

Types, Clinical presentation & optical correction of Myopia, Hypermetropia, Astigmatism, Ankyloblepharon, presbyopia, Aphakia.

Desirable to Know

Anisometropia, Anisokonia, Anomalies of Accommodation & Convergence.

Nice to Know

LASIK, PRK

16. INJURIES

Must Know

Perforating injuries: Mechanical effects, immediate and late complications including Sympathetic ophthalmitis and Endophthalmitis. Immediate management and referral
Contusion Injuries: Mechanical effects, delayed complications and referral, chemical Burns, Immediate first aid, assessment and referral.

Desirable to Know

Other forms of injuries, industrial, retained intraocular foreign body.
Medico Legal Aspects of Injuries.

17. OPHTHALMIC SURGERY

Cataract surgery

Glaucoma operations.

Chalazion surgery, Pterygium surgeries, Entropion correction, ectropion correction.

Enucleation, Evisceration, Excenteration, Dacryocystectomy, Dacryocystorhinostomy

18. COMMUNITY OPHTHALMOLOGY

Definition, types and causes of blindness.

Objective of NPCB and Trachoma control project.

Organisation of ophthalmic screening camps.

19. MISCELLANEOUS

Symptomatic disturbance of vision.

Hemianopia, Amblyopia, Amaurosis, Night blindness, colour blindness, word-blindness, Malingering.

Ocular emergencies- trauma, chemical burns, acute congestive glaucoma, endophthalmitis, sudden loss of vision. Investigative Ophthalmology – Ophthalmic Ultrasound, computerized visual field testing, ERG, VEP, CT Scan.

Adverse Drug Reactions

CLINICAL TEACHING DURING POSTING

Clinical posting in batches during 5th, 6th and 7th SEMESTER – 60 sessions of 3 hrs each.

5th term - 4 weeks

6th term - 4 weeks

7th term - 2 weeks

Theory Lectures 32 hrs, Tutorial 48 hrs, Seminar 10 hrs and Integrated teaching 10 hrs, total 100 hrs.

INNOVATIVE TEACHING:

6th /7th term students are posted for eye camp once/twice during their postings. Slow learners are taken special classes, Seminar (Symposium), integrated teaching, field visit demonstration will be conducted.

SCHEME OF EXAMINATION

INTERNAL ASSESSMENT

Theory : 30 marks

There shall be at least two theory examination. The marks obtained should be reduced to 30 and sent to the university. One MCQ test will be conducted as the evaluation test. Minimum 35% Internal Assessment marks are necessary to be eligible to appear for university exam. However there is no weightage of internal assessment marks for passing theory paper. Candidate has to score minimum 50% in theory including viva voce.

Practical: 15 marks

Journal/Procedure/skills/Log book: 5 marks

Clinical examination shall be held at the end of each clinical posting. One of the clinical examination shall be OSCE. The marks obtained for clinical examination shall be reduced to 20 and sent to the university. Candidate has to score minimum 35% to be eligible to appear for university examination. Candidate has to score minimum 50% in practical and 50% in theory independently to pass the examination.

University Examination

i. Written Paper

Theory One paper: Duration - 3 hours. Maximum marks - 100

Theory type of questions distribution of marks shall be:

Q. No. I – Long essay questions	2 x 20 marks	= 20
Q. No. II - Short Essay questions	10 x 5 marks	= 50
Q. No. III- Short answer type of questions	10 x 3 marks	= 30
		Total	100

ii. Clinical Examination

Clinical Examination of 2 cases 80 marks

iii. Viva – Voce 20 marks

<u>Instruments</u>	<u>Optics & refraction</u>	<u>Drugs</u>	<u>Genral/Community ophthalmology</u>
<u>5 marks</u>	<u>5 marks</u>	<u>5 marks</u>	<u>5 marks</u>

Total: 100 marks

Teaching schedule and hours allotted

Sl. No	Topics	Lectures (32x1 hr)	Tutorials (24x2hrs)	Seminars (5x2hrs)	Integrated teaching* (10 hrs)	
1	Basic science	2 hrs	3hrs			
2	Disease of Conjunctive	2hrs	3 hrs			
3	Disease of Cornea & Sclera	2hrs	6hrs			
4	Disease of Uvea	2hrs	6hrs			
5	Disease of Lens	2hrs	6hrs			
6	Glaucoma	2hrs	6hrs			
7	Disease of Retina & Vitreous	2hrs	3hrs			
8	Disease of Optic Nerve	1hr	3hrs			
9	Squint & Neuro-Ophthalmology	2hrs	3hrs			
10	Disease of Orbit	1hr	3hrs			
11	Disease of Eye Lids	1hr	3hrs			
12	Disease of Lacrimal Apparatus	1hr	3hrs			
13	Refractive Errors and Presbyopia	2 hrs	3hrs			
14	Ocular Injuries	2hrs	3hrs			
15	Community Ophthalmology	2hrs	3hrs			
16	<u>Miscellaneous</u> a) <u>Ocular neoplasms.</u> b) <u>Ocular emergencies</u> c) <u>Ocular Pharmacology & Adverse Drug Reaction</u> d) <u>Ocular surgeries</u> e) <u>Recent Advances.</u> f) <u>Systemic diseases (T.B., Syphilis, Leprosy)</u> g) <u>D/D of red eye</u>	<u>6 hrs</u>	3 hrs			
	Total	32hrs	48hrs	10hrs	10 hrs	

*Integrated teaching

Horizontal (collaborating departments)	Vertical (collaborating departments)
ENT : Orbital cellulitis, proptosis	Biochemistry : Vitamin A, Metabolism of lens
Community Medicine : Blindness, Trachoma	General Medicine : Diabetes mellitus & Eye, Hypertension & Eye
	Pediatric : Retinopathy of prematurity, Pediatric strabismus

TEXT BOOKS OF OPHTHALMOLOGY

1. Parsons Disease of the eye, 22nd Ed 2015 Revised by Dr. Ramanji Sihoti and Radhika Tandon, Published by Butterworth – Heinemann, Elsevier.
2. Comprehensive Ophthalmology by A K Khurana, 6thEd 2015 published by Jaypee Brothers Medical Publishers
3. Clinical ophthalmology A systemic approach by Kanski, 8th Ed 2016 Published by Elsevier.
4. Text book of Ophthalmology by NEMA 6th edition.

OTORHINOLARYNGOLOGY & HEAD & NECK SURGERY

Goals

The goal of training in this subject is to make the candidate familiar with common problems. He should be competent enough to diagnose and treat routine problems. He should be in a position to identify the cases, which require specialist care and identify the deaf individuals at the earliest and refer them for proper rehabilitation.

Objectives

At the end of the course, the student should:

1. know the common problems related to the subject of ENT
2. Be competent to evaluate the symptoms, analyze the findings, diagnose the malady and suggest and implement the treatment modalities to treat the common ENT conditions.
3. perform emergency life saving procedures commonly seen in ENT practice
4. Be aware of the Program on prevention of deafness and have knowledge of methods for screening for early detection of hearing loss.
5. have the attitude, communicative skills, adapt to changing trends in education, learning methods and evolve new diagnostic and therapeutic techniques in the subject of ENT
6. Know the rational use of pharmaco-therapeutic agents used in treating ENT diseases and have the knowledge of the common side effects and interactions of commonly used drugs.

Knowledge

1. Describe surgical anatomy and physiology of the Ear, Nose and Throat and Head and Neck
2. Describe basic pathophysiology of common ear, nose and throat diseases and emergencies.
3. Suggest common investigative procedures and their interpretation.
4. Describe common infective conditions of ENT and treat them.
5. Identify congenital deafness as early as possible.

Skills

1. Examine and diagnose common problems of Ear, Nose and Throat region and manage at first aid level of care.
2. Recognize premalignant and malignant cases of head and neck region at an early stage.
3. Remove foreign bodies in the ear and nose.
4. Perform life saving procedures like tracheostomy.
5. Should be familiar with drainage of intraoral and neck abscesses.
6. Able to do anterior and posterior nasal packing to control epistaxis.

Integration

NEUROSURGERY- Knowledge of intracranial complications caused by diseases of ENT region, meningitis, intracranial abscesses, cavernous sinus thrombosis.

OPHTHALMOLOGY- Knowledge of orbital complications of sinonasal disease.

General Surgery- General principles of surgical treatment like wound healing, acid base balance, blood transfusion and sterilization.

Course Contents

Diseases of Ear

Must know

- Surgical anatomy: external, middle and inner ear.
- Physiology of hearing and vestibular function.
- Examination of the Ear: Tuning Fork tests; hearing assessment in children-broad outline, referred pain in the ear, otalgia tinnitus.
- Functional examination of inner ear (vestibule): caloric test, positional nystagmus test
- Deafness: Types and causes
- Diseases of the external ear: perichondritis, otitis externa, cerumen, foreign body, furunculosis keratosis.

Diseases of middle ear

Must know

- Acute and Chronic suppurative otitis media, Obturans, Otitis media with effusion, Otosclerosis, Cholesteatoma.
- Audiometry – pure tone
- Complications of otitis media; Mastoiditis (acute and chronic), lateral Sinus thrombosis, labyrinthitis, otogenic brain abscess.
- Mastoidectomy-principles Deaf mutism.

Diseases of inner ear

Desirable to know

- Meniere's disease
- Tumours of the ear – Glomus tumours, Acoustic neuroma.

Diseases of Nose and para nasal sinuses (PNS)

Must know

- Surgical anatomy and physiology of nose and P.N.S including olfaction.

- Congenital diseases of the Nose, Cleft lip and palate and Choanal Atresia.
- Diseases of external nose-furunculosis, vestibulitis, Rhinophyma, rodent ulcer.
- Trauma, nose & PNS-fracture of nasal bones, blowout fracture of orbit, fracture of maxilla with Lefort's classification
- Foreign body in the nose-Classification of foreign bodies & management of animate and inanimate foreign bodies, Rhinolith.
- Causes of epistaxis and management
- Diseases of nasal septum-Haematoma, abscess, DNS, perforation.
- Diseases of nasal cavity- Acute rhinitis, Nasal Diphtheria, Granulomatous conditions of the nose, allergic, allergic rhinitis, vasomotor rhinitis, atrophic rhinitis, fungal infections of nose and paranasal sinuses.
- Diseases of PNS: Acute and Chronic sinusitis. Complications of sinusitis and management.
- Sino nasal polyposis – Diagnosis and management.
- Basic principles of FESS (Functional Endoscopic Sinus Surgery)

Tumours of the nose and PNS-Benign tumours like papilloma, inverted papilloma, fibrous dysplasia. Malignant tumors like squamous cell carcinoma, Melanoma, Olfactory neuroblastoma

Desirable to know

- Introduction to skull base
- Endoscopes in ENT
- Lacrimal system and DCR
- Computer aided navigation
- Headache and facial pain

Diseases of the Nasopharynx , oral cavity and Oropharynx

Must know

- Surgical anatomy and physiology of nasopharynx
- Nasopharyngeal carcinoma-diagnosis and management.
- Adenoid – diagnosis and management.
- Juvenile angiofibroma : Diagnosis and management Diseases of the Pharynx
- Surgical anatomy and physiology of oral cavity, oropharynx, tonsils, Waldeyer's ring, Anatomy of retropharyngeal and parapharyngeal spaces.
- Physiology of mastication.

- Diseases of the tonsils: acute and chronic tonsillitis, Vincent's angina, Diphtheric tonsillitis diagnosis and management.
- Neck space infections and abscess- Retropharyngeal, parapharyngeal abscess, peritonsillar abscess, Ludwig's angina.
- Mucosal lesions in oral cavity and oropharynx

Diseases of the Larynx

Must know

- Surgical anatomy and Physiology of Larynx with reference to phonation and respiration.
- Acute infection of the larynx – Acute laryngitis, LTB, Diphtheric, Acute epiglottitis.
- Stridor – Causes of stridor and management.
- Chronic infections of Larynx – Chronic nonspecific and specific laryngitis, granulomatous conditions of larynx.
- Neurological infections of larynx-Cord palsy-Diagnosis and management.
- Tumours of larynx-Diagnosis of laryngeal tumours and management.

Desirable to know

- Stroboscopy
- Disorders of voice and thyroplasty

Diseases of Trachea and oesophagus

Must know

- Surgical anatomy of trachea, stridor, tracheostomy in detail.
- Oesophagus
- Surgical anatomy, physiology of deglutition.
- Causes of dysphagia, diagnosis and management.
- Diseases such as congenital atresia, injuries (traumatic and chemical),
- Foreign body in Oesophagus , Oesophagoscopy, Neurologic Indication for Oesophagoscopy and Ca Oesophagus.
- Bronchoscopy – Indication, contraindication and complications of foreign body in bronchus.

BIO-MEDICAL WASTE: Types, potential risks and their safe management.

Diseases of Head and Neck

- Congenital disorders in head and neck
- Maxillo facial surgeries
- Organ preservation in head and neck cancers
- Thyroid neoplasms
- Cystic lesions in maxillofacial region
- Surgical anatomy and physiology of salivary glands, submandibular Sialadenitis, Salivary calculi, Parotitis, tumours of salivary glands

Miscellaneous topics

- Medicolegal aspects in ENT practice
- Documentation in ENT
- Introduction to research
- Lasers in ENT
- Ethics in ENT

Teaching hours**Theory:** 70 hours including 48 hours of **tutorials**

Ear-28hours, Nose-21hours, Throat-21hours

Theory-Topics	Head	Hours
Diseases of external Ear	Lecture	1
Acute suppurative otitis media, Acute mastoiditis.	Lecture	1
CSOM, Etiology, pathophysiology, clinical features and treatment plan.	Lecture	1
CSOM, Complications, Mastoiditis, Lateral sinus thrombosis, Labyrinthitis, intracranial complication and management.	Lecture	1
Non suppurative conductive deafness, otitis media with effusion, adhesive otitis media, otosclerosis, ossicular dislocation, impedance audiometry	Lecture	1
Differential diagnosis of vertigo, Meniere's diseases, BPPV, vestibular neuronitis.	Lecture	1
Differential diagnosis of deafness, assessment and rehabilitation, hearing aids, Cochlear implants.	Lecture	1
Tumours of ear, Glomus jugulare,, Acoustic neuroma, Carcinoma, ceruminoma.	Lecture	1
Congenital diseases of nose, cleft lip, palate, Choanal atresia.	Lecture	1
Trauma nose and PNS and nasal bones, Blow out fracture of orbit, LeFort's classification //mandible// zygoma fractures	Lecture	1
Acute rhinitis, nasal diphtheria, allergic rhinitis.	Lecture	1
Chronic granulomatous lesions of nose, rhinoscleroma , rhinosporidiosis, atrophic rhinitis, fungal infection.	Lecture	1
Anatomy of middle meatus, pathophysiology of sinusitis.	Lecture	1
Clinical features, Diagnosis and management of acute and chronic sinusitis .Including basic principles of FESS & Computer aided surgery	Lecture	1
Tumours of nose and PNS.	Lecture	1
Waldeyer's ring, adenotonsillitis.	Lecture	1
Neck space infection, retropharyngeal abscess, parapharyngeal abscess peritonsillar abscess, Ludwig's angina.	Lecture	1
Neurological diseases of larynx & thyroplasty & Voice production	Lecture	1
Stridor and tracheostomy.	Lecture	1
Tumours of larynx, Benign lesions of larynx, multiple papilloma, solitary papilloma, precancer conditions in ENT. Including chronic nonspecific and specific laryngitis, granulomatous conditions.	Lecture	1
TNM Staging and Ca Larynx	Lecture	1
Oesophageal conditions in ENT.	Lecture	1
Bronchoscopy, indications, contraindication, complications of foreign body in the bronchus.	Lecture	1

Tutorial –Topics		Hour
Anatomy of Ear	Tutorial	3
Physiology of hearing, tuning fork tests, audiometry, causes of otalgia, referred otalgia, and tinnitus.	Seminar	3
Physiology of equilibrium, investigation of vestibular function and D/D of vertigo	Tutorial	3
ASOM, SOM, Otosclerosis	Seminar	3
Chronic suppurative otitis media-Etiology, pathology and clinical features& treatment plan Panel discussion with physician, surgeon& paediatrician.	Integrated teaching with Medicine, Surgery & Paediatric Dept	3
Complications of CSOM.	Tutorial	3
CSOM treatment plan	Seminar	3
Surgical anatomy and physiology of nose and PNS including mucociliary transport mechanism.	Tutorial	3
Diseases of external nose, furuncle and vestibulitis, rhinophyma, rodent ulcer.	Seminar	3
Vascular anatomy of nose, epistaxis.	Tutorial	3
Septal anatomy of nose ,Epistaxis	Seminar	3
Sinonasal polyposis and D/D nasal mass	Group Discussion-1	3
Surgical anatomy of nasopharynx, juvenile angiofibroma and nasopharyngeal Ca.	Seminar	3
Surgical anatomy of oral cavity, oropharynx, pharyngeal infection.	Tutorial	3
Salivary glands, surgical anatomy and physiology of salivary calculous, parotitis, tumours of salivary glands.	Seminar	3
Surgical anatomy and physiology of larynx with reference to phonation, respiration and deglutition	Tutorial	3
Stridor, stertor and sleep apnoea syndrome. Acute infections of larynx, laryngitis, laryngotracheobronchitis and epiglottitis.	Group Discussion-2	3
Management of compromised airway, endotracheal intubation, laryngotomy and tracheostomy: indication procedure post operative management and complications.	Integrated teaching with Paediatric Dept &	3

	Anesthesia Dept	
Hoarseness of voice, D/D and management.	Tutorial	3
Radiology in ENT, X-ray demonstrations.	Integrated teaching with Radiology Dept	3
Dysphagia. Oesophagolaryngomediastinal and neurological integrated conditions.	Seminar	3

Clinical: Total 8 weeks, 4 weeks each in 6th and 7th terms.

Integrated teaching; each batch will have 3 classes of 3 hours duration each during tutorials

Sl. No	Topics	Department to participate
1	Chronic suppurative otitis media-Etiology, pathology and clinical features & treatment plan Panel discussion with physician, surgeon & paediatrician.	Medicine, Surgery & Paediatric Departments
2	Management of compromised airway, endotracheal intubation, laryngotomy and tracheostomy: indication procedure post operative management and complications.	Paediatric & Anesthesia Department
3	Radiology in ENT, X-ray demonstrations.	Radiology Department

Innovative teaching methods; mind mapping, website teaching, student feedback system, remedial coaching for slow learners and student adaptation system are done.

Scheme of examination

Internal Assessment

Theory: 30 marks

There shall be at least two theory examinations one at the end of VI term and another during VII term. The second theory examination at the end of VII term is of MCQ paper for 50 marks. The marks obtained should be reduced to 20. 10 marks may be demarcated for day to day work, skill acquired, sincerity, punctuality, and analytical ability and communication skills.

Clinical: 20 marks

The Ward Leaving Test:

1. At the end of VI term posting case presentation for 40 marks.
2. At the end of VII term posting
 - a) One case presentation for 40 marks.
 - b) OSCE for 40 marks (5 stations of 8 marks each)

It should be based on Log book in which records of at least 10 case are maintained for which 5 marks be allotted and clinical examination and log book should be reduced to 20 and sent to the university.

UNIVERSITY EXAMINATION

1) *Written paper*

There shall be one theory paper of one hour duration carrying 100 marks. It shall have three types of questions:

Marks Allotment

Otology - 35, Rhinology -30, Laryngology - 20, Head & Neck - 15.

- 1) Long Essay Questions-2 Questions 10 marks each = 20
- 2) Short Essay Questions-10 questions 5 marks each = 50
- 3) Short Answer Questions-10 questions 3 marks each = 30

The average of two evaluations by separate examiners may be taken as final marks.

2) *Clinical Examinations*

One Internal Examiner & One External Examiner will examine as follows:

Clinical examination - two cases [40 marks for each case = 80 marks)

- 3) ***Viva Voce*** : 20 marks
 - a) Instruments +Viva : 10 marks
 - b) X rays +Viva : 10 marks

RECOMMENDED BOOKS

1. Logan Turner's Diseases of ENT, edited by AGB Maran(Wright). 10th edition, Butter worth. K.M Verghese and Company, Bombay, Rs.425.
2. Dhingra. P.L Diseases of Ear, Nose and Throat. 4 th Ed. Churchill Livingstone.
3. Mohd. Maqbool, Textbook of ENT Diseases. 8 th Ed. Jaypee Brothers.
4. Synopsis of Otolaryngology- John Ballantine

REFERENCES

1. Scott-Brown's Otolaryngology.
2. Ballenger's Text book of Otorhinolaryngology.

COMMUNITY MEDICINE

GOAL:

To prepare undergraduate medical students to be a competent community & primary care physician.

OBJECTIVES:

At the end of the course, the student should be able to:

1. Organize elementary epidemiological studies to assess the health problems in the area and prioritize the most important problems and help formulate a plan of action to prevent and control under National Health Programme guidelines.
2. Understand the health care delivery system at different levels in India and plan health care service delivery at primary level for vulnerable groups (mother, infants, under five children, adolescents and geriatrics) and during disasters/emergencies.
3. Inculcate values like compassion, empathy, honesty, sincerity and integrity to ensure high quality ethical professional practice.
4. Work as an effective leader of the health team at the primary health care set-up and maintain liaison with various agencies. (Government, non-government and voluntary organizations) involved in public health.
5. Plan and implement health education programmes and promote community participation.

KNOWLEDGE:

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

1. Describe different levels of health care delivery system in the country.
2. Describe different levels of prevention of diseases at community & individual level.
3. Describe the National Health Programmes like maternal and child health programmes, family planning programmes & programmes related to communicable & non-communicable diseases.
4. List epidemiological methods and their application to treat, control & prevent communicable and non-communicable diseases of public health importance.
5. To understand the basic biostatistical methods and their application.
6. Describe the demographic indicators of the country.
7. Describe the role of individual, family, community & socio cultural milieu in health and diseases.
8. Describe the health information systems available in India.
9. Enunciate the principles and components of primary health care and the national health policies to achieve the goal of 'Health for All'.
10. Understand environmental and occupational hazards and their methods of prevention & control.

11. Describe the importance of water and sanitation in human health.
12. To understand the principles of health economics, health administration, health education in relation to community health

SKILLS:

At the end of the course, the student should be able to:

1. Understand the steps of outbreak investigation & apply it to community and individual level by using epidemiological tools.
2. Collect, analyse, interpret and present community and hospital based research data.
3. Diagnose and manage common health problems and emergencies at the individual, family and community levels keeping in mind the existing health care resources and in the context of the prevailing socio-cultural beliefs.
4. Diagnose and manage common maternal and child health problems and advise a couple and the community on the family welfare planning methods available in the context of the national priorities.
5. Diagnose and manage common nutritional problems at the individual and community level.
6. Plan, implement and evaluate a health education programme with skill to use simple audio-visual aids.
7. Interact with other members of the health care team and participate in the organization of health care services and implementation of national health programmes.

INTEGRATION:

Develop ability to understand the role of socio-cultural and environmental factors in maintenance of health at an individual, family and community level. Develop leadership qualities to promote health, prevent and control diseases at primary health care level.

COURSE CONTENTS

THEORY

I. EVALUATION OF PUBLIC HEALTH AND CONCEPTS OF HEALTH

Must know

1. Evolution of Public Health.
2. Definition of health, holistic concept of health, appreciation of health as a relative concept, determinants of health.
3. Characteristics of agent, host and environmental factors in health and disease and the multifactorial etiology of disease.
4. Understanding Natural history of disease and application, interventions at various levels of prevention with appropriate examples.
5. Indices used in measurement of health.
6. Health profile in India.

Desirable to know

1. ICD Classification of diseases.

Nice to know

1. Complementary Alternative Medicine.

II. ENVIRONMENT AND HEALTH

Must know

1. Water:
 - a) The concept of safe and wholesome water.
 - b) Understanding the methods of purification of water on small scale and large scale.
 - c) Various biological standards, including World Health Organization (WHO) guidelines for third world countries.
 - d) Principles and methods for assessing quality of water.
 - e) Concept of water conservation, rain water harvesting.
2. Sources, health hazards and control of environmental pollution.

3. Problems in the disposal of refuse, sullage, human excreta and sewage and its remedies.
4. Awareness of standards of housing and the effect of poor housing on health.
5. Role of vectors in the causation of diseases.
6. Identifying features of methods of vector control and mode of transmission of vector borne diseases.
7. Hospital Waste Management.

Desirable to know

1. Global Warming.

Nice to know

1. Electronic waste management.

III. HEALTH EDUCATION

Must know

1. The art of communicating: effectively with individuals, family and community using tools and techniques of information, education, and communication. To do so, the student should know:
 - a) Principles of communication, methods and evaluation of health education.
 - b) Appreciate barriers to effective communication.

Desirable to know

1. Evaluation of health promotion and education programme.
2. Behaviour change communication.
3. Counselling in health & diseases.

Nice to know

1. Social Marketing.

IV. NUTRITION AND DIETETICS

Must know

1. Common sources of various nutrients and special nutritional requirement according to age, sex, activity, physiological condition.
2. Nutritional assessment of individual, families and the community by:

- a) selecting and using appropriate methods such as : anthropometry, clinical,
 - b) dietary, laboratory techniques.
3. Plan and recommend a suitable diet for the individuals and families bearing in mind the local availability of foods, economic status, etc.
 4. Common nutritional disorders: protein energy malnutrition, vitamin A deficiency, anemia, iodine deficiency disease, fluorosis, food toxin diseases and their control and management.
 5. Food adulteration, Prevention of Food Adulteration Act, Food hygiene.
 6. National Programmes in Nutrition.

Desirable to know

1. Nutritional surveillance, education and rehabilitation.

Nice to know

1. Preservation of foods.
2. Genetically modified crops.

V. OCCUPATIONAL HEALTH

Must know

1. Relate the history of symptoms with the specific occupation including agriculture.
2. Identification of the physical, chemical, biological and social hazards to which workers are exposed to while working in a specific occupational environment.
3. General preventive measures against these diseases including accident prevention.
4. Employees State Insurance Scheme.

Desirable to know

1. Various legislations in relation to occupational health.
2. Women in Industry.

Nice to know

1. Social Security
2. Offensive Trades & Occupations.

VI. SOCIAL SCIENCE AND MEDICINE

Must Know

1. Conduct of a clinico-social evaluation in relation to social, economic and cultural aspects, educational and residential background; attitude to health, disease and to health services; the individuals, family and community.
2. Assessment of barriers to good health, recovery from sickness and to lead a socially and economically productive life.
3. Development of good doctor – patient and community relationship.

Desirable to know

1. Hospital Sociology.

Nice to know:

1. Social Research.

VII. FUNDAMENTALS OF BIO-STATISTICS AND HEALTH INFORMATION

Must know

1. The scope and uses of biostatistics.
2. Collection of data, simple statistical methods for the analysis, classification interpretation and presentation of data, frequency distribution, measures of central tendency, measures of variability.
3. Analyze and interpret data
4. Common sampling techniques
5. Obtaining health information, computing indices (rates and ratio) and making comparisons.
6. Applying test of significance

Desirable to know

1. Calculation of sample size in different settings.
2. Co-relation & regression analysis.

Nice to know

1. Use of statistical Software like – MS-Excel, Epi-Info, SPSS.

VIII. BASIC EPIDEMIOLOGY AND SCREENING FOR DISEASES

Must know

1. Epidemiology; definition, concept and role in health and disease.
2. Epidemiological study design and research methodologies, concept of association & causation and bias.
3. Use of basic epidemiological tools to make a community diagnosis of the health situation in orders to formulate appropriate intervention measures.
4. Definition of terms used in describing disease transmission & control.
5. Modes of transmission & measures for prevention & control of communicable & non-communicable diseases.
6. Principle sources of epidemiological data.
7. Definition, calculation & interpretation of the measures of frequency of diseases & mortality.
8. Need and uses of screening tests.
9. Accuracy and clinical value of diagnostic and screening test (sensitivity, specificity).
10. Planning, collecting, analyzing. & interpreting data with community participation to reach a community diagnosis.
11. General principles of epidemiology of communicable & non-communicable diseases of public health importance and their control.
 - a) Planning and investigation of an epidemic of communicable diseases in a community setting.
 - b) Institution of control measures and evaluation of the effectiveness of these measures.

Desirable to know

1. Risk association and causation.
2. GIS mapping.

IX. EPIDEMIOLOGY OF SPECIFIC DISEASES COMMUNICABLE AND NON-COMMUNICALBLE DISEASES

Must know

The specific objectives of selected communicable and non-communicable diseases of public health importance of which National Disease control/Eradication Programmes have been formulated are described here. For other diseases, the individual teacher would formulate the

objectives while drawing the lesson plans. The idea of formulation objectives for a few diseases here is to highlight their importance and to emphasize certain learning outcomes.

Communicable diseases:

Intestinal infection: Poliomyelitis, viral hepatitis. Diarrhoeal diseases, Food poisoning, Typhoid, Cholera, Helminthiasis, Amoebiasis.

Respiratory infections: Acute Respiratory infections/Tuberculosis, Measles, Mumps, Rubella, Diphtheria, Whooping cough, Meningococcal meningitis, H₁N₁.

Vector-borne infection: Malaria, Filariasis, Kala-Azar, Dengue, Chickungunya

Surface Infections: Sexually Transmitted Diseases (Syphilis, Gonorrhoea, Herpes), HIV & AIDS, Tetanus, Leprosy.

Zoonosis: Rabies, Japanese encephalitis, Plague, Kyasanur Forest Disease, Brucellosis, Anthrax.

Non-communicable diseases: Coronary heart diseases Hypertension, Rheumatic heart disease, Cancers, Diabetes Blindness and accidents.

Off the above communicable & non communicable diseases, study the following:

1. Extent of the problem, epidemiology and natural history of the disease.
2. Relative public health importance of particular disease in a given area.
3. Influence of social, cultural and ecological factors on the epidemiology of the disease.
4. Prevention and control of communicable and non-communicable disease by diagnosing and treating a case and in doing so demonstrate skills in:
 - i. Clinical methods.
 - ii. Use of essential laboratory techniques.
 - iii. Selection of appropriate treatment regimes.
 - iv. Follow-up of cases.
5. National Disease Control/Eradication Programmes.

Desirable to know

1. Level of awareness of causation and prevention of disease amongst individuals and communities.
2. Yellow fever, Rickettsial diseases, Leptospirosis, Giardiasis.
3. Hospital acquired infections.

Nice to know

1. Essential drugs, Study of emerging and re-emerging diseases.

X. DEMOGRAPHY AND FAMILY PLANNING

Must know

1. Definition of demography and family welfare program.
2. Stages of the demographic cycle and their impact on the population, concept of demographic gap and population explosion.
3. Definition, calculation and interpretation of demographic indices like birth rate, death rate, fertility rates.
4. Reasons for rapid population growth in India and population dynamics.
5. Identify and describe the different family planning methods and their advantages and shortcomings.
6. Demonstrate skills in motivating a couple for selecting an appropriate family planning method.
7. Medical Termination of Pregnancy Act, (MTP) Revised act 2002-03.

Desirable to know

1. Unmet need of family planning.
2. National Population Policy.

Nice to know

1. Recent advances in family planning methods.
2. Population Stabilization.
3. Replacement level fertility.

XI. REPRODUCTIVE AND CHILD HEALTH

Must know

1. Need for specialized services for these groups.
2. Magnitude of morbidity and mortality in these groups in the local area and different regions.
3. Local customs and practices during pregnancy, child birth and lactation and complementary feeding.
4. Components of Reproductive & Child Health (RCH-I & RCH-II).
5. Organization, implementation and evaluation of reproductive child health program components.

6. Children in difficult circumstances.
7. Adolescent Health Problems & its prevention & control.

Desirable to know

1. Organization, technical and operational aspects of the National Family Welfare Programme and participate in the implementation of the programme.

Nice to know

1. Integrated Mother & Child Development Service Scheme (IMCDS).

XII. SCHOOL HEALTH PROGRAMME

Must know

1. Objectives of the School Health Programme.
2. Activities of the Programmes like:
 - a. Carrying out periodic medical examination of the children & the teachers.
 - b. Immunization of children in the school.
 - c. Health education.
 - d. Mid-day meals.
 - e. School health counseling.

Desirable to know

1. Obtaining participation of the teachers in the school health programmes including maintenance of records, defining healthy practices; early detection of abnormalities, national school health programmes.

Nice to know

1. School visit to obtain health profile of school children.

XIII. URBAN HEALTH

Must know

1. Common health problems (Medical, Social, Environmental, Economical, Psychological) of urban slum dwellers.
2. Organization of health services for slum dwellers.

XIV. HEALTH CARE SYSTEM IN INDIA

Must know

1. Concept of Primary Health Care and comprehensive health care
2. Health profile of India.
3. Health care delivery system in India and infrastructure at peripheral, primary, secondary and tertiary care level.
4. Job responsibilities of different category of workers in health system.

Desirable to know

1. Voluntary Health agencies working in India.
2. Indian Public Health Standards (IPHS).

Nice to know

1. Central Govt. Health Scheme (CGHS).
2. Public Private Partnership in Public Health.

XV. HEALTH PLANNING AND MANAGEMENT

Must know

1. Concepts of Planning, Management, Public Health Administration.
2. Components of planning a health activity-conducting immunization session.
3. Classification and understanding of various qualitative and quantitative health management techniques.
4. Overview of administration at village, block district, state and central level in India.
5. Integrated Disease Surveillance Project (IDSP).
6. Health related Millennium Development Goals.
7. National Health Policy & National Health Mission (NHM).

Desirable to know

1. Concepts of Health Economics in health planning and management evaluation of health services.
2. Concepts, scope and methods of Health Audit.

Nice to know

1. Sustainable Development Goals.

XVI. PUBLIC HEALTH LEGISLATIONS

Must know

1. Awareness regarding important health legislation in India such as Birth and Death registration act, Child Labour act, Prevention of Food Adulteration (PFA) act.
2. Consumer protection act, Prenatal diagnostics act, Human organ transplant Act health legislations.

Desirable to know

1. Recent Amendments in Public Health legislation.

XVII. INTERNATIONAL HEALTH

Must know

1. Role of various multilateral, bilateral international health organizations like World Health Organization (WHO), UNICEF, Red Cross, CARE, World Bank.

Desirable to know

1. Organizational structure of these organizations.

Nice to know

1. International Health Regulation (IHR).

XVIII. GERIATRICS

Must know

1. Size of elderly population, their common health problems and justification of their special care.
2. Screening procedures for early detection of various diseases and disabilities of elderly.
3. Comprehensive health care aspects of elderly.

Desirable to know

1. National policy for care of elderly.
2. Benefits & social security for elderly in India.

XIX. MENTAL HEALTH & GENETICS

Must know

1. Importance of mental health care in primary care settings.
2. Comprehensive mental health care at primary care settings.

3. Factors responsible for good mental health.
4. Chromosomal disorders.
5. Population Genetics & Genetic Counseling.

Desirable to know

1. National mental health programme.
2. National mental health policy.

Nice to know

1. Community psychiatry.

XX. DISASTER MANAGEMENT

Must Know

1. Definition, classification of disasters.
2. Triage in disasters.
3. Principles of disaster preparedness and application of these in disaster management.
4. Manmade disasters.

Desirable to know

1. Bio-terrorism
2. Chemical warfare.

XXI. NATIONAL HEALTH PROGRAMMES

Must Know

1. National Programmes Related to Communicable Diseases - Revised National Tuberculosis Control Programme (RNTCP), National Leprosy Elimination Programme (NLEP), National AIDS Control Programme (NACP), National Vector Borne Disease Control Programme (NVBDCP), Integrated Disease Surveillance Project (IDSP), Nutritional Programmes, Integrated Child Development Scheme (ICDS), Reproductive Child Health (RCH), National Health Mission (NHM), National Blindness Control Programme (NBCP), National Programme for Prevention & Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke (NPCDCS).
2. Strategies and functioning of these programmes at centre, state & primary care level.

Desirable to know

1. Twenty Point Programme, Minimum Needs Programme, Swachh Bharat Abhiyan

Nice to know

1. Revised Strategies of National Health Programmes.

SKILLS

PART-I: General Skills

The student should be able to:

1. Elicit the clinico-social history to describe the agent, host and environment factors that determine and influence health.
2. Recognize and assist in management of common health problems of the community.
3. Carry out health education effectively for the community.
4. Apply elementary principles of epidemiology in carrying out simple epidemiological studies in the community.
5. Work as a team member in rendering health care.

PART-II: Skills in Relation to Specific Topic

A. Communication:

The student should be able to communicate effectively with patients, family members, at community and with peers at scientific forums.

Communicable and non-communicable diseases (including social problems)

- a. Eliciting clinico-social history and examining the patient for diagnosis and treatment.
- b. Assessing the severity and / or classifying dehydration in diarrhoea, upper respiratory tract infection, dog bite, leprosy.
- c. Adequate and appropriate treatment and follow-up of leprosy, malaria, filariasis, rabies, upper respiratory tract infections, diarrhoea and dehydration.
- d. Advise on the prevention and prophylaxis of common diseases like vaccine preventable diseases, tetanus, malaria, filariasis, rabies, cholera, typhoid, intestinal parasites.

B. Maternal and child health:

- a. Antenatal examination of the mother, application of the risk approach in antenatal care.

- b. Postnatal-assessment of the mother and newborn, advice on appropriate family planning method, promotion of breast feeding, advice on weaning.
 - c. Assessment of growth & development of the child-use of the road to health, immunization to the child, identifying high risk infant.
 - d. Skills in vaccine management (cold chain).
- C. Statistics:
- a. Simple random sampling technique.
 - b. Apply appropriate tests of significance to make a correct inference.
 - c. Sample analysis and presentation of data.
 - d. Calculation of various health indices.
 - e. Calculation of relative and attributable risks.
 - f. Calculation of sensitivity, specificity and predictive values of screening test.
- D. Nutrition:
- a. Conducting a diet survey.
 - b. Community survey and clinical diagnosis of nutritional deficiencies:
Vitamin - A deficiency, Iodine deficiency, Malnutrition.
 - c. Making recommendation regarding diet.
- E. Health Management:
- a. Be an effective team leader.
 - b. Guide and train workers.
 - c. Supervision of workers and programmes.
- F. Environmental health:
- a. Collect water and stool samples for microbiological evaluation.

THEORY CLASSES

PHASE – II

TERM – III

40 Hours

1. Concept in Health and Disease
2. Concept of Prevention and Control
3. Environment and Health
4. Occupational Health
5. Biomedical waste management
6. Nutritional Health

TERM – IV

20 Hours

1. General Epidemiology including infectious disease epidemiology.
2. Screening of diseases
3. Geriatrics
4. School health services

TERM V – No theory classes are held in term V

PHASE – III

Term – VI

60 Hours

1. Health Education & Communication
2. Epidemiology of Communicable diseases
3. Epidemiology of Non-communicable diseases
4. National Health Programmes
5. Mental Health
6. Genetics & Health
7. Planning & Management
8. Disaster Management
9. Health Information System
10. Health Care delivery system in India.
11. International Health & health agencies

PRACTICAL CLASSES

PHASE - II

III Term

40 Hours

ENTOMOLOGY

Introduction to medical entomology,
Identification of vectors of public health importance
Vector control measures.

WATER

Introduction, Definition, Sources,
Disinfection of wells, Horrock's Test,
Purification water on small scale & large scale
Water problems, Water quality standards problems.

NUTRITION

Definition, Classification, Nutritional Profile of Foods
Nutrition problems.

IV Term

40 Hours

IMMUNIZATION

Definition, Introduction,
National Immunization Schedule,
Route, Dose, Schedule of vaccines,
Adverse effects following immunizations.

CONTRACEPTIVE METHODS

Introduction & Classification,
Advantages/disadvantages of contraceptives,
Natural family planning methods,
Newer Methods, GATHER approach.

OCCUPATIONAL HEALTH

Occupational Models

Preventive Measures in Occupational Diseases,

STATISTICS

Introduction to statistics,
Presentation of statistics,
Diagrammatic presentation of statistics,
Measures of Central Tendency,
Measures of Variability,
Measures of Morbidity & Mortality Rates,
Population – Dynamics,
Tests of Significance ‘Z’ Test,
Tests of Significance ‘T’ Test,
Tests of Significance (X^2) Chi-Square Test.

CLINICAL POSTING

TERM VII

180 Hours

Clinical posting of 3 months:

1. One month posting of medico social case discussion consisting of:
 - Communicable diseases like TB, Malaria, Leprosy, Diarrheal diseases etc.
 - Non communicable diseases like – Diabetes, Hypertension etc.
 - Antenatal Care, Postnatal Care, Acute Gastro Enteritis etc.
2. One month posting of epidemiological problems consisting of TB indices, vaccine requirement, contraceptive failure rate, vaccine efficacy.
3. One month posting of family health study and visits-
4. One family will be allotted to students for period of 07 days to assess the socio economic status, housing conditions, nutritional status & individual health assessment of each family member.
5. Visits to places of public health importance like: PHC, ICDS Centre, Water Purification Centre, Catering establishment etc.

INTEGRATED TEACHING FOR 7th TERM

Topic	Collaborating Departments
Acute Diarrhoeal diseases in children	Pediatrics
Hypertension	Medicine, Physiology
Diabetes among general population	Medicine, Surgery
Malnutrition among under five children	Pediatrics
Anaemia in Pregnancy	Obstetrics & Gynaecology
Blindness	Ophthalmology
Mental Health	Psychiatry
Antenatal Care	Obstetrics & Gynaecology
Postnatal Case	Obstetrics & Gynaecology
RNTCP	Chest & TB, Microbiology
HIV/AIDS	Microbiology, Medicine, Skin & VD
Malaria	Medicine, Pathology
IMNCI	Pediatrics
RMNCH + A Programme	Obstetrics & Gynaecology, Pediatrics
Leprosy	Skin & VD

I. TEACHING - LEARNING METHODS

a) Didactic Lectures:

Phase I (1 st & 2 nd term)	30 hours
Phase II (3 rd & 4 th term)	60 hours (40+20 hours)
Phase III (6 th term)	60 hours

b) Community Visits/Institutional Visits:

Phase I (1 st & 2 nd term)	30 hours
Phase III (7 th term)	60 hours

c) Integrated Teaching/Student Seminars:		
Phase III (7 th term)		40 hours
d) Group Discussions:		
Phase III (7 th term)		40 hours
e) Clinico-Social Case Discussions:		
Phase III (7 th term)		60 hours
f) Problem based learning/Case Scenario:		
Phase III (7 th term)		60 hours
g) Demonstration/Video Clips:		
Phase II (3 rd & 4 th term)		80 hours

TEACHING HOURS

Theory	-	230 hours
Practicals	-	80 hours
Clinical Posting	-	180 hours
Total	-	490 hours

V. FORMATIVE ASSESSMENT

1. Theory and Practical exam at the end of 4th term
2. Theory exam at the end of 6th term
3. OSCE/OSPE during block posting in 7th term
4. Monthly tests during 7th term
5. One MCQs test in 7th term

VI. INTERNAL ASSESSMENT

1. 1st Internal Assessment will be held at the end of 4th term.
2. 2nd Internal Assessment at the end of 6th term.
3. 3rd Internal Assessment (Preliminary examination) at the end of 7th term. 3rd Internal/Preliminary examination will be similar to the pattern of University examination.

Total Marks – 80 (Theory – 60; Practical- 20)

Theory – 60 Marks:

Out of 3 internal assessment exams conducted, average of any two best internal assessment marks obtained will be taken into consideration for calculation. 30 marks are allotted for theory exams. Other 30 marks are distributed as follows:

- A) Medico Social Case Study examination will be conducted at the end of Block Posting - 10 Marks.
- B) Seminars - 10 Marks
- C) Journals/Record keeping - 10 Marks

Practical – 20 Marks:

Two practical tests will be conducted one at the end of 4th term and at the end of 7th term. Average of these 2 tests shall be reduced to 20 marks.

VII. UNIVERSITY EXAMINATION

* Note: The examination for Community Medicine will be held in Phase III along with Phase – III, Part – I subjects.

A. WRITTEN PAPER: 200 MARKS

There shall be two papers, each carrying 100 marks. Each paper shall be of 3 hours duration. The pattern of questions would be of three types:

- 1. Long essay question – each question carrying - 10 Marks x 2 questions
- 2. Short essay question – each question carrying - 5 Marks x 10 questions
- 3. Short answer question – each question carrying - 3 Marks x 10 questions

Topic wise marks distribution in Paper - I and Paper - II, from the University examination is given below*.

Paper - I: 100 Marks

Topic	Marks
Environment and Health, Biomedical Waste Management	20
Basic Epidemiology & Screening of Diseases	15
Nutrition and Dietetics	15
Occupational Health, Genetics & Mental Health	15
Evolution of Public health and Concepts of Health	10
Health Education & Communication	10
Medical Sociology	10
Bio-statistics	05

Paper - II: 100 marks

Topic	Marks
Epidemiology of specific diseases : Communicable & Non-communicable diseases, National Health Programmes	40
Reproductive and Child Health, School Health, Geriatrics	20
Demography & Family Planning	10
Health System in India	10
Health Planning & Management	10
Disaster Management, International Health	10

* The topics assigned to the different papers are generally evaluated under those sections. However, a strict division of the subject may not be possible and some overlapping of topics is inevitable, students should be prepared to answer overlapping topics.

B. PRACTICAL: 80 MARKS

The distribution of different components shall be:

- Problem Solving Exercises - 35 marks
(Problems based on Epidemiology, Biostatistics, Demography, Environmental health, Nutrition and Health care of Community).
- Clinico-Social case presentation - 35 marks
- Spotters - 10 marks

C. VIVA VOCE: 40 MARKS

- Consisting of questions on all aspect of syllabus.

VIII. LIST OF TEXT BOOKS AND REFERENCE BOOKS:

1. K.Park. Text Book of Preventive & Social Medicine, 23rd Edition, Ms Baranarasidas Bhanot, Jabalpur.
2. B.K.Mahajan & M.Gupta. Text Book of Preventive & Social Medicine, 4th Edition, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
3. A H Suryakantha. Community Medicine with Recent Advances, 4th Edition, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
4. Gopalan et al. Nutritive Value of Indian Foods Stuffs, 3rd Edition, NIN-ICMR, Hyderabad.
5. J. Kishore. National Health Programmes of India, 8th Edition, Century Publications, New Delhi.
6. B.K. Mahajan. Biostatistics, 6th Edition, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
7. Sundarlal, Adarsh, Pankaj. Text Book of Community Medicine (P&SM), 3rd Edition, CBS Publishers & Distributor (P). Ltd., New Delhi.
8. G.K. Ratnaswamy. A Hand Book of Medical Entomology, 2nd Edition.

PEDIATRICS INCLUDING NEONATOLOGY

Goals

The course facilitates systematic learning of common pediatric diseases, evaluation of growth and development, nutrition, immunization, social and preventive pediatrics, and counseling.

Objectives

Knowledge

1. At the end of the course students will acquire the Knowledge of normal growth and development during foetal, neonatal, childhood and adolescence periods.
2. Knowledge of common pediatric disorders including adolescence and emergencies, in terms of epidemiology, etiopathogenesis, clinical manifestations, diagnosis, rational therapy, rehabilitation, and prevention.
3. Knowledge of age related requirements of calories, nutrients, fluids, drugs etc., in health and disease.
4. Knowledge of preventive strategies for common infectious disorders, poisoning, accidents, and child abuse.
5. Knowledge of national programmes related to child health, including immunization programmes.
6. Knowledge of common pediatric procedures.
7. Knowledge of management of the common pediatric disorders as per IMNCI, (Government of India or World Health Organization recommendations in force from time to time.)

Skills

At the end of the course the students shall be able to

1. Take a detailed pediatric history, conduct an appropriate physical examination of children including neonates, make clinical diagnosis, conduct common bedside investigations, interpret common laboratory investigation results, and institute therapy.
2. Know the skills of basic life support and cardio pulmonary resuscitation.
3. Distinguish between normal newborn babies and those requiring special care and institute essential newborn care.

4. Take anthropometric measurements, prepare oral rehydration solution, perform tuberculin test, administer vaccines available under current national programs, perform intraosseus access, start an intravenous line, provide naso-gastric feeding, and insert foleys catheter.
5. Would have observed procedures such as lumbar puncture, liver and kidney biopsy, bone marrow aspiration, pleural tap including intercostal drainage insertion, ascitic fluid tapping, venesection, and neonatal & pediatric advanced life support.
6. Provide appropriate guidance and counseling in breast feeding and complimentary feeding.
7. Provide ambulatory care to all sick children, identify indications for specialized/inpatient care and ensure timely referral of those who require hospitalization.
8. Be aware and analyze ethical problems that arise during practice and deal with them in an acceptable manner following the code of ethics.

Integration

The training in pediatrics should prepare the student to deliver preventive, promotive, curative and rehabilitative services for care of children both in the community and hospital as part of a team in an integrated form with other disciplines, e.g. Anatomy, Physiology, Biochemistry, Pharmacology, Forensic Medicine, Pathology, Microbiology, Community Medicine, Obstetrics, Medicine, and Physical Medicine and Rehabilitation.

Course Contents

Knowledge Must Know	Knowledge Desirable to Know
The Field of Paediatrics	
1. History of Paediatrics	1. Traditions and Cultural Issues pertaining to child care
2. Overview of Child Health	2. Ethical Issues in Paediatrics
3. The normal child	
4. Preventive and Social Paediatrics	
5. Epidemiology, Basic Statistics	

Growth and Development

- | | |
|--|-----------------------------------|
| 1. Biopsychological Models of Development | 1. IQ assessment |
| 2. Fetal growth and development | 2. Approach/management of obesity |
| 3. The newborn G/D | |
| 4. Infant, Preschool, Early school, Adolescence G/D/ | |
| 5. Assessment of Growth | |
| 6. Development Assessment | |
| 7. Standards/Normograms (including Indian) | |
| 8. Approach to short stature | |
| 9. Approach/management of Undernutrition | |

Knowledge Must Know

Knowledge Desirable to Know

Psychological Disorders

- | | |
|---|-----------------------|
| 1. Assessment and Interviewing | 1. Autism |
| 2. Vegetative Disorders-Rumination, Pica, Enuresis, Encopresis, Sleep | 2. Learning Disorders |
| 3. Habit Disorders | |

Social Issues

- | | |
|---|-------------|
| 1. Separation, death | 1. Adoption |
| 2. Abuse and Neglect | |
| 3. Child Labor | |
| 4. Media (TV, Movies) and its effect on the child | |

Children with Special Needs

- | | |
|--|------------------------|
| 1. Failure to Thrive – Problems, Approach and Management | 1. Children in Poverty |
| 2. Development disabilities, Chronic Illness | |
| 3. Mental Retardation – Problems, Approach and management. | |
| 4. Care of Child with fatal illness | |

Nutrition

- | | |
|---|---|
| 1. Nutritional Requirements – Water, energy, proteins, CHO, Fats, Minerals, Vitamins, | 1. Nutrition in Special situations – LBW, IEM, Chronic illness, Surgery, Critically ill child |
|---|---|

2. Diet/Nutrition Evaluation
3. Breast Milk Feeding, Human Lactation Management, BFHI
4. Infant and Child Feeding
5. Feeding through 1 and 2nd years
6. Protein Energy Malnutrition
7. Vitamin Deficiencies and Excess

2. Nutrition Values of Indian Foods, Recipes

Knowledge Must Know	Knowledge Desirable to Know
<p>Patho-physiology of Body Fluids and Fluid therapy (Approach and Management)</p> <ol style="list-style-type: none"> 1. Physiology of Fluids, Electrolytes and Acid Bases 2. Dehydration and fluid management 3. Approach and Management of dyselectrolytemia and Acid-base abnormalities 	
<p>Acutely Ill child (Approach and Management)</p> <ol style="list-style-type: none"> 1. Evaluation in Emergency 2. Injury Control 3. Emergency Medical Services 4. Paediatric Critical Care 5. Recognition of <ol style="list-style-type: none"> a) Respiratory Failure b) Circulatory Failure and Shock c) Acute Neurological Dysfunction 6. Resuscitation – Basic 7. Transport of sick child / neonate 	
<p>Emergencies/Critical Care Paediatrics(Approach and Management)</p> <ol style="list-style-type: none"> 1. Congestive Cardiac failure 2. Cardiogenic shock 3. Cyanotic spells 	
	<ol style="list-style-type: none"> 1. Concepts of Ventilation 2. Level II equipment for Intensive care
	<ol style="list-style-type: none"> 1. Septicemic shock, Viral infections and shock 2. Pneumothorax, empyema, pleural effusion, ascites 3. Burns/electrocution

4. Vomiting and Diarrhea
5. GI Bleeds – Hematemesis, Melena, Hematochezia
6. Animal Bites
7. severe complicated malaria
8. Acute severe asthma, Bronchiolitis
9. Status epilepticus
10. Febrile seizure
11. Cardiopulmonary resuscitation
12. Poisoning
13. Snake bite
14. Scorpion sting

Human Genetics

1. Inheritance Patterns
2. Chromosomal/genetic clinical Abnormalities
3. Genetic Counseling

Metabolic Disorders (Approach and Management)

1. Approach to IEM
2. Mucopolysaccharidosis
3. Hypoglycemia

Knowledge Must Know

Fetus and New born (Approach and Management)

1. Mortality and morbidity
 1. Newborn – history, examination, routine delivery care,
3. High risk pregnancies
5. Fetus
 - Fetal distress
 - Maternal diseases
 - Maternal medications

4. Coma, Increased intra-cranial pressure

1. Dysmorphism

Knowledge Desirable to Know

1. Organization and levels of newborn care
2. Antenatal Diagnosis/treatment
3. Congenital anomalies/malformations- Recognition and Referral
4. Ambiguous genitalia – Recognition and Referral

- | | |
|---|--|
| <ul style="list-style-type: none"> 6. High risk infant <ul style="list-style-type: none"> Multiple pregnancies Prematurity Postdated IUGR/LBW 7. Birth injuries 8. Hypoxia – ischemia, asphyxia 9. Normal Newborn 10. Common problems in a normal newborn 11. Delivery room emergencies 12. Respiratory disorders 13. Oxygen therapy, toxicity 16. Cardiac problems 17. Blood disorders-- Anemia Hemorrhagic disease of newborn Hemolytic disease of newborn 18. Metabolic disorders 19. Nutrition and feeding the newborn-term/preterm, LBW, IUGR 20. Neonatal sepsis/meningitis 21. Thermoregulation 22. Neonatal transport | <ul style="list-style-type: none"> 5. Surgical problems-Recognition and referral
 6. Genitourinary disturbances |
|---|--|

Knowledge Must Know	Knowledge Desirable to Know
Adolescent Health	
<ul style="list-style-type: none"> 1. Epidemiology 2. Sexual development and SMR stages 3. Menstrual problems – Recognition and Referral 	<ul style="list-style-type: none"> 1. Pregnancy 2. Contraception 3. STD
Immunological system	
<ul style="list-style-type: none"> 1. Basics of Immunology 2. Approach to immunodeficiency 3. HIV 	<ul style="list-style-type: none"> 1. Bone marrow transplantation
Allergic disorders	
<ul style="list-style-type: none"> 1. Allergy and Immunological basis 2. Allergic Rhinitis 3. Asthma 4. Atopic dermatitis 	<ul style="list-style-type: none"> 1. Insect allergy 2. Ocular allergy 3. Adverse food reaction

5. Urticaria, Angioedema
6. Anaphylaxis

Rheumatology (Approach and Management)

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Autoimmunity 2. JRA | <ol style="list-style-type: none"> 1. SLE |
|---|--|

Knowledge Must Know

Infectious diseases

(Approach and Management)

1. Fever
2. Clinical use of Micro Lab

3. Fever without a focus
4. Sepsis and Shock
5. CNS Infections
6. Pneumonia
7. Gastroenteritis
8. Bacterial Infections
9. Anaerobic infections
10. Viral Infections
11. Parasitic infections

Helminthiasis

12. Protozoal
 - a. Malaria
 - b. Giardia
 - c. Amoeba
13. Antimicrobials , Antiparasitic drugs, Antivirals drugs
14. Emerging and re-emerging diseases of tropics like dengue, chikungunya , H1N1 flu

Immunization

1. Principles, Schedules of Standard vaccines
2. Adverse events following vaccines

Knowledge Desirable to Know

1. Osteomyelitis, Septic arthritis
2. Preventive measures
 - a. Health advice for traveling.
 - B. Infection control

1. Optional Vaccines

Knowledge Must Know

Digestive system

(Approach and Management)

1. Normal tract – Physiology, Anatomy, Development
2. Clinical features of Disorders
3. Acid Peptic disease, GI bleeds
4. Malabsorption, Obstruction
5. Disorders of Liver and biliary system
Acute Hepatitis, Chronic Hepatitis, Cirrhosis,

Respiratory system

(Approach and Management)

1. Development and Physiological function
2. Upper Respiratory tract infection
3. Lower Respiratory tract infection
4. Pleural disorders Empyema, Effusion
5. Bronchial Asthma

Cardiovascular System

(Approach and Management)

1. Investigations – Lab, ECG, CXR,
2. Congenital Heart Disease
Approach --- Cyanotic
Acyanotic
3. Acquired heart disease
 - a. Rheumatic Heart Disease
 - b. Infective endocarditis
4. Cardiac Therapeutics

Knowledge Must Know

Blood

(Approach and Management)

1. Anemia

Inadequate production

Iron, Folate, B12

Bone Marrow failure

Nutrition –

Knowledge Desirable to Know

Peritonitis

1. Pulmonary Function tests
2. Basics/Indications of Ventilation

1. Physiology and Pathophysiology of Transitional Circulation
2. ECHO

3. Cardiac Arrhythmia

Knowledge Desirable to Know

1. Development of Hematopoietic system

- Hemolytic
- Congenital and Acquired
- 2. Pancytopenia
- 3. Hemorrhagic disorders –
acquired and congenital
- Bleeding disorders Coagulation
disorders
- 4. Physiology and Disorders of the Spleen
- 5. Blood and component transfusions

Neoplasms (Approach and Management)

- | | |
|----------------------------|-------------------|
| 1. Principles of diagnosis | 1. Neuroblastomas |
| 2. Principles of treatment | 2. Retinoblastoma |
| 3. Leukemia | |
| 4. Lymphomas | |

Nephrology (Approach and Management)

- | | |
|-----------------------------|---|
| 1. Hematuria and conditions | 1. Tubular disorders |
| 2. Proteinuria | 2. Renal Failure & Renal Replacement
therapy |

- 3. Nephrotic syndrome
- 4. Acute Glomerulonephritis

Knowledge Must Know

Knowledge Desirable to Know

Urological disorders

(Approach and Management)

- 1. UTI
- 2. Vesicoureteral reflux
- 3. Obstructions
- 4. Investigations – imaging, renal
function tests

- 1. Penis, urethra anomalies
- 2. Urinary lithiasis
- 3. Scrotal anomalies

Gynecological problems

(Approach and Management)

- 1. Menstruation – Normal
- 2. Vulvovaginitis

Endocrine (Approach and Management)

- | | |
|-----------------|-------------------------------|
| 1. Thyroid | 1. Hypothalamus and pituitary |
| Thyroid studies | Hyperpituitarism |

Hypothyroidism
Hyperthyroidism
Goitre

Hypopituitarism,
Growth hormone
DI

ADH

3. Diabetes mellitus

2. Adrenal Disorders

CAH

Cushing

Addisons

3. Approach to short stature

3. Parathyroid and disorders

Knowledge Must Know

Knowledge Desirable to Know

CNS (Approach and Management)

1. Examination, Localization of lesions
2. Seizures & Febrile seizure
3. Antiepileptic drugs
4. Headaches
5. Coma
6. Hydrocephalous
7. Pyogenic Meningitis
8. Viral meningoencephalitis
9. TB meningitis
10. Cerebral Palsy
11. Acute Flaccid paralysis

Neuromuscular

(Approach and Management)

1. Evaluation, investigations
2. Muscular Dystrophy
3. Floppy Infant
4. Bell's Palsy

1. GB syndrome

Eye

1. Examination of eye
2. Squint
5. Diseases of Conjunctiva - Conjunctivitis
5. Diseases of Lens – Cataracts
6. Vitamin A deficiency

8. Lacrimal problems – Dacrocystitis

1. Papilledema
2. Vision
3. Injuries to eye
4. Retinopathy of Prematurity
5. Diseases of Optic nerve – Papillitis, Neuritis

Knowledge Must Know	Knowledge Desirable to Know
Skin	
1. Eczema	1. Leprosy
2. Cutaneous Infections – Bacterial, Viral, Fungal	
3. Arthropod bites, infestations	
4. Atopic dermatitis	
5. Nutritional diseases	
Bone/Joint	
1. Congenital Dislocation of Hip	1. Achondroplasia
2. Osteomyelitis	2. Osteopetrosis
3. Septic Arthritis	
4. Rickets – Nutritional and non nutritional	
5. Bone and vitamin D	
Unclassified disease	
1. SIDS	
Environmental	
1. Lead poisoning	
2. Envenomation	
3. Mammalian bites	
4. Common Poisonings – OP, Kerosene, Phenobarbitone, Iron, etc	

VI TERM

16 CLASSES

VITAL STATISTICS

1. Introduction to age related disorders,
IMR, PMR, EPMR, Child Mortality and Morbidity
2. Preventive pediatrics
Different national programmes – ICDS, MCH, RCH, CSSM, IMCI, RCH and other preventive programmes.

BEHAVIOURAL PROBLEMS

1. Pica, Enuresis, Breath holding spells. Temper tantrums, Encopressis Thumb sucking, Tics.

GROWTH AND DEVELOPMENT

1. Growth and development, parameters of growth, and growth monitoring
2. Developmental milestones and assessment of development

NUTRITION

1. Normal Nutritional requirements of different age groups.
2. Breast feeding and lactation failure management
3. Infant feeding
4. Protein Energy malnutrition Part I
5. Protein Energy malnutrition Part II
6. Vitamin disorders – Fat soluble
7. Vitamin disorders – water soluble
8. Micronutrients disorders & Mineral disorders

MISCELLANEOUS

1. JRA
2. Communication skills and counseling the parents
3. Ethical consideration in pediatric practice with case illustrations (2 cases)

VII TERM 13 Classes

INFECTIONS

1. Exanthematous illness: Measles, Rubella, Chicken pox, Mumps etc.
2. Typhoid fever
3. Tuberculosis Part – 1
4. Tuberculosis part – 2
5. Parasitic infestations
6. Malaria symposium
7. HIV infection (prenatal / perinatal / postnatal)
8. Dengue hemorrhagic fever

HEMATOLOGY

1. Leukemia, Lympho reticular malignancy
2. Nutritional anemia
3. Hemolytic anemia
4. Bleeding / Coagulation disorder

GENETICS

1. Genetic terminology and definitions, common genetic disorders (Down's Syndrome)

VIII TERM

20 Classes

NEONATOLOGY

1. Classification of newborn, and Gestational age assessment
2. Normal newborn, and newborn care Neonatal infection
3. High risk pregnancy and high risk neonates
4. Neonatal jaundice
5. Low birth weight babies including their feeding
6. Birth asphyxia
7. Birth Injuries
8. Respiratory distress in the newborn
9. Neonatal Seizures
10. Congenital anomalies (diaphragmatic hernia, Cleft palate, Cleft lip, Pyloric stenosis)

GASTROENTEROLOGY

1. Viral Hepatitis
2. Cirrhosis of liver
3. Acute Gastroenteritis

RESPIRATORY SYSTEM

1. Acute Upper respiratory tract infections including Croup syndrome
2. Acute LRTI (Pneumonia and Bronchiolitis)
3. Foreign body and suppurative lung diseases
4. Bronchial Asthma

CARDIOLOGY

1. Rheumatic fever & RHD
2. Cyanotic congenital heart diseases
3. Acyanotic congenital heart diseases

IX TERM

17 Classes

ENDOCRINOLOGY

1. Common endocrinal disorders – hypothyroidism
2. Juvenile diabetes
3. Short stature – evaluation

CENTRAL NERVOUS SYSTEM:

1. Cerebral palsy
2. Mental retardation other than cerebral palsy
3. Hydrocephalus
4. Seizure disorders (including febrile seizures)
5. Acute central nervous system infections – bacterial
6. Acute central nervous system infection – viral

PEDIATRIC EMERGENCIES

1. Shock in children
2. Poisoning in children – Prevention / Management
3. Snake bite and scorpion sting
4. Drowning
5. Burns

NEPHROLOGY

1. Nephritis
2. Nephrotic syndrome
3. Urinary tract infection

The topics for integrated teaching involving other faculties (Two hours each)

1. Bleeding and coagulation disorders
2. Coma
3. PUO
4. Jaundice
5. Anemia
6. High risk pregnancy and the neonate (with Obstetrics and Gynecology)
7. Renal failure
8. Rheumatic Heart Disease
9. Portal hypertension
10. Tuberculosis
11. Malaria
12. Fetal and postnatal development (with Obstetrics and Gynecology)
13. Cerebral palsy

DEMONSTRATION:

IX TERM

1. Nutritional exhibition
2. Immunization : Administration of vaccines, vaccine preventable diseases, National immunization programme, individual vaccines, Newer vaccines, Pulse polio, Cold chain
3. Gastroenteritis - Diarrhea Treatment Unit (DTU)
4. Bronchial asthma including management of status asthmatics
5. Resuscitation of newborn
6. Developmental assessment
7. Pediatric procedures

Note: The number of classes mentioned are suggestive

Teaching hours

Theory: Total number of theory hours will be 100 hrs

Clinical postings: Total number of weeks of clinical postings – 10 weeks

6th / 7th term – 4 weeks

1. Introduction to Pediatrics
2. Pediatric History taking
3. Pediatric physical examination including neurological assessment
4. Common conditions like PEM, Acute gastroenteritis, and ARI.

8th / 9th Term – 6 weeks

An additional emphasis will be placed on Diagnosis and Management of individual cases.

Some suggested cases are:

Assessment of growth and development in a normal child

Gastroenteritis with dehydration

Kwashiorkor, Marasmus

Down's Syndrome

Central Nervous System

Meningitis / meningitic sequelae

Cerebral palsy

Hemiplegia/ Monoplegia/ Isolated cranial nerve palsy

AFP, Rheumatic chorea

Cardio Vascular System

Rheumatic heart disease – M.S, M.R, Carditis

Congenital heart disease – VSD, PDA, TOF

Infective endocarditis

Respiratory System

Pneumonia

Empyema

Suppurative lung disease

Gastrointestinal System

Hepatosplenomegaly, Ascites, Hepatitis, Portal hypertension

Renal system
Nephrotic syndrome
Nephritis

Neonatology
Brief History
Examination of newborn, including common problems
Gestational age assessment including classification

Endocrine
Cretinism

BLDEU's SHRI B.M.PATIL MEDICAL COLLEGE BIJAPUR
DEPARTMENT OF PEDIATRICS

UNDER GRADUATE TEACHING

PROGRAMME.

DAY	UNIT- A	UNIT-B	UNIT-C
Monday	OPD TEACHING		GRAND ROUNDS
Tuesday	GRAND ROUNDS	OPD TEACHING	
Wednesday		GRAND ROUNDS	OPD TEACHING
Thursday	OPD TEACHING		
Friday		OPD TEACHING	
Saturday			OPD TEACHING

Note: 6th term students will have OSCE at the end of their clinical posting in addition to ward leaving Test.

THEORY TEACHING SCHEDULE FOR UG STUDENTS OSCE. FOR 6 TH TO 9 TH TERM (4 WEEKS)					
Month	6 th Term	7 th Term	8 th Term	9 th Term	9 th Term
	Wednesday	Wednesday	Tuesday	Friday	Saturday
T-Theory	8 - 9 AM – FM	12 - 1 PM – G-1	4 - 5 PM –G-1	12- 1 PM – H-2	3 - 5 PM H-2
GD-Group Discussion					DR. RAKESH/D R. SUNIL
SEM-Seminar	21 HOURS	17 HOURS	20 HOURS	18 HOURS	TUTORIAL -24 HOURS
IT-Integrated Teaching	DATE - TOPIC	DATE - TOPIC	DATE - TOPIC	DATE - TOPIC	DATE - TOPIC
August	03-Introduction to age related disorders(T) 10-- Pica, enuresis,breath holding spells (T) 17- PEM part- I (T) 24-PEM – II (T) 31- Ethical consideration in pediatrics (T)	03- Acute hepatitis (T) 10- HIV Infection (T) (prenatal/perinatal /postnatal) 17- HIV Infection (T) (prenatal/perinatal /postnatal) 24- Dengue hemorrhagic fever (T) 31- Typhoid fever (T)	02- Neonatal seizures (T) 09- Thermogulation in neonates (T) 16- Neonatal Sepsis (T) 23- Bleeding neonate (T) 30- Neonatal jaundice (T)	05- Common endocrine dis- Hypothyroidism (T) 12- Juvenile diabetes (T) 19- Nephritis (T) 26- CAH(Congenital Adrenal Hyperplasia) (T)	06- Nutritional exhibition 13- Immunization 20- GE-DTTU 27- Integrated Teaching
September	07- Growth charts IMNCI (T) 14- Infant feeding (GD) 21- Preventive	07- Common genetic disorder (T) 14- Exanthematous illnesses- I (SEM)	06- Rheumatic fever (T) 13- Shock in Children (T) 20- Muscular	02- Fluid & electrolyte Disturbances (T) 09-	03- Bronchial asthma 10- Resuscitation of

	pediatrics(IT/PS M) 28- Growth & Development(G D)	21- Exanthematous illnesses- II (SEM) 28- Malaria (SEM)	dystrophies (T) 27- RDS in newborn (GD)	Nephrotic syndrome-(SEM) (NON MCNS) 16- Nephrotic syndrome-(MCNS)(SEM) 23- UTI (GD)	newborn 17- Developmental assessment 24- Integrated Teaching
October	05- JRA (IT/ORTH) 19- Vasculitis Syndrome – I (SEM) 26- Vasculitis Syndrome – II (SEM)	05- Tuberculosis part – I (IT/PSM/MICRO BIOLOGY) 19- Tuberculosis part – II (IT/PSM/MICRO) 26- Nutritional anemia (SEM)	04- Birth asphyxia (GD) 18- MAS(Meconium aspiration syndrome) (GD) 25- Neonate – Gest age (GD)	07- Hydrocephalus (GD) 14- Mental retardation (SEM) 21- Seizure disorder (SEM) 28- Cerebral Palsy (GD)	01-Pediatric procedure 08- X-Ray 15- Instruments 22- Integrated Teaching
November	02- Vitamin def-Fat soluble (GD) 09- Vitamin def-Fat soluble (GD) 16- Vitamin def-water soluble(GD) 23- Vitamin def-water soluble (GD) 30- - Communication skills &	02- Bleeding & coagulation (SEM) 09- Bleeding & coagulation (GD) 16- Leukemias & lymphoma (SEM) 23- Genetics terminology (GD) 30- Parasitic infestations (IT/MIC)	08- High risk preg & babies (IT/OBG) 15- Cyanotic CHD (SEM) 22- Acynotic CHD (SEM) 29- Acute LRTI (GD)	04- Acute CNS infection-bact(SEM) 11- Acute CNS infection-viral(SEM) 18- AFP(Acute Flaccid paralysis)(SEM) 25- Poisoning in	

	counselling (GD)			children (GD)	
December	07- Breast feeding & FL(GD) 14- Micronutrient disorder (GD) 21- Micronutrient disorder(GD) 28- Developmental milestone(GD) Theory Test On 04-01-2017	07-Theory Test	06- Acute LRTI (GD) (Pneumonia & Bronchiolitis) 13- prolonged cholestatic Jaundice (IT/BIO) 20-Birth injuries (SEM) 27-LBW babies (GD) 03-01-2017 MCQ Test	02- Short stature-evaluation (GD) 09-- Snake bite & Scorpion Sting.(SEM) 16- - Theory Test	

3. Marks distribution for UG theory, practical& viva examination

Theory: Total Marks – 100

Gen Pediatrics – 20

Neonatology-20

Hematoncology-20

Systemic paediatrics -40

Practicals: Total Marks-100

Pediatric case-40

Neonatology-40

Viva-voce-20

During 2nd Clinical posting each student should write 10 case sheets in the students Journal

e) Scheme of Examination

INTERNAL ASSESSMENT: Total Marks 50 (Theory 30, and clinical 20)

Theory 30 Marks

Minimum of three examinations are recommended. Theory test will be of short answer type. The 9th term examination preceding the University examination may be similar to the pattern of University examination. Average of any two best marks obtained in the notified internal examination will be taken into consideration for calculating internal assessment. The total marks be reduced to 30 and sent to the University

Clinical 20 Marks

The clinical internal assessment will be conducted at the end of each posting-- that is 2 clinical internal assessment examinations. OSCE will be the method of assessment in the first internal assessment exam. The marks obtained in the clinical examination shall be reduced to 20 marks and sent to the University.

The internal assessment marks both theory and practical obtained by the candidates should be sent to the University at least fifteen days prior to the commencement of theory examination. Note that a student shall secure at least 50% of the total marks fixed for internal assessment in a particular subject in order to be eligible to appear in final university examination.

University Examination

Theory (Written Paper)

There shall be one paper of 3 hours duration, carrying 100 marks.

The pattern of questions would be of three types:

Long essay question - each question carrying 10 marks

Short essay question - question - each question carrying 5 Marks

Short answer question - each question carrying 3 Marks

Clinical exams

Clinical--80 Marks (Two cases of 40 marks each)

Suggested cases for clinical examination:

Assessment of growth and development in a normal child

Gastroenteritis with dehydration

Kwashiorkor, Marasmus

Meningitis / meningitic sequelae

Cerebral palsy

Hemiplegia/ Monoplegia/ Isolated cranial nerve palsy

Rheumatic heart disease – M.S, M.R, Carditis

Congenital heart disease – VSD, PDA, TOF

Pneumonia

Empyema

Suppurative lung disease

Hepatosplenomegaly

Cretinism

Normal newborn

Down's Syndrome

Viva voce-- 20 marks includes questions on

1. Nutrition
2. X-Rays
3. Drugs and vaccines
4. Instruments

Integrated Teachings topics

JRA (IT/ORTH)

Preventive pediatrics(IT/PSM)

Tuberculosis part – I (IT/PSM/MICRO BIOLOGY)

Tuberculosis part – II (IT/PSM/MICRO)

Parasitic infestations (IT/MIC)

High risk preg & babies (IT/OBG)

Prolonged cholestatic Jaundice (IT/BIO)

Acute CNS infection-bact (SEM)

Acute CNS infection-viral (SEM)

AFP (Acute Flaccid paralysis) (SEM)

Text Books-- Recommended

1. Indian Academy of Pediatrics (IAP) - Textbook of Pediatrics.
2. Ghai O P, Essential pediatrics CBS Publishers
3. Achar Text book of pediatrics Orient Longman
4. Meharban Singh's Clinical Methods, Sagar Publication
5. Hutchison's Clinical Methods Swash publication
6. Meharban singh, Care of the Newborn, Sagar Publications

Books-- Selected Reading

Nelson Textbook of Pediatrics Saunders Publications.

Note: Student must refer to the most recent edition of the recommended books.

MEDICINE & ITS ALLIED SPECIALITIES

Medicine and its allied specialties:

- a) Medicine
- b) Psychiatry
- c) Dermatology
- d) Tuberculosis & Respiratory Diseases

COURSE CONTENTS:

a) MEDICINE

a) Goal

The broad goal of teaching of undergraduate students in Medicine is to have the knowledge, skills and behavioral attitudes to function effectively as the first contact physician.

b) Objectives

Knowledge

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

1. Diagnose common clinical disorders with special reference to infectious diseases, nutritional disorders, tropical and environmental diseases.
2. Outline various modes of management including drug therapeutics especially dosage, side effects, toxicity, interactions, indications and contra-indications.
3. Perform diagnostic and investigative procedures and interpret them.
4. Provide first level management of acute emergencies promptly and efficiently and decide the timing and level of referral, if required.
5. Recognize geriatric disorders and their management.

Skills

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

1. Develop clinical skills (history taking, clinical examination) to diagnose various common medical disorders and emergencies.
2. Refer a patient to secondary and/or tertiary level of health care after having instituted primary care.
3. Perform simple routine investigations like haemogram, stool, urine, sputum and biological fluid examinations.

4. Assist the common bedside investigative procedures like pleural tap, lumbar puncture, bone marrow aspiration/biopsy and liver biopsy.

Integration

1. With Community Medicine and Physical Medicine and Rehabilitation to have the knowledge and be able to manage important current national health programmes, also to be able to view the patient in his/her total physical, social and economic milieu.
2. With other relevant academic inputs which provide scientific basis of clinical medicine e.g., anatomy, physiology, biochemistry, microbiology, pathology and pharmacology.

Departmental Objectives

- At the end of clinical postings in General Medicine, the medical student will;
- Be able to evaluate each patient as a person in society and not merely as a collection of organ systems.
- Have developed an interest in and care for all types of patients.
- Be able to discern the hopes and fears of patients, which inevitably underlie the symptom complexes and know how to handle these emotions, both in himself and in others.
- Possess adequate knowledge in the sciences of Medicines and be able to
- Elicit a good clinical history and physical findings, elucidate the clinical problems based on these and discuss the means of solving the problems common side lab procedures.
- Outline the principles of management of various diseases.
- Have an open attitude to the developments in medicine so as to be aware of the need to keep abreast of new knowledge.
- Learn to be adaptable to new ideas and new situations where resources may be limited.
- Possess knowledge of and perform certain procedures.
- Understand the ethical and legal implications of his medical decisions.

c) Course Contents

Knowledge

I. Clinical methods in the practice of medicine:

1. Clinical approach to the patient: The art of medicine, doctor Patient relationship, communication skill and doctor's responsibilities.
2. Clinical approach to disease and care of patient; Diagnostic possibilities based on interpretation of history, physical findings and laboratory investigations and principles of rational management.

II. Common symptoms of disease:

1. Pain: Pathophysiology, clinical types, assessment and Management
2. Fever: Pathophysiology of heat regulation, its disturbances, clinical types, clinical assessment and management.
3. Cough expectoration and hemoptysis.
4. Dyspnoea, tachypnea, and cyanosis.
5. Common urinary symptoms including dysuria, oliguria, nocturia, polyuria, incontinence and enuresis.
6. Edema and Anasarca.
7. Shock and cardiovascular collapse.
8. Cardiac murmurs: functional and organic.
9. Anorexia, nausea and vomiting.
10. Constipation and diarrhoea.
11. Hematemesis, melena and hematochezia.
12. Jaundice and hepatomegaly
13. Abdominal swelling and ascities.
14. Weight loss and weight gain.
15. Fainting, syncope and seizures, headache, dizziness and vertigo
16. Paralysis, movement disorders and disorders of gait.
17. Coma and other disturbances of consciousness.
18. Pallor and bleeding.
19. Enlargement of lymphnodes and spleen.
20. Joint pain and pain in the extremities and back.

III. Nutrition/exposure to physical and Chemical agents:

1. Nutrition and dietary management:
 - i) Nutritional requirements
 - ii) Protein calorie malnutrition in adults.
 - iii) Obesity
 - iv) Vitamin deficiency and excess.
2. Fluid and electrolyte balance; acidosis and alkalosis in particular relevance to vomiting, diarrhoea, uremia and diabetic ketoacidosis.
3. Poisoning: Phenobarbitone, Organophosphorous compounds, sedative/hypnotic, and other common poisons in the locality.
4. Acute and chronic effects of alcohol and their management.
5. Venoms, stings, insect bites: poisonous snakes, insects and scorpions.
6. Disturbances of temperature: heat stroke, heat exhaustion and cold exposure.
7. Drowning, electrocution and radiation hazards.
8. Fluorosis

IV. Infections:

- Approach to infectious diseases, diagnostic and therapeutic principles.
- General principles of rational use of antibiotics and other chemotherapy against the following:
 - Common gram positive infections
 - Common gram negative infections
 - Enteric fever
 - Cholera, gastroenteritis food poisoning and
 - Dysentery.
 - Influenza and other common viral respiratory
 - infections
 - Rabies
 - Tetanus
 - Herpes simplex and herpes zoster
 - Amoebiasis and worm infestations
 - Malaria, filariasis, leishmaniasis
 - Common exanthemata
 - HIV infections and infections in the
 - Common sexually transmitted diseases.
 - Common fungal infections.
 - Viral encephalitis.
 - Tuberculosis.
 - Leprosy.
 - Infectious mononucleosis.
 - Brucellosis.
 - Dengue Fever
 - Chikungunya fever
 - Rickettsial fever
 - Laptospirosis

V HAEMATOLOGY:

Definition, prevalence, etiological factor, pathophysiology, Pathology, recognition, investigations and principles of, Treatment of:

Anaemia: iron deficiency, megaloblastic and common

Hemolytic anaemia (thalassemia, sickle cell and acquired hemolytic)

Common bleeding disorders (thrombocytopenia and hemophilia).

Agranulocytosis, aplastic anaemia and leukemia.

Lymphomas

Blood group and transfusion: Major blood group systems and histocompatibility complex, concepts of transfusion and component therapy; indications for transfusion therapy, precautions to be taken during blood transfusion, hazards of transfusion and safe handling of blood and blood products.

VI. RESPIRATORY SYSTEM:

1. Physiology and diagnostic methods: Sputum examination, X-ray chest, pulmonary function tests and bronchoscopy.
2. Upper respiratory infections
3. Pneumonias.
4. Bronchiectasis and lung abscess.
5. Bronchial asthma and tropical eosinophilia.
6. Chronic obstructive airway disease and cor pulmonale.
7. Acute and chronic respiratory failure.
8. Disease of pleural effusion, empyema, pneumothorax.
9. Pulmonary tuberculosis.
10. Neoplasms of lung
11. Common occupational lung diseases.

VII. CARDIO VASCULAR SYSTEM:

1. ECG, X-ray chest with reference to common cardiovascular diseases.
2. Coronary artery disease.
3. Rheumatic fever and rheumatic heart disease
4. Infective endocarditis
5. Hypertension and hypertensive heart disease.
6. Acute and chronic heart failure.
7. Common congenital heart disease in adolescents and adults: ASD, VSD, PDA, TOF and Coarctation of aorta.
8. Common cardiac arrhythmias.
9. Acute and chronic pericarditis, pericardial effusion and cardiac tamponade.
10. Common aortic diseases, peripheral vascular disease, arterial and venous.

VIII. GASTRO-INTESTINAL TRACT:

1. Stool examination, endoscopy in reference to common Gastrointestinal diseases.
2. Acid peptic disease.
3. Malabsorption syndrome.
4. Inflammatory bowel disease and irritable bowel syndrome.
5. Acute and chronic hepatitis.

6. Cirrhosis of liver.
7. Abdominal tuberculosis.

IX. EMERGENCY MEDICINE:

1. Cardiopulmonary resuscitation
2. Acute pulmonary oedema.
3. Hypertension emergencies.
4. Diabetic keto acidosis and hypoglycemia.
5. Status epilepticus.
6. Acute severe bronchial asthma.
7. Shock and anaphylaxis.
8. Acute myocardial infarction.
9. Upper GI bleeding and hepatic coma.
10. Diagnosis and management of comatose patient.
11. Management of unknown poisoning.

X. NEUROLOGICAL SYSTEM:

1. Cerebrovascular diseases.
2. Meningitis: Viral, bacterial and tuberculous.
3. Peripheral neuropathy
4. Epilepsy
5. Extra pyramidal diseases.
6. Common compressive and non-compressive spinal cord syndromes.
7. Motor system disease, motor neuron disease.
8. Myasthenia gravis.
9. Common myopathies in India.
10. Degenerative, nutritional and metabolic diseases of the nervous system.

XI. NEPHROLOGY AND URINARY SYSTEM:

1. Acute renal failure.
2. Chronic renal failure
3. Nephritis and nephrotic syndrome.
4. Urinary tract infections/pyelonephritis.
5. Tubulointerstitial diseases and toxic neuropathies.

XII. CONNECTIVE TISSUE DISORDERS:

1. Rheumatoid arthritis.
2. Degenerative joint disease including cervical spondylosis.
3. Systemic lupus erythematosus, systemic sclerosis and other collagen vascular diseases.
4. Gout

XIII. ENDOCRINES:

1. Diabetes mellitus.
2. Hypo and hyperthyroidism, Iodine deficiency disorders.
3. Cushing's syndrome and Addison's disease.
4. Pituitary disorders: Acromegaly and Sheehan's syndrome.
5. Calcium and phosphorus metabolism: parathyroid and Metabolic bone disease.

XIV. GERIATRICS:

1. Geriatric medicine: general principles of dealings with Health problems of the elderly.

XV. BIO-MEDICAL WASTE:

Types, potential risks and their safe management (see Annexure 3)

Skills

1. Obtain a proper relevant history, and perform a humane and thorough clinical examination including internal examinations (per-rectal and per-vaginal) and examinations of all organs/systems.
2. Arrive at a logical working diagnosis after clinical examination.
3. Order appropriate investigations keeping in mind their relevance (need based) and cost effectiveness.
4. Plan and institute a line of treatment which is need based, cost effective and appropriate for common ailments taking into consideration:
5. Recognise situations, which call for urgent or early treatment at secondary and tertiary centres and make a prompt referral of such patients after giving first and or emergency treatment.
6. Assessment and manage fluid/electrolyte and acid-base imbalance.
7. Interpret abnormal biochemical laboratory values of common diseases.
8. Interpret skiagrams of common diseases.
9. Identify irrational prescriptions and explain their irrationality.
10. Interpret serological tests such as VDRL, ASLO, Widal, HIV, Rheumatoid factor, Hepatitis and TORCH infections.
11. Demonstrate empathy and humane approach towards patients, relatives and attendants.
12. Demonstrate interpersonal and communication skills befitting a physician in order to discuss the illness and its outcome with patient and family.
13. Develop a proper attitude towards patients, colleagues and other staff.
14. Maintain an ethical behavior in all aspects of medical practice.
15. Develop a holistic attitude towards medicine taking social and cultural factors in each case.
16. Obtain informed consent for any examination/procedure.
17. Appreciate patients right to privacy.
18. Write a complete case record with all necessary details.
19. Write a proper discharge summary with all relevant information.

20. Write a proper referral note to secondary or tertiary centres or to other physicians with all necessary details.
21. Assess the need for issue proper medical certificates to patients for various purposes.
22. Adopt universal precautions for self protection against HIV and hepatitis and counsel patients.
23. Perform skin sensitivity tests for drugs and serum.
24. Record and interpret ECG and be able to identify common abnormalities like myocardial infarction and arrhythmias.
25. Start intravenous line and infusion.
26. Do venous cut down.
27. Give intra dermal, subcutaneous, intra muscular, intra venous injections.
28. Grand rounds
29. X-ray Classes
30. ECG Classes
31. Image Classes
32. Seminars
33. Quiz
34. Group Discussion
35. Remedial Classes
36. MCQ Classes
37. Problem based learning
38. Integrated classes
39. OSCE

d) Teaching Hours

Teaching of Medicine and its allied specialties starts from 3rd term and extends to 9th term during phase II and III. Theory is taught for 300 hours starting from 4th term till 9th term as follows:

Integrated Teaching: 36 hours for group discussions, seminars etc., involving multi-speciality teachers.

Clinical Posting: 26 weeks (see table)

Phase	Term	No. of classes Per week	Total Hours
Phase II	4 th Term	1	24
Phase II	5 th Term	1	24
Phase III	6 th Term	1	24
Phase III	7 th Term	2	48
Phase III	8 th Term	3	72
Phase III	9 th Term	3	72
Total			264

b) PSYCHIATRY

Course Description

As specified by Medical Council of India

a) Goal

The aim of teaching the undergraduate student in Psychiatry is to impart such knowledge and skills that may enable to diagnose and treat common Psychiatric disorders, handle Psychiatric emergencies and to refer complicated/unusual manifestations and refer Psychiatric disorders to the specialist.

b) Objectives

Knowledge

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

1. Comprehend nature and development of different types of normal human behavior like learning, memory, motivation, personality and intelligence;
2. Recognize difference between normal and abnormal behavior,
3. Classify psychiatric disorders;
4. recognize clinical manifestations of the following common syndromes and plan their appropriate management; organic psychosis, functional psychosis, schizophrenia, affective disorders, neurotic disorders, personality disorders, psycho-physiological disorders, drug and alcohol dependence, psychiatric disorders of childhood and adolescence;
5. Describe rational use of different modes of therapy in psychiatric disorders.

Skills

The student shall be able to

1. Interview the patient and understand different methods of communication in patient doctor relationship.
2. Elicit detailed psychiatric case history and conduct clinical examination for assessment of mental status;
3. Define, elicit and interpret psycho-pathological symptoms and signs;
4. Diagnose and manage common psychiatric disorders;
5. Identify and manage psychological reactions and psychiatric disorders in medical and surgical patients in clinical practice and in community setting.

Integration

Training in Psychiatry shall prepare the students to deliver preventive, promotive, curative and re-habilitative services for the case of patients both in the family and community and to refer advance cases to a specialized Psychiatry/Mental Hospital. Training should be

integrated with the department of Medicine. Neuro-Anatomy, Behavioral Sciences and Forensic Medicine.

Departmental Objectives

At the end of the course, the student will be able to comprehend nature and development of different aspects of normal human behavior like learning, memory, motivation, personality and intelligence.

- Recognise difference between normal and abnormal behavior.
- Classify psychiatric disorders.
- Recognise clinical manifestations of common syndromes, and plan their appropriate management.
- Describe rational use of different modes of therapy in psychiatric disorders.

C) Course Contents

1. History aspects of the diagnosis and treatment of mental illness; concept of mental health v/s illness; classification system currently in use in psychiatry.
2. Eliciting a detailed psychiatric history and conduction of a mental status examination; defining, eliciting and interpreting psycho pathological symptoms and signs.
3. Concept of underlying normal and abnormal human behavior; principles o learning, memory, personality and intelligence; psychopathology (ef. Behavioural sciences).
4. Classification of the different types of psychoses; differences between psychoses and neuroses; difference between functional and organic psychoses.
5. Clinical features, diagnosis and management of:
 - a) Schizophrenia.
 - b) Mania and depression
 - c) Anxiety disorders and hysteria.
 - d) Dementia.
 - e) Alcoholism.
6. Clinical recognition and initial therapy of psychiatric emergencies.
7. Clinical features, diagnosis and management of psychiatric disorders of childhood and adolescence.
8. Use of questionnaires in psychology.
9. Use of intelligence test.
10. Personality disorders.

Skills

Do psychiatric evaluation and recognize common psychiatric illness.

d) Teaching Hours

Theory: 20 Hours,

Clinical Posting: 2 weeks.

c) DERMATOLOGY, VENEROLOGY AND LEPROSY

Goals

The main goal of undergraduate teaching in Dermatology, Venereology and Leprosy is to train the student in such a way that he/she acquires knowledge and skills to diagnose and treat common dermatoses, and refer complications of common dermatoses or emergencies or rare diseases to a specialist.

Objectives

At the end of the course in Dermatology, Venereology and Leprosy, the student should demonstrate the following knowledge and skills:

A. Knowledge

1. Clinical manifestations and complications of common dermatological conditions and emergencies
2. Relevant investigations to confirm the diagnosis of common dermatoses
3. Pharmacology of commonly used topical preparations and systemic drugs in Dermatology, Venereology and Leprosy
4. Various therapeutic options (both medical and surgical) available for a given disease and selection of appropriate therapy after discussing the same with patients and/or their relatives
5. Recognition of need for referral in case of complications developed during the treatment of common dermatoses, or emergencies, or rare diseases

B. Skills

1. Elicitation of relevant and correct clinical history and presenting it in a chronological order
2. Complete clinical examination and demonstration of diagnostic clinical signs and/or tests that will help in arriving at the correct diagnosis of common dermatoses and emergencies
3. Simple side-lab procedures or tests required to make bedside diagnoses
4. Method of application of various topical preparations and compresses used in the treatment of common dermatoses

Syllabus

a. Theory

Topics that a student must know

1. Structure and functions of skin and its appendages
2. Common cutaneous bacterial infections: impetigo, ecthyma, folliculitis, furuncle, carbuncle, cellulitis, erysipelas

3. Common cutaneous fungal infections: pityriasis versicolor, dermatophytoses, candidal infections
4. Common cutaneous viral infections and viral exanthems: varicella, herpes simplex, herpes zoster
5. Common ectoparasitic infestations and arthropod bites: scabies, pediculosis, papular urticaria
6. Contact dermatitis, atopic dermatitis, seborrheic dermatitis
7. Urticaria, angioedema, erythema multiforme, Steven-Johnson's syndrome and toxic epidermal necrolysis
8. Papulosquamous disorders: psoriasis and lichen planus
9. Nutritional dermatoses: Cutaneous manifestations of protein energy malnutrition, pellagra, riboflavin and vitamin A deficiencies
10. Pigmentary disorders: vitiligo, melasma
11. Others: acne vulgaris
12. Leprosy: microbiology, pathology, clinical features, reactions and deformities, investigations, management and control
13. Sexually transmitted diseases: cutaneous manifestations of HIV infection
14. Cutaneous manifestations of emerging diseases like chikungunya, dengue, rickettsial fevers

Topics that are desirable to know

1. Diseases causing acute skin failure: erythroderma, pemphigus, staphylococcal scalded skin syndrome, severe adverse cutaneous drug reactions
2. Cutaneous manifestations of common systemic diseases: diabetes mellitus, renal failure, hepatobiliary disorders, thyroid disorders

b. Practical

Skills that a student must perform independently

1. Identification of primary, secondary and special skin lesions, and general principals of approach to a patient with skin diseases
2. Clinical signs and tests: Auspitz's sign, dermatographism, Nikolsky's sign, diascopy
3. Slide lab procedures: wet mount preparation, KOH mount, Gram staining, Tzanck smear, Z-N staining
4. Potassium permanganate and saline compresses
5. Leprosy: testing for anesthesia/impaired sensations in skin patches and extremities, demonstration of peripheral nerve thickening, care of deformities and trophic ulcers, prevention of disabilities through counseling, and foot and hand care
6. Sexually transmitted diseases: syndromic management, Gram staining of genital discharge for gonococci

Skills that a student must perform under supervision

1. Slit skin smear for demonstration of *M. leprae*
2. Incision and drainage of abscesses
3. Management of urticaria and angioedema

Skills that a student must learn by assisting the specialist

1. Skin biopsy
2. Management of dermatological emergencies

Skills where a student participates as an observer

1. Molluscum and wart removal techniques
2. PUVA and NBUVB therapy
3. Patch testing
4. Dark ground microscopy
5. Tissue smear
6. Vitiligo surgeries

Teaching methods

- A. *Structured interactive sessions (lectures)*
- B. *Small group discussions (demonstration and discussion of clinical cases during clinical postings)*
- C. *Self-learning tools*
 - Assignments
 - Problem based learning
 - Written case scenarios
 - Simulated patient management problems
 - One to one teaching in wards

Learning resource materials

Textbooks, internet, teaching aids: CDs, videos and slides

Assessment

Formative at the end of capsule course and clinical postings, and summative at the end of the course

- A. *Theory*
 1. Problem solving MCQs
 2. Structured long questions
 3. Problem solving long questions
 4. Short answer questions

B. Practical

1. Short cases
2. Spotters

Recommended textbooks (latest editions)

1. Roxburg's common skin diseases
2. Jopling's handbook of leprosy
3. Tropical venereology by Arya and Osaba

d) TUBERCULOSIS AND RESPIRATORY DISEASES

As specified by Medical Council of India

Goal

The aim of teaching the undergraduate student in Tuberculosis and Chest Diseases is to impart such knowledge and skills that may enable him/her to diagnose and manage common ailments affecting the chest with the special emphasis on management and prevention of Tuberculosis and National Tuberculosis Control Programme.

Objectives

Knowledge

At the end of the course of Tuberculosis and Chest-diseases, the student shall be able to:

1. demonstrate knowledge of common chest diseases, their clinical manifestations, including emergent situations and of investigative procedures to confirm their diagnosis;
2. demonstrate comprehensive knowledge of various modes of therapy used in treatment of respiratory diseases;
3. describe the mode of action of commonly used drugs, their doses, side-effects/toxicity, indications and contra-indications and interactions;
4. Describe commonly used modes of management including medical and surgical procedures available for treatment of various diseases and to offer a comprehensive plan of management inclusive of National Tuberculosis Control programme.

Skills

The student shall be able to:

1. interview the patient, elicit relevant and correct information and describe the history in chronological order;
2. conduct clinical examination, elicit and interpret clinical findings and diagnose common respiratory disorders and emergencies;

3. perform simple, routine investigative and office procedures required for making the bed side diagnosis, especially sputum collection and examination for etiologic organisms especially acid fast bacilli (AFB), interpretation of the chest x-rays and respiratory function tests;
4. interpret and manage various blood gases and pH abnormalities in various respiratory diseases;
5. manage common diseases recognizing need for referral for specialized care, in case of inappropriateness of therapeutic response;
6. Assist in the performance of common procedures, like laryngoscopic examination, pleural aspiration, respiratory physiotherapy, laryngeal intubation and pneumo-thoracic drainage aspiration.

Integration

The broad goal of effective teaching can be obtained through integration with departments of Medicine, Surgery, Microbiology, Pathology, Pharmacology and Preventive and Social Medicine.

a) Teaching Hours

Theory: 20 hours, Clinical posting: two weeks.

SCHEME OF EXAMINATION OF MEDICINE AND ITS ALLIED SPECIALITIES

Internal Assessment: Total marks: 100; (Theory 60 and Clinical 40)

Theory: 60 marks

Minimum of three examinations are recommended. The 9th term examination preceding the University examination may be similar to the pattern of University examination. Average of any two best marks obtained in the notified internal examination is taken into consideration for calculating internal assessment. The total marks be reduced to 60 and sent to the University.

Clinical: 40 marks

There will be ward leaving examination at the end of each posting. Average of any two best marks obtained in the clinical examination shall be reduced to 40 marks and sent to the University.

The internal assessment marks both theory and practical obtained by the candidates should be sent to the University at least fifteen days prior to the commencement of theory examination. Note that a student shall secure at least 35% marks of the total marks fixed for internal assessment in a particular subject in order to be eligible to appear in final university examination. Criteria for passing:

A student has to secure marks as follows to pass in a subject:

- 1) 35% in Internal assessment (for eligibility to appear for University examination)
- 2) 50% of the total marks for Theory with Orals (only externals)
- 3) 50% of the marks of Practical / clinical (only externals)
- 4) 50% of the aggregate (total of externals and internals)

University Examination

Total marks: 400 (Theory 200, Viva-voce 40 and Clinical 160)

Theory (Written Paper)

There shall be two papers, each carrying 100 marks. Each paper shall be of 3 hours duration. The pattern of questions would be of three types:

- Long essay question – each carrying 10 marks
- Short essay question – each carrying 05 marks
- Short answer question – each carrying 03 marks

Distribution of subjects in Paper I and Paper II, for the University examination shall be as follows:

Paper I - General Medicine

Paper II - General Medicine including Psychiatry (20 marks), Dermatology, STD, Tuberculosis and Respiratory Diseases.

(Shall contain one question on basic sciences and allied subjects)

Clinical

Clinical examination consists of one long case carrying 80 marks and two short cases of 40 marks each. Max marks – 160.

Viva voce

Consists of oral questions on all aspects of syllabus and also interpretations of X-ray, ECG, prescriptions, etc., specimens, and instruments, 40 marks.

Recommended Books (Latest editions)

1. Davidson's Principles and Practice of Medicine, Churchill Livingstone, London.
2. API Text Book of Medicine.
3. Swash M, Hutchison's Clinical Methods.
4. Chamberlain's Symptoms and Signs in Clinical Medicine, ELBS.

Reference Books

1. Harrison's Principles of Internal Medicine, McGraw Hill.
2. Macleod's Clinical Examination ISE 9th Ed 1995.

SURGERY AND ITS ALLIED SPECIALITIES

- (a) General Surgery
- (b) Orthopedics
- (c) Radiodiagnosis
- (d) Radiotherapy
- (e) Anaesthesia

a) GENERAL SURGERY (Including Pediatric Surgery)

COURSE DESCRIPTION

As specified by Medical Council of India

GOAL

Graduate capable of delivering effective first contact surgical care.

OBJECTIVES

Knowledge

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

1. Should be competent to diagnose and describe management of common surgical diseases including emergencies.
2. Understand, describe and apply the knowledge of fluid and electrolyte therapy.
3. Describe indications of blood transfusion, apply it and manage complications.
4. Understand and describe principles of asepsis, disinfection and sterilization, take up rational drug therapy and appropriate use of antibiotics in surgical conditions.
5. Develop basic awareness and detect common malignancies in the country, understand principles of management and prevention.
6. Enumerate different types of anesthetic agents, their indications, uses, contraindications and side effects.

Skills

At the end of the course, the student should be able to:

1. Examine and diagnose common surgical conditions.
2. Plan for various tests and their interpretation.
3. Diagnose and manage patients with various types of shock.
4. Resuscitate and manage air-way, a critically injured, burns and Patients with cardio-respiratory failure.
5. Resuscitate and provide basic care in polytrauma patients and refer them appropriately.

6. Diagnose and initiate treatment of acute surgical emergencies and refer appropriately.
7. Provide primary care for a patient of burns.
8. Management of wounds including tetanus, gas gangrene and prophylaxis.
9. Acquire knowledge of basic principles of operative surgery, including per operative procedures and manage patients in post operative period.
10. Diagnose neonatal and pediatric surgical emergencies and provide sound primary care before referring the patient to secondary/tertiary Centers
11. Identify congenital anomalies and refer them for appropriate management.
12. In addition to the skills referred above in items he shall have observed/assisted/performed the following during internship:
 - a. Incision and drainage of abscess
 - b. Debridement and suturing of open wounds and management of external hemorrhage
 - c. Venesection/I.V.line insertion
 - d. Excision of small lumps
 - e. Biopsy of surface malignancy
 - f. Catheterization and Nasogastric intubation
 - g. Circumcision
 - h. Vasectomy
 - i. Peritoneal and pleural aspirations
 - j. Diagnostic Proctoscopy
 - k. Hydrocele operation
 - l. Endotracheal intubation
 - m. Tracheostomy and cricothyroidotomy
 - n. Chest tube insertion.

Affector Domain:

1. Understand and follow ethical approach in management of surgical conditions.
2. Counsel and guide the patients regarding need, options, advantages and disadvantage of common surgical procedures.
3. Develop overall humane approach in management of terminal care for needy patients.
4. Co-ordinate and organize needful services at the time of natural disasters and mass casualties.
5. Work in tandem with National and State level health care policies.
6. Understand and follow medico legal aspects in surgical care.

Integration

The undergraduate teaching in surgery shall be integrated to various stages with pre clinical, para clinical and other clinical departments.

C) COURSE CONTENTS

CLINICAL CLASSES FOR - II Phase – 3rd Term

Sl. No	Topic	
1	1. Introductory Classes for 2 weeks during clinical postings at the beginning of 3 rd term.	Interactive Sessions/Didactic Lecture
2	2. Learning of Basic clinical Skills using simulation at University clinical skills laboratory (1 class)per week during 3 rd & 4 th term clinical postings	Interactive Sessions

Theory Classes for II Phase – 4th Term

(One classes per week (24 Hours))

Sl. No	Topic	
1	Introduction of Surgery, Historical background and progress made	Interactive Sessions
2	Metabolic response to injury	Interactive Sessions
3	Wounds, Wound healing, wound management and scars	Didactic Lecture
4	Asepsis, antisepsis, sterilization and universal precautions	Didactic Lecture
5	Surgical infections, causes and management	Didactic Lecture
6	Prevention of surgical site infections.	Interactive Sessions
7	Tetanus, gas gangrene- management & prevention	Didactic Lecture
8	Chronic specific infections, Tuberculosis, Filariasis and syphilis	Didactic Lecture
9	Boils, cellulites, abscess, necrotizing fascitis and Hospital infections	Didactic Lecture
10	Acute specific and non-specific infections	Didactic Lecture
11	Antibiotic therapy	Didactic Lecture
12	AIDS and Hepatitis	Didactic Lecture
13	Tumours, Cysts, Ulcers, Sinuses and Fistulae, and Pressure sores	Interactive Sessions/Case study
14	Haemorrhage and Shock:- etiology ,pathophysiology ,symptomatology & management	Interactive Sessions/Didactic Lecture

II Phase – 5th Term

One class per week (24 Hours per term)

Sl. No	Topic	
15	Fluid, Electrolyte and Acid Base Balance, Nutrition	Interactive Sessions/Didactic Lecture
a	Introduction to Physiology of fluids and Electrolytes	Didactic Lecture/Ward rounds
b	Dehydration and over hydration	Didactic Lecture
c	Specific electrolyte losses, clinical presentation & management of Hypokalaemia, Hyponatraemia, Hypocalcaemia, Acidosis, Alkalosis & acid Base balance	Interactive Sessions/Didactic Lecture
d	Various replacement fluids in Surgery, mode of administration and complications	Didactic Lecture/Seminar
e	Blood grouping, Blood transfusion, indications and complications	Didactic Lecture/Seminar
f	Nutrition, pre-operative, post-operative & intravenous alimentation	Didactic Lecture/Seminar
g	Nutritional support to surgical patients.	Didactic Lecture/Seminar
	<i>Desirable to know</i>	
h	Electrolyte changes in specific diseases, Pyloric obstruction, Intestinal obstruction, & Renal failure.	Interactive Sessions
	<i>Must know</i>	
16		Didactic Lecture
a	Basic principles in management of trauma patients Mechanisms and management of missile, blast and gunshot injuries	
b	Bites and stings	Didactic Lecture
c	Infections of the hand and foot	Didactic Lecture/Ward rounds
d	Common skin and subcutaneous conditions.	Didactic Lecture
e	Skin tumours, Skin Grafting & flaps.	Interactive Sessions
f	Burns causes, prevention & management	Interactive Sessions

g	Diagnostic Imaging.	Seminar
h	Common preoperative preparation and postoperative complications	Interactive Sessions
i	Anaesthesia and pain management	Didactic Lecture
	<i>Desirable to know</i>	
j	Organ transplantation: Basic Principles	Didactic Lecture
k	Diseases of muscles, tendons, bursae and fasciae	Didactic Lecture
17	ARTERIAL DISEASES: -	
a	Assessment of a case of peripheral vascular disease	Didactic Lecture/Ward round
b	Acute arterial occlusion, diagnosis and initial management- Thrombosis and Embolism	Interactive Sessions
c	Thromboangitis Obliterans (Buerger's disease)	Didactic Lecture
d	Arterio sclerosis	Didactic Lecture
e	Gangrene- Types of gangrene & management.	Didactic Lecture
f	Conservative management of an ischaemic limb& Amputations.	Didactic Lecture
g	Diabetic foot	Interactive Sessions
	<i>Desirable to know</i>	
h	Surgical management of an ischaemic limb-direct arterial surgeries.	Didactic Lecture
i	Vascular injuries-basic principles and management	Didactic Lecture
j	Sympathetic system: -Anatomy, Indications for sympathectomy,	Didactic Lecture
	Cervical sympathectomy & Lumbar sympathectomy	Didactic Lecture
18	VENOUS DISEASES: -MUST KNOW	
a	Varicose veins	Didactic Lecture/Seminar
b	Superficial and deep vein thrombosis- Diagnosis, principles of therapy and prevention.	Didactic Lecture
c	Chronic venous ulcers.	Ward rounds
19	LYMPHATICS AND LYMPHNODES:	
a	Diagnosis and principles of management of lymphangitis and lymphedema	Didactic Lecture

b	Diseases of Lymphnodes	Seminar/Ward rounds
	<i>Desirable to know</i>	
	The Reticulosis & Lymphomas	Didactic Lecture

THEORY CLASSES FOR III/I Phase – 6th Term
Two class per week (48 Hours per term)

Sl. No	Topic	
	<i>Must know</i>	
20	Basic principles of oncology	Didactic Lecture
21	Basic principles of minimal access surgery & Endoscopy.	Didactic Lecture
22	Hernia: Inguinal hernia, Femoral Hernia, Umbilical Hernia Epigastric Hernia & Ventral Hernias	Interactive Sessions
23	Abdominal wall – Anatomy, Incisions, Burst abdomen,	Didactic Lecture
24	FACE: Rodent ulcer & jaw swellings	Didactic Lecture
25	MOUTH	
a	Ranula & retention cysts	Didactic Lecture
b	Lingual and Sublingual dermoids	Didactic Lecture
c	Carcinoma cheek	Interactive Sessions
26	TONGUE	
a	Hyperkeratosis and leucoplakia	Didactic Lecture
b	Ulcers of tongue & precancerous lesions	Interactive Sessions/Seminar
c	Carcinoma tongue.	Interactive Sessions/Seminar
27	SALIVARY GLAND	
a	Inflammation	Didactic Lecture
b	Salivary calculi	Didactic Lecture
c	Neoplasms	Didactic Lecture
28	NECK: Differential diagnosis of swellings of the neck & basic principles in the management of secondaries in neck	Seminar
29	BIO-MEDICAL WASTE: Types, Potential risks and their safe Management in relation to Surgical Practice	Interactive Sessions
30	Surgical ethics and informed consent	Didactic Lecture
31	Declaration of death and brain death.	Integrated with

		Forensic Department
32	Day care surgery	Didactic Lecture
33	Clinical trials	Didactic Lecture
	<i>Desirable to know</i>	
34	Diseases of Umbilicus, Desmoid tumor, Development and Congenital anomalies	Didactic Lecture
35	Cleft lip and cleft palate, Fascio-Maxillary injuries, Branchial cyst and fistula, Cystic Hygroma and solitary lymphatic cyst, Thoracic outlet syndrome	Didactic Lecture/Seminar

THEORY CLASSES FOR -III/I Phase – 7th Term

One class per week (24 Hours)

Sl. No	Topic	
	<i>Must know</i>	
36.	THYROID GLAND, THYROGLOSSAL TRACT & ENDOCRINES: -	
a	Development, Anatomy, Physiology and Investigations	Didactic Lecture
b	Thyroglossal cyst and fistula	Didactic Lecture
c	Classification and management Goiters.	Seminar
d	Solitary thyroid nodule	Didactic Lecture
d	Thyroiditis, Hashimoto's disease & Riedel's thyroiditis	Didactic Lecture
f	Thyroid neoplasms-Clinical features, diagnosis and management of Carcinoma of the thyroid.	Interactive Sessions
	<i>Desirable to know</i>	
g	Parathyroid, adrenals and thymus	Didactic Lecture
37	BREAST: -	
a	Anatomy, physiology and lymphatic drainage	Didactic Lecture
b	Clinical breast examination, breast self examination, Investigation of breast lump and Screening.	Didactic Lecture
c	Inflammation of the breast and Breast abscess	Didactic Lecture
d	Benign breast diseases-Fibroademoma, ANDI, Cystosarcoma phyllodes, Management of nipple discharge	Seminar
e	Malignant tumors of the breast- clinical features, diagnosis, staging and principles of management	Seminar
38.	CRANIO – CEREBRAL INJURIES:-	
a	Mechanism, Pathology, investigations & Management	Didactic Lecture

b	Cerebral concussion, contusion and laceration	Didactic Lecture
c	Extradural haematoma	Didactic Lecture
d	Subdural haematoma	Didactic Lecture
	<i>Desirable to know</i>	
a	Intracerebral haematoma	Didactic Lecture
b	Fractures of the skull	Didactic Lecture
39	DISEASES OF THE BRAIN:-	
a	Intracranial abscess	Didactic Lecture
b	Intracranial tumors	Interactive Sessions
c	Hydrocephalus	Seminar

40.	DISEASES OF THE NERVES:-	
a	Injuries of nerves and nerve regeneration	Didactic Lecture
b	Facial nerve	Didactic Lecture
	<i>Desirable to know</i>	
c	Radial,Ulnar and Median nerve, Lateral Popliteal nerves.	Didactic Lecture
41.	CARDIOTHORACIC SYSTEM:	
a	Injuries to the thorax- Recognition and treatment of pneumothorax, haemothorax, Flail chest, stove in chest.	Seminar/Interactive Sessions
b	Infections: - Empyema thoracis , Suppurative conditions of the lungs and pleura.	Didactic Lecture
c	Pulmonary embolism: prevention, recognition and treatment	Didactic Lecture
d	Postoperative pulmonary complications	Didactic Lecture
	<i>Desirable to know</i>	
e	Neoplasms of the lung, clinical features, diagnosis and principles of management.	Seminar

III Phase – 8th Term

2 classes Theory + 1 Tutorial Classes per Week/integrated teaching & student seminars 96 Hours

Sl. No	Topic	
	<i>Must know</i>	
42	GENITO URINARY SYSTEM:-	

	Symptomatology and investigations of a genito-urinary case	Didactic Lecture
43	KIDNEYS AND URETER:-	
a	Congenital anomalies– Polycystic kidney	Didactic Lecture
b	Trauma	Didactic Lecture
c	Renal failure and dialysis	Didactic Lecture
d	Hydronephrosis	Didactic Lecture
e	Renal and Ureteric calculi: Diagnosis and principles of management of urolithiasis	Seminar
f	Pyonephrosis, perinephric abscess	Didactic Lecture
g	Genitourinary Tuberculosis	Integrated with allied Depts.
h	Neoplasms: Renal tumors Clinical features and diagnosis, Principles of management	Interactive Sessions
44.	URINARY BLADDER	
a	Congenital anomalies- Ectopia vesicae[desirable to know]	Didactic Lecture
b	Trauma –injuries to urinary bladder.	Didactic Lecture
c	Retention of urine and cystitis	Didactic Lecture
d	Vesical calculi	Didactic Lecture
e	Bladder tumours.	Seminar
45.	PROSTATE	
a	Surgical anatomy	Didactic Lecture
b	Lower Urinary tract symptoms or prostatism	Didactic Lecture
c	Benign prostatic hyperplasia; diagnosis and management	Didactic Lecture
	Desirable to know	
d	Carcinoma prostate-Clinical features, diagnosis and Principles of	Seminar
46.	URETHRA:-[desirable to know]	
a	Principles of management of Urethral injuries	Didactic Lecture
b	Stricture and its complications.	Didactic Lecture
47	PENIS, TESTIS AND SCROTUM:	
	PENIS:-<i>must know</i>	
a	Phimosis, Paraphimosis, meatal stenosis & hypospadias.	Didactic Lecture
b	Pre-cancerous conditions of the penis,	Didactic Lecture
c	Carcinoma penis: Clinical features, diagnosis & Principles of management	Didactic Lecture
	TESTIS:-	
a	Undescended testis and testicular torsion: Diagnosis and principles of Management.	Interactive Sessions

b	Varicocele	Didactic Lecture
c	Hydrocele & complications.	Didactic Lecture
d	Acute epididymo orchitis	Didactic Lecture
e	Testicular tumours. Clinical features and diagnosis, Principles of management[desirable to know]	Seminar
	SCROTUM: -	
	Fournier's gangrene,	Interactive Sessions
	Carcinoma-scrotum[desirable to know]	Didactic Lecture
	VASECTOMY:-	
	Indications, Techniques, Complications	Videos
	Recanalisation[desirable to know]	Videos
	<u>Must know</u>	
48.	INTRODUCTION TO PAEDIATRIC SURGERY,	
a	Fluid and electrolyte management.	Didactic Lecture
b	Anatomy and Physiology	Didactic Lecture
49.	PAEDIATRIC TRAUMA COMMON PAEDIATRIC SURGICAL CONDITIONS	
a	Inguino-scrotal disorders,	Didactic Lecture
b	Anomalies of penis,	Didactic Lecture
c	Umbilical hernia,	Didactic Lecture
d	Congenital hypertrophic pyloric stenosis,	Videos
e	Intussusception,	Didactic Lecture
f	Acute abdomen in children.	Interactive Sessions
g	Acute appendicitis,	Didactic Lecture
h	UTI	
	Constipation & prolapse rectum	Didactic Lecture
i	Meckels diverticulum	Didactic Lecture
g	Foreign body inhaled/swallowed.	Videos
50.	CONGENITAL MALFORMATIONS [DESIRABLE TO KNOW]	
a	Oesophageal atresia,	Didactic Lecture
b	Intestinal atresia,	Didactic Lecture
c	Intestinal malrotation,	Didactic Lecture
d	Ano rectal malformation,	Didactic Lecture
e	Urinary tract malformation,	Didactic Lecture
f	Diaphragmatic hernia	Didactic Lecture

g	Gastroschisis,	Didactic Lecture
h	Biliary atresia,	Seminar
i	Necrotising enterocolitis.	Didactic Lecture
51	PAEDIATRIC SURGERY ONCOLOGY	
a	Neuroblastoma,	Didactic Lecture
b	Wilms tumor,	Seminar
c	Hepatoblastoma,	Didactic Lecture
d	Rhabdomyosarcoma	Didactic Lecture

	MCQ Test for 60 marks (1 hr)	

III Phase – 9th Term

3 Classes per week (72 Hours per term)

Sl. No	Topic	
	<i>Must know</i>	
52.	OESOPHAGUS: -	
a	Investigations of Upper G.I.tract diseases	Interactive Sessions/Videos
b	Dysphagia- differential diagnosis, investigations and management	Didactic Lecture
c	Achalasia Cardia	Didactic Lecture
d	Reflux Oesophagitis and hiatus hernia	Didactic Lecture
e	Carcinoma oesophagus : Clinical features, diagnosis and Principles of Management	Seminar
53.	STOMACH AND DUODENUM:	
a	Congenital hypertrophic pyloric stenosis	Didactic Lecture
b	Acute dilatation of the stomach	Didactic Lecture
c	Gastritis types and clinical features.	Didactic Lecture
d	Peptic ulcer: etiopathogenesis, diagnosis, management and Complications of peptic ulcer.	Didactic Lecture
e	Cancer stomach, Clinical features and diagnosis, Principles of Management	Seminar
f	Miscellaneous-Bezoars.[desirable to know]	Didactic Lecture
54.	SPLEEN:	

a	Splenic Injuries: Assessment, diagnosis and initial management of abdominal injuries.	Interactive Sessions
b	Indications & complications of splenectomy	Interactive Sessions
55.	LIVER: -	
a	Anatomy and segments of liver.	Videos
b	Hepatocellular dysfunction, failure & investigations.	Didactic Lecture
c	Trauma	Didactic Lecture
d	Amoebic liver abscess and pyogenic liver abscess.	Didactic Lecture
e	Cysts of the liver, Simple and Hydatid cyst	Didactic Lecture
f	Portal hypertension Clinical features and diagnosis, Principles of management	Seminar
g	Neoplasms of the liver: primary and secondary.[desirable to know]	Seminar
56.	GALL BLADDER AND BILE DUCTS	
a	Anatomy, Physiology and Investigations	Didactic Lecture
b	Choledochal cyst	Didactic Lecture
c	Extrahepatic biliary system, trauma & management [<i>desirable to know</i>].	Didactic Lecture
d	Cholangitis & stricture	Didactic Lecture
e	Cholelithiasis and cholecystitis	Didactic Lecture
f	Obstructive Jaundice	Integrated teaching
g	Carcinoma gall bladder Clinical features and diagnosis, Principles of management.[desirable to know]	Seminar
57 .	PANCREAS:	
a	Anatomy & Physiology	Didactic Lecture
b	Trauma	Didactic Lecture
c	Acute pancreatitis	Didactic Lecture
d	Chronic pancreatitis	Didactic Lecture
e	Pancreatic cysts-pseudocyst.	Videos
f	Carcinoma pancreas.[desirable to know]	Seminar
58.	PERITONEUM:	
a	Peritonitis: causes, recognition, diagnosis, complications and principles of management	Didactic Lecture
b	Subphrenic abscess	Didactic Lecture
c	Abdominal Tuberculosis	Didactic Lecture
d	Mesenteric cysts[desirable to know]	Didactic Lecture
59 .	INTESTINES:	

a	Congenital anomalies	Didactic Lecture
b	Surgical aspects of intestinal amoebiasis	Didactic Lecture
c	Crohn's disease	Interactive Sessions
d	Ulcerative colitis	Interactive Sessions
e	Round worm infestations and their clinical presentation	Didactic Lecture
f	Carcinoma colon: Premalignant conditions of large bowel, Clinical features and diagnosis, Principles of management	Seminar
g	Ileostomy & Colostomy	Didactic Lecture
60.	INTESTINAL OBSTRUCTION:	
a	Classification	Didactic Lecture
b	Pathology	Didactic Lecture
c	Signs and symptoms	Didactic Lecture
d	Management	Interactive Sessions
61.	SPECIFIC OBSTRUCTIONS:	
a	Intussusception	Didactic Lecture
b	Volvulus of sigmoid and small bowel	Didactic Lecture
c	Paralytic ileus.	Didactic Lecture
62.	APPENDIX:	
a	Appendicitis: Diagnosis and management of acute appendicitis	Didactic Lecture
b	Complications and Management	Didactic Lecture
c	Other diseases of appendix[desirable to know]	Didactic Lecture
63.	RECTUM AND ANAL CANAL:	
a	Anatomy, Anorectal anomalies	Didactic Lecture
b	Clinical features of anorectal diseases & investigations.	Didactic Lecture
c	Ano-rectal abscess & fistula in ano.	Seminar
d	Fissures and Haemorrhoids.	Didactic Lecture
e	Prolapse of rectum	Didactic Lecture
f	Pilonidal sinus	Didactic Lecture
g	Rectal polyps[Desirable to know]	Didactic Lecture
h	Ano-Rectal Carcinoma	Seminar
64.	Robotics, Notes, Endoluminal surgeries, Newer gadgets in surgery. (<i>NICE TO KNOW</i>)	Videos

SCHEME OF EXAMINATION OF SURGERY AND ITS ALLIED SPECIALITIES

Internal Assessment:

Total Marks: 100, (Theory 60 and Clinical 40)

Theory: 60 Marks: (45 for surgery and 15 for Orthopaedics)

Minimum of three examinations are recommended. The 9th term examination preceding the university examination may be similar to the pattern of university examination. Average of any two best marks obtained in the notified internal examination be taken into consideration for calculating internal assessment. The total marks be reduced to 45 and sent to the University. Among the theory tests, one test shall be based on MCQ's of 100 marks

Clinical: 40 marks (30 marks for surgery and 10 marks for Orthopaedics)

There will be ward-leaving examination at the end of each posting. Average of any two best marks obtained in the clinical examination shall be reduced to 30 marks and sent to the university. One of the clinical exam or ward leaving test shall be OSCE.

The internal assessment marks both theory and practical obtained by the candidates should be sent to the University at least fifteen days prior to the commencement of theory examination. Note that a student shall secure at least 35% marks of the total marks fixed for internal assessment in a particular subject in order to be eligible to appear in final university examination.

NOTE: *The internal assessment for surgery shall consist of 45 marks for General Surgery and 15 marks for Orthopaedics in Theory component and 30 marks for General Surgery and 10 marks for Orthopaedics in clinical component.*

Splitting of marks in Surgery

20% as stipulated

Theory: 45

- Break up: Test =30 / best 3 among the conducted tests will be taken and reduced to 30.
One test of 100 marks in the form of MCQs
- Record book = 5
- ICMR projects/Assistance to any research activity=5
- Participation in student seminar and group discussion = 5
- =30 + 5+5+5+=45

I. A. PRACTICALS

20% as stipulated

Total =30

Ward leaving tests after clinical posting minimum one shall be OSCE of 10 marks

5 marks for best of 3 ward leaving tests, 5+5+5=15

10 marks for OSCE

5 marks for participation in Dept. extension activities

Total 15+10+5=30

University Examination

Total marks : 400 (Theory 200, Viva-Voce 40 and Clinical 160)

Theory (Written)

There shall be **two papers each carrying 100 marks**; each paper shall be of three hours duration.

The pattern of **questions would be of three types.**

Long essay question – each question carrying 10 marks

Short essay question – each question carrying 5 marks

Short answer question – each question carrying 3 marks

Distribution of subjects in Paper I and Paper II for the University examination shall be as follows:

Paper-I

Max. Marks – 100

Time 3 hours

Section - A (Gen. Surgery)

- | | | |
|----------------------------|-----------------|-----------|
| 1. Long essay questions | 2x10 marks each | 20 |
| 2. Short essay questions | 3x5 marks each | 15 |
| 3. Short answers questions | 5x3 marks each | <u>15</u> |

Total – 50 marks

Section B (Orthopedics)

- | | | |
|------------------|-----------------|-----------|
| 1. Long essay | 2x10 marks each | 20 |
| 2. Short essay | 3x5 marks each | 15 |
| 3. Short answers | 5x3 marks each | <u>15</u> |

Total - 50 marks

PAPER-II

Max. Marks:100

Time 3 hours

(Gen. Surgery including anaesthesiology, Dental diseases, Radiology, Electrotherapeutics and their application in surgery)

1. Long essay	2x10 marks each	20
2. Short essay	10x5 marks each	50
3. Short answers	10x3 marks each	<u>30</u>
		Total - 100 marks

Clinical Examination: 160 Marks

Surgery : 120 marks (one long case of 60 marks & Two short cases of 30 marks each)

Orthopaedics : 40 marks (Two short cases, 20 marks each)

Viva Voce Examination : 40 marks

Surgery : 30 marks

Orthopaedics : 10 marks

Tutorial Topics

For III Phase – 8th Term

1 Class per week of 2 hours each (48 Hours)

These sessions will be conducted by various teaching learning methods like Interactive lectures, Video demonstrations, and e-learning methods. The methodology will be planned at the beginning of term and communicated to students.

Sl. No	Topic	Hours Allotted
1	Ulcers in oral cavity	
2	Thyroid swelling	
3	Breast lumps	
4	Shock & Haemorrhage	
5	Abdominal Tuberculosis	
6	Right iliac fossa mass	
7	Thyrotocisosis	
8	Inguino-scrotal swelling	
9	Scrotal swelling	
10	Gastric outlet obstruction & Carcinoma Stomach	
11	Upper gastrointestinal bleeding	

12	Lower gastrointestinal bleeding	
13	Portal hypertension	
14	Acute intestinal obstruction	
15	Obstructive jaundice	
16	Acute retention of Urine & Haematuria	
17	Renal mass	
18	Peripheral vascular diseases	
19	Varicose veins	
20	Lymphadenopathy.	

65) Integrated teaching along with concerned departments.

[2 HOURS EACH]

Sl. No	Topic	Departments to be include
1	Obstructive Jaundice	Anatomy, Pathology, Radiology, GI Surgery
2	Hyper thyroid diseases	Medicine, Biochemistry
3	Diabetes & Diabetic foot	Biochemistry, Microbiology, Medicine & Physiotherapy
4	Critically ill patients	Anaesthesia, Medicine
5	Management of Polytrauma	Anaesthesia, Orthopaedics, Radiology
6	Cardiothoracic resuscitation	Casualty, Anesthesia, Cardiology
7	Abdominal tuberculosis	OBGY, Urology
8	Acid peptic diseases	Gastroenterology, Physiology, Psychiatry
9	Pre malignant lesions and management of oral cavity malignancies	Pathology, Dentistry, Community Medicine
10	HIV and surgeon	Dermatology, Microbiology, ICTC

Each of this topic will be announced earlier, a co ordinator will be chosen. The co ordinator will co ordinate with concerned departments and organize either a **student symposium, group discussion or panel discussion.**

Each topic will be allotted 2 hours, So total hours will be 20. These will be adjusted with theory classes.

Teaching learning & formative assessment & monitoring of progress

1. Didactic Lectures : 4th to 9th Term
2. Tutorials : Once a week in 7th & 9th Term
3. Group Discussion in 9th term : Once a month
4. Student Seminars in 9th Term : Once a month
5. Quiz in 8TH term : Once a month

Phase	Term	No. of theory hours Per week	Total Hours
Phase II	4 th Term	1	24
Phase II	5 th Term	1	24
Phase III	6 th Term	2	48
Phase III	7 th Term	1	24
Phase III	8 th Term	(1) 2 didactic lectures /week+ (2) Tutorials/integrated teaching of 2hrs/week (3) Quiz once a month	96
Phase III	9 th Term	(1) 3 Didactic lectures/Week (2) Student seminars of two hours (3) Demonstration of X-rays, pathology specimens, operative procedure videos and instruments	72 20 10
Total			318

PRACTICAL /CLINICAL TEACHING

1) 3 hours/day - (Total 26 weeks) during 3rd, 4th, 8th & 9th term)

- During 3rd term, first two weeks are dedicated to introductory classes in basic clinical examination for whole batch.
- Later they are distributed in various clinical Units & rotated.
- During these postings, they are exposed and taught thorough clinical examination, history taking, differential diagnosis & management of common surgical problems.
- In addition, they observe live operative procedures on scheduled days and attend OPDs.
- In addition to ward procedures, they observe endoscopies, minor bedside procedures and interventions in minor OT. They are taught basics in procedures using manikins in University clinical skills laboratory.
- They participate in grand rounds on post OPD days in all Units.

- The students are encouraged to participate in CME, workshops and research activities of the department and are encouraged to take up short term research projects under guidance.
- Basic skills workshop for interns at the beginning of their surgery postings.

FORMATIVE ASSESSMENT

- Theory tests (3-4) during 8th & 9th term and one preliminary examination before University examinations.
- Ward leaving tests in the form of objective structured clinical examination at the end of 3rd & 4th term clinical posting in 8th & 9th term clinical postings.
- Students are expected to maintain Logbooks where daily entries regarding day to day learning during clinical postings are entered and this is regularly monitored by teachers of the Unit and Head of the department.
- The Logbook has to be submitted to the department and procedure during University examination.

MONITORING OF THE PROGRESS

- The day to day progress of the learning outcome is monitored regularly.
- Attendance and performance is summarized after the end of every term, displayed. Scheduled counseling is conducted by teachers with prior communication regarding performance and attendance and counseled. Students are expected to clarify and attend counseling regarding progress.
- Log books also form method of assessment of activity, participation and progress.
- Classes for slow learners will be conducted during 12-1pm. Performance of first two tests will be the criteria to chose slow learners

Recommended Books;

1. Bailey & Love, A Short Practice of Surgery, 26th Edition (International Student's. Edition) 2013
2. Manipal manual of Surgery 4th Edition, Dr. K. Rajgopal Shenoy & Anita Nileshwar 2010,CBS Publishers.
3. Das S, Clinical Methods in Surgery 10th Edition 2013.
4. Pye's Surgical Handicraft, 22nd edition, J Kyle, JAR Smith & D Johnson

Reference Books:

1. Mastery of Surgery by Robert J Baker & Joseph Fischer, Vol- I & II, 6th Edition
2. Sabiston's Text Book of Surgery, 20TH Edition
3. Farquharson's text book of operative surgery, 10th Edition.
4. Schwartz's Principles of Surgery – 10th Edition

ORTHOPAEDICS

a) Objectives

Knowledge

The student shall be able to:

1. Explain the principles of **management** of bone injuries and dislocations;
2. Apply suitable methods to detect and manage common infections of bones and joints;
3. Identify congenital, skeletal anomalies and their referral for appropriate correction or rehabilitation.
4. Recognize metabolic bone diseases.
5. Explain etiology, pathogenesis, manifestations, and diagnosis of neoplasms affecting bones.
6. **Recognise shock in polytrauma patients.**

Skills

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

1. Detect common fractures and sprains and manage uncomplicated fractures of clavicle, Colle's fracture, and phalanges fractures;
2. Use techniques of splinting, plaster, immobilization;
3. Manage common bone infections;
4. Advise aspects of rehabilitation for polio, cerebral palsy and amputations.

Application

Be able to perform **basic** orthopedic skills, provide sound advice of skeletal and related conditions at primary or secondary health care level.

Integrated teaching

1. With surgery: Trauma, diabetic foot, deep venous thrombosis
2. With Radiology: Bone tumours, bone infection
3. With Paediatrics: Rickets, scurvy, congenital talipes equino varus deformity and developmental dysplasia of hip.

9TH TERM

INTEGRATED TEACHING PROGRAMME [EACH ACTIVITY OF 2HRS]

SL	TOPIC	COLLABORATING DEPARTMENTS
1	BONE TUMOURS – BENIGN	PATHOLOGY
2	BONE TUMOURS – MALIGNANT	PATHOLOGY

3	ORTHOPAEDIC MANIFESTATION OF RENAL DISORDERS	PAEDIATRICS & MEDICINE
4	METABOLIC DISORDERS IN ORTHOPAEDIC	MEDICINE
5	POLYTRAUMA MANAGEMENT	SURGERY & ANAESTHESIA
6	APPROACH TO RHEUMATIC DISORDERS	MEDICINE
7	DISCUSSION OF BONE TUMOURS & COMMON ORTHOPAEDIC CONDITIONS	RADIOLOGY
8	TUBERCULOSIS IN MUSCULOSKELETAL SYSTEM	MEDICINE
9	SENILE OSTEOPOROTIC FRACTURES	MEDICINE
10	CEREBRAL PALSY , CTEV , POLIO	PAEDIATRICS

b) Course Contents

TRAUMATOLOGY:

Injuries of Bone and joints:

Fracture

general types

healing of fractures

principles and management

diagnosis *and* methods of reductions

immobilization

complications of fractures

management of open fractures

pathological fractures.

Dislocations and subluxations - mechanism, clinical features and management.

I. Injuries of upper extremity:

Injuries of shoulder, arm & forearm.

Fracture clavicle, injuries of acromio clavicular joints.

Fracture scapula, upper end of humerus.

Dislocation of shoulder—acute and recurrent.

Fracture shaft humerus.

Fractures around the elbow, radius, ulna.

Monteggia fracture-dislocation - Injuries around the wrist. Fracture scaphoid bone. Dislocation of lunate.

Injuries of the hand: Fractures of metacarpals and phalanges.

Bennetts fracture dislocation, Tendon injuries.

POP slab application.

Must know: *Clavicle fracture*, Colles fracture, supracondylar fracture of humerus, anterior shoulder dislocation, posterior elbow dislocation, monteggia fracture, gallezzi fracture, nerve injuries-radial nerve, median nerve, ulnar nerve, brachial plexus, vascular injuries- brachial artery, *radial artery*.

Desirable to know:, scapular fracture, proximal humerus fracture, humerus shaft fracture, fracture both bones forearm and scaphoid fracture.

II. Injuries of Lower Extremity:

Dislocation of hip, Fracture neck of femur, trochantric fracture, fracture shaft femur.

Injuries - of knee-

fracture tibia, fracture dislocation of ankle, fracture calcaneum.

Traction splintage

below knee slab and above knee slab.

Must know: Dislocations of hip joint, *fracture neck of femur* , *intertrochantric fracture of femur* , patellar fractures, ankle fractures, nerve injuries- sciatic nerve, common peroneal nerve, vascular injuries- popliteal artery.

Desirable to know: Pelvic fractures, femur shaft and distal femur fractures, tibial plateau fractures, ligamentous injuries of knee joint.

III. Injuries of the Spine:

Incidence-mechanism, types, clinical features of cord injury, traumatic Paraplegia, *quadriplegia*

Must Know: Whiplash injuries, traumatic paraplegia, *first aid treatment of spine injuries*.

Desirable to know: Fractures and fracture dislocation of spine.

IV. Vascular Injuries:

Types, sub fascial compression, Brachial artery injury, Popliteal artery injury, Tibial artery injury.

V. Amputations: General indications, levels, technique of above knee amputation, below knee stump, Syme`s amputation, upper limb amputation, prosthesis.

Upper limb

Must know: Above elbow and below elbow amputations.

Lower limb

Must know: Above knee and below knee amputations.

Desirable to know: Syme's amputation.

Prosthesis:

Must Know: SACH foot, Jaipur foot, Madras foot

Desirable to Know: Patellar tendon bearing *prosthesis*

COLD ORTHOPAEDICS:

I. Deformities: General, congenital, acquired, principles of management, splints, Club foot, Developmental dysplasia of hip, Congenital skeletal limb deficiencies,

Must Know: Congenital Talipes Equin Varus deformity (club foot), Developmental dysplasia of hip joint (DDH)

Desirable to Know: Congenital Limb deficiencies.

II. Regional Conditions

Neck: Torticollis, Inter vertebral disc prolapse, Cervical rib

Shoulder, elbow arthritis, painful arc syndrome, Tennis elbow,

Cubitus Varus –Valgus deformities.

Wrist and Hand: wrist drop, claw hand, ganglion, Dupuytren's contracture, deQuervain's disease, trigger thumb, Carpal tunnel syndrome

Spine: Backache examination, Intervertebral disc prolapse, Spondylolisthesis

Hip: Clinical Examination, Perthe's disease

Knee: Genu valgum, varum, recurvatum, recurrent dislocation of Patella

Semi membranous Bursa.

Foot: Plantar Fascitis, Flat foot, Foot drop

Must Know: Torticollis, cervical rib, tennis elbow, painful arc syndrome, cubitus varus, ganglion, dupuytren's contracture, de quervain's disease, carpal tunnel syndrome, genu valgum, genu varum, foot drop, plantar fascitis, claw hand, ***Baker's cyst , Osteoarthritis of knee.***

Desirable to Know: Lumbar disc prolapse, frozen shoulder, wrist drop, trigger finger, back examination, spondylolisthesis, perthes disease, recurrent dislocation of patella, bursae around knee joint, flat foot, ***Rheumatoid arthritis , Spondyloarthropathies.***

III. Neuromuscular Disorders

Cerebral Palsy: Clinical features, management

Anterior Poliomyelitis: pathology; clinical features management, surgery.

Leprosy: pathology, Orthopaedic problems - Claw hand, Foot drop - Wrist drop

Rehabilitation.

Must know: Claw hand, wrist drop, foot drop.

Desirable to know: Cerebral palsy, Poliomyelitis, Leprosy

IV. INFECTIONS:

Infections : Pyogenic osteomyelitis, acute, chronic, subacute & Brodie's abscess Mycotic infections, Syphilitic lesions.

Disease of joints : Clinical examination, synovial fluid analysis, septic arthritis

Rheumatic, Rheumatoid diseases, Haemophilic arthritis.

Bone and Joint Tuberculosis :

Aetiopathogenesis , clinical features ,management.

Tuberculosis of spine, Pott's paraplegia,

Tuberculosis of hip knee and other joints.

Must know: Acute and chronic osteomyelitis, Brodie 's abscess, septic arthritis of hip and knee joint, tuberculosis of hip joint, knee joint and spine(Pott 's spine), *Pott' paraplegia.*

Desirable to know: Mycotic infections, syphilitic infections.

V. Metabolic Disorders:

Metabolic disorders: Rickets, Osteomalacia, Osteoporosis, Scurvy , Gout

Must Know: Rickets, osteomalacia, **Osteoporosis**

Desirable to know: Scurvy, gout,

VI .Tumours:

Benign and malignant bone tumours

Benign : Osteochondroma, Enchondroma

Malignant: Osteosarcoma, Osteoclastoma, Ewing's tumour, Multiple myeloma, secondaries

Must Know: Osteochondroma, osteoclastoma, Osteosarcoma, secondary deposits in the bone

Desirable to know: Enchondroma, Ewings sarcoma, Multiple myeloma

VII. Physical Medicine& Rehabilitation:

Short wave diathermy, interferential therapy, wax bath, ultrasound therapy, lumbar and cervical traction, continous passive motion.

Must Know: Short wave diathermy, wax bath, continous passive motion.

Desirable to know: interferential therapy, ultrasound therapy, lumbar and cervical traction,

VIII. Bio-Medical Waste:

Types, potential risks and their safe management. (See Annexure 3)

IX. Miscellaneous:

Miscellaneous: Paget disease, Various types of bone cysts.

Must Know: Rheumatoid arthritis, osteoarthritis

Desirable to know: paget's disease, bone cyst, haemophilic arthritis

X. Innovative Teaching/ Learning Methods:

1. Objective structural clinical examination (OSCE)
2. Integrated teaching
3. Student seminars
4. Web teachings.
5. Log book also form method of assessment of activity, participation and progress.

7TH TERM**SEMINAR**

1	TRACTIONS & SPLINTS
2	DEFORMITIES AND THEIR MANAGEMENT
3	COMPLICATION OF FRACTURES
4	TRUAMATIC PARAPLEGIA
5	OSTEOMYELITIS
6	TB GENERAL
7	TB SPINE

THEORY CLASS

SL. NO.	NAME OF THE TOPICS/SUBJECTS
1	FRACTURE & FRACTURE HEALING
2	FRACTURE COMPLICATIONS
3	COLLE'S FRACTURES
4	T.B.SPINE
5	PERIPHERAL NERVE INJURIES
6	OSTEOMYELITIS [AC , SUB,CHRONIC]
7	SUPRACONDYLAR FRACTURE HUMERUS
8	RHEUMATOID ARTHRITIS
9	D.D.H.
10	C.T.E.V.

8TH TERM

SEMINAR

	NAME OF THE TOPICS/SUBJECTS
1	TUMOUR GENERAL
2	SEPTIC ARTHRITIS
3	POLIOMYELITIS
4	AMPUTATIONS
5	DEGENERATIVE DISORDERS
6	INFECTIONS OF HAND
7	CTEV
8	FRACTURES IN CHILDREN

THEORY CLASS

SL. NO.	NAME OF THE TOPICS/SUBJECTS
1	PERTHE'S DISEASE
2	ANKLE FRACTURES
3	PROLAPSED INTERVERTEBRAL DISC
4	MONTEGGIA FRACTURE DISLOCATION / GALEAZZI FRACTURE
5	SCAPHOID FRACTURES
6	T.B.HIP
7	ACETABULAR FRACTURE & PELVIC FRACTURE
8	SEPTIC ARTHRITIS
9	INFECTIONS OF HAND
10	TUMOUR BENIGN

GROUP DISCUSSION [EACH ACTIVITY OF 2 HRS]

SL	TOPIC	
1	BONE TUMOURS	
2	CTEV	
3	HIP DISORDERS – NECK OF FEMURE FRACTURE, INTERTROCHANTRIC FRACTURE	
4	INFECTION IN ORTHOPAEDIC- OSTEOMYELITIS	
5	INFECTION IN ORTHOPAEDIC-SEPTIC ARTHRITIS, TUBERCULOSIS	
6	GENERAL PRINCIPLES OF FRACTURE HEALING	

	& ACUTE TRAUMA MANAGEMENT	
7	SOFT TISSUE DISORDERS IN ORTHOPAEDICS – TENNIS ELBOW, D Q TENOSYNOVITIS, DUPUYTREN’ CONTRACTURE, MALLET FINGER, GOLFER ELBOW, PAIN FULL ARC SYNDROMES	
8	MANAGEMENT OF LARGE JOINT DISLOCATION – HIP , SHOULDER	
9	RECENT ADVANCE S IN ORTHOPAEDICS- ARTHROPLASTY , ARTHROSCOPY , SPINE	
10	IMPLANTS, SPECIMEN, XRAY S	

CLINICAL DEMONSTRATION [EACH ACTIVITY OF 2 HRS]

SL	TOPIC	
1	GENERAL PRINCIPLE IMMOBILISATION IN ORTHOPAEDIC	
2	REDUCTION METHODS OF HIP AND SHOULDER	
3	DRESSING , APPLICATION OF SPLINTS& PLASTER	
4	PROSTHETICS, ORTHOTICS	
5	BASIC TECHNIQUES OF SUTURING AND MANAGEMENT OF CHRONIC WOUND	

SEMINAR

	NAME OF THE TOPICS/SUBJECTS
1	ARTHRITIS AND RELATED DISEASE
2	SOFT TISSUE DISORDERS
3	METABOLIC BONE DISEASE
4	DISLOCATION OF SHOULDER AND HIP
5	MISCELLANANEOUS REGIONAL DISEASE

THEORY CLASS

SL. NO.	NAME OF THE TOPICS/SUBJECTS
1	TUMOUR MALIGNANT
2	AMPUTATIONS
3	FRACTURE NECK OF FEMUR
4	PERTROCHANTRIC FRACTURE
5	REGIONAL ORTHOPAEDICS(TENNIS ELBOW, D Q TENOSYNOVITIS, CARPAL TUNNEL SYNDROME, PLANTAR FASCIITIS)
6	PHYSIOTHERAPY – COMMON MODALITIES
7	XRAY
8	FRACTURES OF SPINAL COLUMN
9	SPORTS INJURY
10	OSTEOARTHRITIS OF HIP AND KNEE

c) Teaching Hours

Theory classes: 100 Hours, including 20 hours of integrated teaching.

Clinical postings: 10 weeks (See Table 2)

Internal assessment: No of tests- three

Methodology to be adapted: Theory and clinicals.

Scheme of examination: See section (d) under Surgery

Books recommended:

1. Natarajan M., Textbook of Orthopaedics — Vol. I & II
2. Maheshwari, Textbook of Orthopaedics.
3. Crawford Adams, Outline of Orthopaedics. Fractures and dislocation, 9th edition, ELBS, 1987.
4. Crawford Adams, Outline of Orthopaedics, 11th ed, ELBS; 1990.
5. Baily & Love, A Short Practice of Surgery, 25th ed., (International Students Edition); 2007.
6. Graham Apley, System of Orthopaedics.
7. Das S, Clinical Methods in Surgery, 6th ed, S Das .13 Old Mayors, Calcutta; 1996.
8. **John ebenezer 4th edition text book of orthopaedics.**

**MARKS DISTRIBUTION FOR THEORY, PRACTICAL & VIVA EXAMS
UNDER GRADUATE COURSE**

	MAX MARKS	INTERNAL ASSESSMENT MAX.MARKS
THEORY	50	15
PRACTICAL	40	10
VIVA-VOCE	10	
TOTAL	100	25

OSCE & MCQ TEST

Tests will be conducted for 9th term students.

RADIO-DIAGNOSIS AND IMAGING

1. Specify the teaching – learning methods in theory classes, practical etc.

- 20 Didactic lectures as per MCI guidelines.
- Revision of Topics – Quiz
- OSCE for proper reporting training.

2. The theory topics must be divided into 3 categories.

MUST TO KNOW TOPICS

GENERAL:

XRAY - Advantages & Disadvantages

USG - Advantages & Disadvantages

CT/MRI - Advantages & Disadvantages

Musculoskeletal System:

Rickets

Congenital dislocation of hip

Fractures

Osteomyelitis

Malignant Bone Tumors

CHEST (Respiratory System):

Normal x-ray chest

Antero Posterior/Postero Anterior views

Consolidation

Collapse

Pleural effusion

Pneumothorax

Hydropneumothorax

TB

Miliary TB

Cavitations/Nodules

ABDOMEN (Gastro intestinal system):

Normal air fluid levels/ abnormal air fluid levels.

Oesophagus: Barium swallow, Varices, Hernia.

Stomach: Barium meal, Ulcers.

Small intestine: Barium meal follow through, Malrotation, Strictures.

Large intestine: Barium enema, Valvulus, Intussusception, Megacolon.

Gall Bladder: Cholelithiasis

Kidney: IVP, Renal calculus, Hydronephrosis, Renal malignancy

Urinary bladder: Calculus, Malignancy

Male (urethra) – RGU: strictures

Female – HSG: Uterine anomalies, Fallopian tube patency

USG: Role in ANC workup

Central Nervous System:

Plain x-ray Skull – Fractures

CT for - Stroke

Infarct

Bleed

Hydrocephalus

Infections

DESIRABLE TO KNOW

General:

Conventional Angiogram, DSA

Contrast used in Radiology

Musculoskeletal System:

Skeletal Dysplasia

Arthritis

Benign Neoplasms of bone

CHEST (Respiratory System):

Bronchial Carcinoma

Differential Diagnosis – Millitary shadows

Coin lesion

Mediastinal mass

Cavity

Hypertranslucency

Opaque hemithorax

Obstructive airway disease

ABDOMEN (Gastro intestinal system):

Oesophagus: Carcinoma, Strictures

Stomach: Carcinoma

Small intestine: Polyps, Tumors

Large intestine: Ulcerative colitis/Crohns disease

Polyps

Diverticulae

Gall Bladder: Cholecystitis

Liver: Abscess, Cysts, Tumors

Pancreas: Calculi, Pancreatitis, Carcinoma

Kidney: Pyelonephritis

Carcinoma

Male: MCU

Female: Transvaginal USG and its importance

Central Nervous System:

Neoplasms

NICE TO KNOW

PET-CT, Interventional Radiology developments

Mammography

- 1. Marks distribution for theory, Practical and Viva examination.**
- 2. Integrated teaching.**
 - Integrated teaching with allied subjects.
- 3. One of the formative practical examination to be conducted in the form of OSPE/OSCE (Partially or totally)**
- 4. One of the formative theory examinations to be conducted in the form of MCQ test.**
- 5. Clinical departments to start logbooks for undergraduates for better monitoring.**

ANAESTHESIOLOGY

Goals:

The undergraduate students should realise the importance of safe forms of anaesthesia for different kind of surgeries. They should also know the importance of maintenance of patency of the airway in an unconscious patient – anaesthetised or otherwise.

Objectives:

The undergraduate shall be able to

1. Enumerate different local anaesthetic agents, general anaesthetic agents, muscle relaxants, sedatives and analgesics.
2. They shall also understand the indications, mode of administration, contraindications, and side effects of the agents mentioned above.
3. They shall be trained in CPBR on manikins.

MUST KNOW

1. Preanaesthetic check up and medications.
2. Venepuncture set up and IV drip.
3. Laryngoscopy, Endotracheal intubation.
4. Simple general anaesthetic procedures/Regional Anaesthesia.
5. Monitoring of patients during postoperative period.
6. Local anaesthetic agents and simple blocks.
7. Maintenance of anaesthetic record.
8. Recognition and treatment of complications in the post operative period.
9. Usage of life support system.
10. To perform CPR on Mannequin.

DESIRABLE TO KNOW

1. Recognition and management of problems associated in emergency situations.
2. Crystalloids & Colloids
3. Blood & Blood component therapy.
4. Oxygen transport and various methods of O₂ administration.
5. ICU & Introduction to mechanical ventilation.
6. Interpretation of ABG.
7. Acute pain management.

NICE TO KNOW

1. Boyle's Machine.
2. History & Modern trends in practice of Anaesthesia.
3. Chronic pain management.
4. Occupational hazards

The above mentioned syllabus will be taught under the following theory & practical topics.

Sl. No.	Topic
1	Introduction to Anaesthesiology.
2	Pre-anaesthetic evaluation of Patients
3	Oxygen transport and various methods of O ₂ administration.
4	Airway obstruction and Management of airway in an unconscious patient.
5	Muscle relaxants & reversal agents.
6	Inhalational Anesthetic Agents.
7	Intravenous Anaesthetic agents.
8	Boyles Machine. (Practical Class)
9	Local anaesthetic agents and simple blocks.
10	Spinal & Epidural Anaesthesia
11	Crystalloids & Colloids.
12	Blood & Blood component therapy.
13	Monitoring during Anaesthesia.
14	Intubation & airway gadgets. (Practical Class)
15	Day case anaesthesia.
16	ICU & Introduction to mechanical ventilation. (Practical Class)
17	Role of Anaesthesiologists in acute and chronic pain relief.
18	History & Modern trends in practice of Anaesthesia.
19	C.P.B.R. (Practical Class)
20	Occupational hazards of Anaesthesia.

RECOMMENDED BOOKS FOR REFERENCE

Recent editions of the following books

- Lee's synopsis of Anaesthesia.
 - Atkinson, Rushman & David
- Anaesthesia & Co-existing diseases
 - Robert K. Stoelting
 - Stephen. F. Dierdorf.
- Clinical Anaesthesiology
 - G. Edvard. Morgan. Jr.
 - Maged. S. Mikhail.
 - Micharl. J. Murray.
 - C Philip Larson - Jr
- Pharmacology & Physiology in Anaesthetic Practice.
 - Stoelting R.K.

OBSTETRICS AND GYNAECOLOGY

As Specified by Medical Council of India, Obstetrics and Gynecology includes family welfare and family planning.

Goal

The broad goal of the teaching of undergraduate students in Obstetrics and Gynecology is that he/she shall acquire understanding of anatomy, physiology and patho physiology of the reproductive system and gain the ability to optimally manage common conditions affecting it.

Objectives

Knowledge

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

1. Outline the anatomy, physiology and patho physiology of the reproductive system and the common conditions affecting it.
2. Know about normal pregnancy, labor, puerperium and manage the problems he/she is likely to encounter therein.
3. List the leading causes of maternal and perinatal morbidity and mortality.
4. Understand the principles of contraception and various techniques employed, methods of medical termination of pregnancy, sterilization and their complications.
5. Identify the use, abuse and side effects of drugs in pregnancy, pre menopausal and post menopausal periods.
6. Describe the national programme of maternal and child health and family welfare and their implementation at various levels.
7. Identify common gynecological diseases and describe principles of their management.
8. State the indications, techniques and complications of surgeries like Caesarean section, laparotomy, abdominal and vaginal hysterectomy, Fothergill's operation and vacuum aspiration for Medical Termination of pregnancy (MTP).

Skills

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

1. Examine a pregnant woman, recognize high risk pregnancy and make appropriate referrals.
2. Conduct a normal delivery, recognize complications and provide postnatal care.
3. Resuscitate new born and recognize congenital anomalies.
4. Advise a couple on the use of various available contraceptive devices and assist in insertion and removal of intra-uterine contraceptive devices.
5. Perform pelvic examination, diagnose and manage common gynecological problems including early detection of genital malignancies.

6. Make a vaginal cytological smear, wet vaginal smear examination for *Trichomonas vaginalis*, Moniliasis & pap smear.
7. Interpret data of investigations like biochemical, histopathological, radiological, ultrasound etc.

Integration

The student shall be able to integrate clinical skills with other disciplines and bring about coordination of family welfare programme for the national goal of population control.

Departmental Objectives:

At the end of training in Obstetrics and Gynecology, MBBS student should be able to;

1. Appreciate the socio-cultural, economic and demographic factors that influence the practice of Obstetrics and Gynaecology.
2. Understand the preconceptional, antenatal, intranatal and postnatal factors including drugs that affect the mother and foetus.
3. Recognize the changes and adaptation that occur in the mother during pregnancy, labour & puerperium.
4. Institute primary treatment in Obstetrics and Gynaecological emergencies.
5. Assist couples with infertility with appropriate counseling.
6. Know about the benign and malignant tumors of the genital tract and appreciate the need for screening and prevention.
7. Understand the implication of medicolegal and ethical issues concerning the specialty.
8. Acquire communication, decision making and managerial skills.

GENERAL GUIDELINES FOR TRAINING:

A) CLINICAL POSTING

1. Students shall attend a minimum period of 6 months in the inpatient and outpatient sections including family welfare and family planning.
2. Clinical postings will start from 3rd term onwards & will be of 3hrs duration daily.
3. Students of 3rd term will be having an orientation classes for 2 weeks in the 1st clinical posting.
4. Each unit has to follow a structured clinical teaching programme.
5. Students will be attending the rounds along with the unit staff once weekly.
6. Students posted in clinical posting of all terms will be taken to skill lab for demonstration of various skills/procedures using mannequins.
7. An assessment card has to be maintained for each clinical posting, which has the details of cases seen, cases presented, procedures seen/done by the student. It has to be signed by the unit chief & submitted back to the department at the end of each clinical posting.

8. During this period of clinical postings students have to attend the labour room posting and conduct at least 10 cases under supervision & assist in 10 other cases of normal deliveries.
9. A certificate showing the number of cases attended by the student shall be signed by the head of the department and shall state;
 - a) That the student has been present during the course of and personally conducted each case, making the necessary abdominal and other examinations under the supervision of the on duty staff.
 - b) That satisfactory written history of the cases conducted including wherever possible antenatal and postnatal observations were presented by the student and initiated by the supervising staff.
10. Student shall maintain a record book (Log Book) & should record the details of the different cases seen (ANC, PNC, Gynecology & Labour cases) during clinical posting.

CLINICAL COURSE: HOSPITAL POSTINGS:

Hospital Postings

1 st Posting	3rd Term	8 weeks
2 nd Posting	4th Term	8 weeks
3 rd Posting	8th Term	6 weeks
4 th Posting	9th Term	4 weeks
TOTAL:		26 weeks

Structured clinical teaching programme

Topics to be taught in clinics

3rd Term

A) Orientation classes for 2 weeks on the following topics

Obstetrics

1. Orientation to clinical posting & different Wards
2. Various definitions used
3. History taking
 - a. Antenatal case
 - b. Postnatal case
4. General physical examination & obstetric examination
5. Diagnosis of pregnancy
 - a. 1st Trimester
 - b. 2nd Trimester
 - c. 3rd Trimester

6. Antenatal checkup
 - a. 1st Trimester
 - b. 2nd Trimester
 - c. 3rd Trimester

Gynaecology

1. Various definitions used
2. History taking for gynecology case
3. General physical examination
4. Introduction to menstrual disorders

B) Cases to be discussed:

1. Normal antenatal cases
2. Normal postnatal cases
3. White discharge per vagina
4. Menstrual disorders

Skills Lab

1. Obstetric examination (Grips)
2. Gynecology examination (per speculum & per vaginal)

Procedures to be observed in OPD/Wards

1. Obstetric grips
2. Urine pregnancy test
3. Per speculum examination
4. Per vaginal examination

4th Term

Obstetrics:

1. Normal labour
2. Normal puerperium
3. Abortions & MTP
4. Hyperemesis

Gynaecology

1. Leucorrhoea
2. WDPV
3. Menstrual disorders
4. Pain abdomen & D/D in Gynecological cases

5. PID
6. Introductions to instruments in OT Complex

Skill Lab

Obstetric examination (Revision)

- Obstetric grips
- Lie
- Presentation
- Position
- Period of gestation
- Grips

Procedures to be observed in OPD/Wards

1. Per speculum examination
2. Per vaginal examination
3. Pap smear
4. Vaginal smear

8th Term

Obstetrics

1. Anemia
2. Hypertensive disorder in pregnancy
3. Cephalo pelvic disproportion
4. Multiple pregnancy
5. Gestational diabetes mellitus
6. Cardiac diseases in pregnancy
7. Dummy pelvis and fetal skull
8. Instruments & drugs
9. Specimens

Gynaecology

1. Mass per vagina (Prolapse)
2. Mass per abdomen (Fibroid & Benign ovarian tumors)
3. PID
4. AUB
5. Adenomyosis
6. Evaluation of primary & Secondary amenorrhea
7. Instruments & Drugs
8. Specimens

Procedures to be observed in OPD/Ward

1. Use of fetal hand Doppler to hear FHS
2. Cervical stitch removal
3. Stripping of membranes
4. Pelvic assessment
5. Tests to assess CPD
6. External cephalic version
7. OGCT
8. Bedside urine albumin testing
9. Wound dressing
10. Suture removal

Skill Lab

1. Mechanism of labour – occipito anterior
2. Abnormal labour
 - Occipito posterior & deep transverse arrest
 - Breech
 - Face & Brow
3. Management of different stages of labour
4. Steps of episiotomy

9th Term

Obstetrics:

1. Anemia
2. Preeclampsia
3. Cephalopelvic disproportion
4. Complications of 3rd stage of labour
5. Abnormal Puerperium
6. VBAC
7. Antenatal assessment of fetal well being
 - Demonstration of NST/CTG
 - USG
8. Dummy pelvis and fetal skull
9. Instruments & Drugs
10. Specimens

Gynaecology

1. Family planning
2. Carcinoma cervix
3. Carcinoma ovary
4. Carcinoma endometrium

5. Infertility
6. GTN
7. Instruments & drugs
8. Specimens

Procedures to be observed in OPD/Ward

1. Use of fetal hand Doppler to hear FHS
2. Cervical stitch removal
3. Stripping of membranes
4. Pelvic assessment
5. Tests to assess CPD
6. External cephalic version
7. OGCT
8. Bedside urine albumin testing
9. Wound dressing
10. Suture removal

Skill Lab

1. Complications of 3rd stage of labour
2. Instrumental delivery
3. Cu-T insertion
4. Introduction to laparoscopy

Operative procedures demonstrated in OT

Gynecology

1. Steps of Abdominal hysterectomy
2. Steps of vaginal hysterectomy
3. Dilatation and curettage
4. Fractional curettage
5. Cauterization of cervix.
6. Fothergills repair
7. Staging laparotomy for ovarian tumors
8. Diagnostic hysteroscopy & laparoscopy for evaluation of infertility
9. Laparoscopic sterilization/abdominal tubectomy.

Obstetrics

1. Steps of Cesarean section
2. Dilatation & evacuation (MTP)
3. Cervical encirclage

USG POSTING SCHEDULE FOR STUDENTS IS AS FOLLOWS:

8TH TERM STUDENTS

2nd and 4th week of the month

1 st UNIT	MONDAY
2 nd UNIT	TUESDAY
3 rd UNIT	WEDNESDAY

PROCEDURES IN LABOUR ROOM POSTING TO BE OBSERVED/DONE

1. Assessment of cervical dilatation
2. Pelvic assessment
3. Artificial rupture of membranes
4. Perineal support
5. Conduct normal delivery in low risk patients
6. Active management of third stage of labour
7. Basic resuscitative measures in obstetrics emergencies (Eclampsia, PPH, shock)
8. Episiotomy suturing
9. CTG monitoring
10. Forceps application
11. Vacuum application
12. Cesarean section
13. Neonatal Resuscitation

TEACHING LING METHODS IN OBSTETRICS

Sl. No	TOPIC NAME	TEACHING LINE METHOD
1	Anatomy of female genital tract	Didactic lecture, Demonstration in OT
2	Diagnosis of pregnancy (Obstetric grips, urine pregnancy test, USG)	Didactic lecture, Interaction during clinics, demonstration in skill lab, USG demonstration in OPD, tutorials
3	ANC	Interaction during clinics, Didactic lecture, case presentation, seminar
4	Complications in early pregnancy	Interaction during clinics, Didactic lecture, case presentation, seminar

5	Normal labour (mechanism of labour, AMTSL(active management of third stage of labour), steps of episiotomy)	Didactic lecture with videos, Demonstration in skill lab, Discussion in tutorials and clinics, live demonstration in labour room
6	Complications of third stage of labour	Didactic lecture with videos, Demonstration in skill lab, Discussion in seminar and clinics, live demonstration in labour room,
7	Puerperium and its complications	Didactic lecture, case presentation, tutorials
8	Hypertensive disorders in pregnancy	Didactic lecture, case presentation, integrated teaching, small group discussion,
9	Anaemia in pregnancy	Didactic lecture, case presentation, tutorial, integrated teaching
10	Cardiac diseases in pregnancy	Didactic lecture, case presentation , tutorial
11	MTP (medical termination of pregnancy)	Didactic lecture, case discussion in OT, small group discussion
12	RCH (reproduction and child health)	Didactic lecture, integrated teaching
13	APH(antepartum hemorrhage)	Didactic lecture, case presentation, tutorial
14	CPD(Cephalopelvic disproportion) (dummy pelvis, pelvic assessment, CPD test)	Didactic lecture, case presentation, demonstration in skill lab, tutorials
15	Previous LSCS	Didactic lecture, case presentation, tutorial
16	Multiple pregnancy	Didactic lecture, case presentation ,seminar
17	Fetal distress and neonatal resuscitation Neonatal problems	Didactic lecture, demonstration in labour room, integrated teaching
18	Assessment of fetal well being	Didactic lecture, demonstration of USG in OPD, NST in labour room, tutorial
19	Malpresentations	Didactic lecture, case presentation, demonstration in skill lab, tutorial
20	Family planning	Didactic lecture, demonstration in OPD & discussion in clinics & small group discussion
21	Drugs in pregnancy	Didactic lecture, discussion during clinics

22	Instruments	Didactic lecture, demonstration in OT, discussion during clinics
23	Instrumental delivery	Didactic lecture, demonstration in OPD, Demonstration in skill lab, Demonstration in labour room
24	Induction of labour (stripping of membranes, instillation of PGE ₂ gel, ARM)	Didactic lecture, demonstration in OPD, Demonstration in skill lab, Demonstration in labour room
25	Operative procedure (steps of Caesarean section, D&E, MRP, Cervical encircage)	Didactic lecture, live demonstration in OT

TEACHING LINING METHODS IN GYNAECOLOGY:

Sl. No	TOPIC NAME	TEACHING LINE METHOD
1	Gynaecological examination	Demonstration in OPD, skill lab
2	Pathological vaginal discharge	Didactic lecture, Demonstration in OPD, Case presentation, Tutorial
3	Puberty	Didactic lecture, seminar
4	Mullerian abnormalities	Didactic lecture, seminar
5	Fibroid	Didactic lecture, case presentation, tutorial
6	DUB	Didactic lecture, case presentation, tutorial
7	Amenorrhoea	Didactic lecture, case presentation, seminar
8	Displacement of uterus	Didactic lecture, case presentation, Demonstration in OPD and OT, seminar, small group discussion
9	PID	Didactic lecture, case presentation, tutorial
10	Infertility	Didactic lecture, case presentation, seminar and tutorial
11	Operative procedures (hysterectomy, laparotomy, minor procedures)	Didactic lecture, demonstration in OT
12	Benign, premalignant & malignant lesions of cervix (pap smear, cervical biopsy)	Didactic lecture, case presentation, demonstration in

		OPD & OT, tutorial, small group discussion
13	Benign, premalignant & malignant lesions of ovary	Didactic lecture, case presentation, demonstration in OPD&OT, small group discussion
14	Benign, premalignant & malignant lesions of endometrium	Didactic lecture, case presentation, tutorial
15	Radiotherapy, chemotherapy and imaging techniques in gynecology	Didactic lecture ,seminar

*Didactic lectures will be made more interactive and interesting including the following methods

- Effective use of audiovisuals
- Putting questions to students
- Brain storming
- Role reversal teaching
- Problem oriented teaching (discussing the case scenarios related to the theory topic)

THEORY TEACHING

1. Theory teaching will start from 4th term onwards.
2. Total number of teaching hours will be 300 hours.
3. Didactic lectures should not more than 100 hours.
4. Remaining 200 hours of teaching shall be done using other teaching learning methods like tutorials, seminars, small group discussions & integrated teaching.
5. Integrated teaching: Both horizontal and vertical integration to be done to have comprehensive understanding of the subject.

Phase	Term	No. of classes per week	No. of Hours
Phase II	4 th term	I class	16
Phase II	5 th term	nil	Nil
Phase II	6 th term	1 class	16
Phase III	7 th term	I class_	12
Phase III	8 th term	-two theory classes of 1 hr	32
		-one seminar of 2 hrs	40
		-one tutorial of 2 hrs	40
Phase III	9 th term	-two theory classes of 1 hr	24
		-one seminar of 2 hrs	40
		-one tutorial of 2 hrs	40
Total No. of teaching hours			260

Phase	Term	No. of classes per term	No. of hours
Phase III	8 th term	-Small group discussion: five classes of two hours duration	10
		-Integrated teaching : five classes of two hours duration	10
Phase III	9 th term	-Small group discussion: five classes of two hours duration	10
		-Integrated teaching: five classes of two hours duration	10
Total hours			40

TOPICS FOR DIDACTIC LECTURES:

4th Term **16 Hrs**

A. Must know:

OBSTETRICS

1. **ANATOMY OF THE FEMALE REPRODUCTIVE TRACT** 1 hour
 - Basic Anatomy:
Relationship to other pelvic organs. Applied anatomy, as related to Obstetrics & Gynecological surgery.
2. **PHYSIOLOGY OF CONCEPTION** 1 hour
 - Gametogenesis, fertilization & implantation.
3. **DEVELOPMENT OF FOETUS AND PLACENTA & TERATOGENESIS** 2 hours
 - Basic embryology, Organogenesis, factors influencing fetal growth & development,
 - Anatomy and development of placenta, placental barriers, teratogenesis
4. **DIAGNOSIS OF PREGNANCY** 1 hour
 - Clinical features, tests to diagnose pregnancy & differential diagnosis of pregnancy

- | | |
|--|---------|
| 5. MATERNAL CHANGES IN PREGNANCY | 2 hours |
| <ul style="list-style-type: none"> • Genital tract, cardiovascular system and hematology. • Respiratory and gastrointestinal system, etc. | |
| 6. ANTENATAL CARE | 2 hours |
| <ul style="list-style-type: none"> • Objectives of antenatal care. Clinical monitoring of maternal and Foetal well-being (gravidogram), basic investigations • Advice regarding nutrition; prescribing in pregnancy; immunization against tetanus. | |
| 7. COMPLICATIONS OF EARLY PREGNANCY. | |
| <ul style="list-style-type: none"> • Abortions: definition, types, causes & Management. | 1 hour |
| <ul style="list-style-type: none"> • Recurrent abortions. | 1 hour |
| <ul style="list-style-type: none"> • Ectopic pregnancy: Causes, clinical features, differential diagnosis of acute Abdomen, & conservative management of ectopic pregnancy, principles of surgical management. | 1 hour |
| <ul style="list-style-type: none"> • Benign trophoblastic diseases: (Hydatiform mole) Aetiopathology, clinical features, differential diagnosis, Principles of management, follow up. | 1 hour |
| <ul style="list-style-type: none"> • Hyperemesis gravidarum: Definition, aetiology, clinical features & management. | 1 hour |

GYNAECOLOGY

- | | |
|--|--------|
| 1. PHYSIOLOGY OF VAGINAL DISCHARGE. | 1 hour |
| <ul style="list-style-type: none"> • Clinical characteristics: Biology of vagina, cytology of vagina, natural defense mechanism against infections, bacterial flora of vagina. | |
| 2. PATHOLOGICAL VAGINAL DISCHARGE. | 1 hour |
| <ul style="list-style-type: none"> • Aetiology, characteristics; clinical recognition; investigation, treatment of common causes;(candidiasis, Trichomoniasis, Bacterial vaginosis,) genital hygiene. | |

B. Desirable to know

1. Teratogenesis
2. Different teratogenic drugs & their effects
3. USG features for diagnosis of pregnancy
4. Special investigation in pregnancy
5. APLA
6. Criteria for diagnosis of Bacterial vaginosis

C. Nice to know

1. Safe antihypertensives & antiepiletics
2. Thrombocytopenia & its management
3. Safe & Unsafe vaccines in pregnancy
4. Different thrombophilias in RPL
5. Cesarean scar pregnancy
6. Scoring in bacterial vaginosis

6TH term

16 Hours

OBSTETRICS

A) Must know:

1. **NORMAL LABOR:** 3 hours
 - Stages of labour, physiological changes in various stages
 - Management of various stages in occipito anterior position
 - Partogram.
2. **COMPLICATIONS OF THIRD STAGE OF LABOR.** 3 hours
 - Active management of 3rd stage
 - predisposing factors, prevention, management of atonic PPH & Management of Traumatic PPH.
 - Inversion of uterus
 - Retained placenta
3. **UTERINE DYSFUNCTION** 1 hour
 - Definition
 - Types
 - Clinical features
 - Complications and management.
4. **NORMAL PUERPERIUM** 1 hour
 - Definition
 - Normal changes
 - Common complaints & their management.
5. **BREAST FEEDING** 1 hour
 - Physiology of lactation
 - Care of breasts
 - Counseling regarding breast feeding, mastitis and breast abscess.

6. **ABNORMAL PUERPERIUM.** 2 hours
- Clinical features
 - Recognition and principles of management
 - Prevention & Treatment of puerperal pyrexia.
 - Other complications in puerperium.

GYNAECOLOGY

1. **PUBERTY** 1 hour
- Definition
 - Changes during puberty (hormonal & physical)
 - Abnormal puberty
2. **MENSTRUATION** 1 hour
- Definition
 - Physiological changes
 - Normal menstrual cycle
3. **MULLERIAN ANOMALIES** 2 hours
- Development of female genital tract
 - Classification of mullerian anomalies
 - Classification of common Mullerian anomalies
4. **INTER SEXUALITY** 1 hour
- Definition
 - Causes
 - Etiology and clinical features of Turners syndrome, klinefelters syndrome, Adrenogenital syndrome Testicular feminization
5. **DISEASES OF BREAST** 1 hour
- Anomalies of breast
 - Fibro adenoma
 - Fibro adenosis
 - Mastitis
 - Breast abscess

B) Desirable to know:

1. Dosages of drugs used for PPH
2. Details of surgical methods used for PPH
3. Galactoguges and lactation suppression
4. Management of complications of breast feeding

5. Details of surgeries for Mullerian anomalies
6. Management of Turners syndrome, Klinefelters syndrome and Adrenogenital syndrome
7. Diseases of breast

C) Nice to know:

1. Labour analgesia
2. Management of cervical tear
3. Management of vault tear
4. DVT in puerperium
5. Precocious puberty

7th TERM

12 hours

OBSTETRICS

A) Must know:

1. MEDICAL DISORDERS IN PREGNANCY

- | | |
|--|---------|
| a. Hypertension in pregnancy | 3 hours |
| • Etiology, classification | |
| • Pre Eclampsia | |
| • Eclampsia | |
| • Chronic Hypertension | |
| b. Anemia in pregnancy | 1 hour |
| • Definition | |
| • Etiology | |
| • Types | |
| • Clinical features | |
| • Management | |
| c. Cardiac diseases in pregnancy | 1 hour |
| • Classification | |
| • Clinical features | |
| • Complications | |
| • Management during pregnancy, labour & postpartum | |
| d. Diabetes mellitus in pregnancy | 1 hour |
| • Definition | |
| • Classification | |
| • Etiology | |
| • Screening | |
| • Complications | |
| • Management | |

- e. Urinary infection in pregnancy 1 hour
- Definition
 - Etiology
 - Clinical features
 - Complications
 - Management
- 2. GYNAECOLOGICAL DISORDERS IN PREGNANCY.** 2 hours
- a) Fibroid in pregnancy
 - b) Ovarian tumor
 - c) Retroverted gravid uterus
 - d) Genital prolapse & pregnancy
 - e) Cancer cervix with Pregnancy.
- 3. MEDICAL TERMINATION OF PREGNANCY.** 1 hour
- a) Definition
 - b) Indications
 - c) Methods
 - d) Complications & management of complications.
- 4. VITAL STATISTICS:** 1 hour
- a) Birth rate
 - b) Maternal mortality
 - c) Perinatal & neonatal mortality
 - d) Live birth, still birth, abortion, period of viability.
- 5. MATERNAL AND CHILD HEALTH FACILITIES AVAILABLE UNDER REPRODUCTIVE AND CHILD HEALTH PROGRAMME(RCH)** 1 hour
- a) Advantages
 - b) Dis advantages

B) Desirable to know:

1. Dosages of drugs used for Hypertension in pregnancy
2. Safe & unsafe antihypertensives.
3. Differentiation between chronic Hypertension & PIH
4. Diagnosis of HELLP syndrome
5. Magnesium sulfate toxicity
6. Management of imminent eclampsia
7. Iron sucrose
8. Management of Non Iron deficiency anemia

9. Management of CCF
10. OGCT

C) Nice to know:

1. Management of Hypertensive crisis in pregnancy
2. Management of HELLP syndrome
3. Management of cerebral edema
4. Ferric Carboxy Maltose
5. Oral hypoglycemic drugs for GDM

8TH TERM

16 Hours

A) Must know

OBSTETRICS

1. ANTEPARTUM HAEMORRHAGE

(Classifications, aetiopathology and management)

2 hours

1. Abruptio placenta

- Definition
- Types
- Etiology
- Diagnosis
- Complication
- Management

2. Placenta previa

- Definition
- Types
- Etiology
- Diagnosis
- Complication
- Management

2. CPD

1hour

- Definition
- Types
- Etiology
- Assessment to rule out Contracted pelvis & CPD
- Complications & management

- 3. OBSTRUCTED LABOUR** 3 hours
- Definition
 - Etiology
 - Diagnosis
 - Management
- 4. ABNORMAL PRESENTATIONS & ABNORMAL POSTIONS.** 3 hours
1. Occipito posterior position
 - Definition
 - Causes
 - Diagnosis
 - Management
 2. Breech presentation.
 - Definition
 - Causes
 - Diagnosis
 - Management
 3. Face and brow presentation, Cord prolapse & Transverse lie
 - Definition
 - Causes
 - Diagnosis
 - Management
- 5. PREVIOUS LSCS** 1 hour
- Definition
 - Antenatal management
 - Mode of delivery
- 6. MULTIPLE PREGNANCY:** 1 hour
- Causes, clinical features
 - Investigations
 - Complications
 - Principles of management
- 7. INDUCTION OF LABOR** 1 hour
- Definition
 - Indications

- Methods
- Advantages & Disadvantages of each method

8. FOETA DISTRESS : 1 hour

- Causes
- Diagnosis
- Management & prevention

9. PRE-TERM LABOR, P.R.O.M. 1 hour

- Definition
- Causes
- Diagnosis
- Complications
- Management

10. POST MATURITY 1 hour

- Definition
- Causes
- Diagnosis
- Complications
- Management

11. INTRA-UTERINE DEATH 1 hour

- Definition
- Causes
- Diagnosis
- Complications
- Management

12. NEONATAL PROBLEMS AND RESUSCITATION 1 hour

- Steps of neonatal resuscitation
- Neonatal Hyper bilirubinemia
- Convulsions
- Sepsis

B) Desirable to know

1. Diagnosis of DIC
2. External cephalic version
3. Classical cesarean section

4. Complications of Monochorionic twins
5. Post maturity syndrome
6. Tests for fetal lung maturity
7. Types of decelerations
8. Sudden intra uterine death

C) Nice to know

1. Management of DIC
2. Asynclitism
3. Internal podalic Version
4. Arrested breech delivery
5. Difficulties encountered during LSCS
6. TRAP, discordant twin
7. Selective fetal reduction

8th TERM

GYNECOLOGY

16 Hours

1. FIBROID UTERUS

1 hour

- Definition
- Etiology
- Types
- Clinical features
- Investigations
- Management
- Complications

2. D U B.

1 hour

- Definition
- Etiology
- Types
- Clinical features
- Evaluation
- Management

3. AMENORRHEA- PRIMARY & SECONDARY

2 hours

- Definition
- Etiology
- Clinical features
- Management

4. **DISPLACEMENT OF UTERUS: GENITAL PROLAPSE** 2 hours
- Definition
 - Etiology
 - Types
 - Clinical features
 - Investigations
 - Management
 - Complications
5. **GENITAL INFECTIONS** 2 hours
(Acute, Chronic & TB)
- Causes
 - Clinical features
 - Management
 - Complications
6. **ENDOMETRIOSIS.** 1 hour
- Definition
 - Causes
 - Clinical features
 - Management
 - Complications
7. **INFERTILITY.** 2 hours
- a) Male:
- Causes
 - Evaluation
 - Semen Analysis
 - Treatment of abnormal severe parameters
- b) Female:
- Causes
 - Evaluation
 - Management of tubal and ovarian factors
8. **GENITAL INJURIES & FISTULAE.** 1 hour
- Causes
 - Clinical features
 - Management
 - Complications

- 9. LOW BACK ACHE.** 1 hour
- Causes
 - Clinical features
 - Evaluation
 - Management

- 10. OPERATIVE PROCEDURES.** 3 hours
- (Abdominal & Vaginal Hysterectomy Fothergills)
- Dilatation & curettage
 - Staging laparotomy

B) Desirable to know:

1. Cervical fibroid, broad ligament fibroid
2. Laparoscopic myomectomy, myolysis
3. Details of conservative surgeries for DUB
4. Premature ovarian failure
5. Malpa's classification for prolapse
6. Details of sling surgeries
7. CDC criteria for diagnosis of PID
8. Treatment of endometriosis in infertile cases
9. Treatment of male infertility
10. Management of genital fistula

C) Nice to know:

1. Uterine artery embolisation
2. Ormifloxifene
3. POP-Q classification for prolapse
4. Recent techniques in diagnosis of genital tuberculosis
5. Staging of endometriosis
6. Scar endometriosis
7. Artificial reproduction techniques(ART)
8. Newer treatment modalities for chronic pelvic pain
9. NDVH-Non descent vaginal hysterectomy
10. Types of Abdominal hysterectomy

9th TERM **12 hours**

OBSTETRICS

A) Must know:

1. RH ISO IMMUNIZATION: 1 hour

- Mechanism
- Foetal complications
- Prophylaxis & management

2. ASSESSMENT OF FOETAL WELL-BEING 1 hour

- Downs screening
- Chorionic villous sampling
- Amniocentesis
- Biophysical profile

3. FAMILY PLANNING METHODS. 4 hours

(Natural, Barriers, IUCDs, Hormonal Contraception, Implants)

- Definition
- Types
- Method of use
- Advantages and disadvantages of each method

4. PHARMACO THERAPEUTICS IN OBSTETRICS 2 hours

- Oxytocin
- Prostaglandins
- Anti hypertensives
- Tocolytics
- Anticonvulsants,

5. SPECIAL TOPICS IN OBSTETRICS 2 hours

High Risk pregnancy & Immunology in obstetrics (APLA)
shock in obstetrics, Blood coagulation disorders in obstetrics.(DIC)

6. MATERNAL MORBIDITY AND MORTALITY

- **Causes and prevention in hospital and community settings** 1 hour

7. MEDICO LEGAL ASPECTS & MEDICAL ETHICS IN OBSTETRICS AND GYNECOLOGY. 1 hour

B) Desirable to know

1. ABO incompatibility, Kleihauer Betke's test
2. Direct & indirect Coombs test
3. Modified Bio physical profile
4. Multiloader Cu IUCD
5. Contraception during lactation
6. Management of missing Cu T
7. Fetal hydantoin syndrome
8. Post ligation syndrome
9. Criteria for diagnosis of APLA
10. PCPNDT act

C) Nice to know

1. Exchange transfusion
2. Umbilical artery Doppler
3. Karyotyping
4. Non-scalpel vasectomy
5. Male hormonal contraception
6. Atosiban
7. Carbetocin
8. Treatment of APLA
9. Current MMR
10. Current national and WHO strategy to reduce MMR

9th TERM

Gynecology

12 hours

- 1. BENIGN, PREMALIGNANT & MALIGNANT LESIONS OF VULVA** 1 hour
 - Etiology
 - C/F
 - Investigation
 - Treatment & Prevention.

- 2. BENIGN, PREMALIGNANT & MALIGNANT LESIONS OF VAGINA** 1 hour
 - Etiology
 - C/F
 - Investigation
 - Treatment & Prevention.

- 3. BENIGN, PREMALIGNANT & MALIGNANT LESIONS OF CERVIX.** 3 hours
- Etiology
 - Types
 - Screening
 - Clinical features
 - Investigations
 - Management
- 4. BENIGN & MALIGNANT LESIONS OF OVARY.** 2 hours
- Etiology
 - Types
 - Screening
 - Clinical features
 - Investigations
 - Management
- 5. BENIGN, PREMALIGNANT & MALIGNANT LESIONS OF ENDOMETRIUM.** 2 hours
- Etiology
 - Types
 - Screening
 - Clinical features
 - Investigations
 - Management
- 6. RADIOTHERAPY IN GYNAECOLOGY.** 1 hour
- Indications
 - Mechanism of action
 - Methods
 - Advantages and dis advantages
- 7. CHEMOTHERAPY IN GYNAECOLOGY.** 1 hour
- Indications
 - Mechanism of action
 - Methods
 - Advantages and disadvantages
- 8. IMAGING TECHNIQUES IN GYNAECOLOGY.** 1 hour
- Indications
 - Mechanism of action

- Methods
- Advantages and disadvantages

B) Desirable to know

1. Premalignant lesions of vulva
2. Toluidine Blue test
3. Differential diagnosis for ulcerative lesions of cervix
4. Gardasil & Cervarix
5. Bethesda classification for CIN
6. HPV testing
7. Endometrial hyperplasia types & management
8. Details of hysteroscopy
9. Procedures done under day care
10. Radiological diagnosis of benign Vs malignant tumours

C) Nice to know

1. Details of colposcopy
2. Details of radical hysterectomy
3. Pelvic lymphadenectomy
4. Trachelectomy
5. Newer tumour markers for ca ovary
6. LYNCH I & II, HNPCC syndrome
7. Intensity Modulated Radiotherapy (IMRT)
8. Details of various chemotherapy regimens

8TH TERM TUTORIAL TOPICS

Sl. No.	Obstetrics	Gynecology
1	Diagnosis of pregnancy	Physiology of menstrual & menstrual disorders
2	Antenatal assessment of fetal well being	PID ,Acute chronic
3	CPD & contact of pelvis(skill lab)	STD, Genital TB Contraception
4	Mechanism of labor in OA,OP(Skill lab)	Fibroid uterus and adenomyosis
5	Mechanism of labour in breech face transverse lie(skill lab)	DUB
6	Management of different stage of labour & partograph (Skill Lab)	Ca Cervix
7	Forceps & ventouse (Skill lab)	Benign ovarian tumour
8	Cesarean section	Malignant ovarian tumour
9	puerperium	Carcinoma endometrium
10	Abnormal puerperium	choriocarcinoma

8th SEMINAR TOPICS

Sl. No.	Obstetrics	Gynaecology
1	Physiological changes during pregnancy	Malformation of genital tract
2	ANC	Amenorrhoea
3	Molar pregnancy	Prolapse
4	Uterine dysfunction	Endometriosis
5	Complication of 3 rd stage	Infertility-I
6	Breast Feeding	Infertility-II
7	Multiple pregnancy	Benign lesion of vulva vagina & cervix
8	Fetal growth restriction	Premalignant lesion of cervix & screening of Ca cervix
9	Polyhydromnios & oligohydromnios	Premalignant lesion of vulva vagina & endometrium
10	Teenage pregnancy elderly primigravida & grand nullipara	Menopause & HRT

9TH TERM SEMINAR TOPICS

Sl. No.	Obstetrics	Gynaecology
1	Abortion & Re abortion	Hysterectomy
2	MTP	Minor operative procedures-I
3	Ectopic pregnancy	Minor operative procedures-II
4	Hyperemesis	Vesicovaginal fistula & Ureterovaginal fistula
5	Induction of labour	Hormones in gynecology
6	Rh incompatibility	Radiotherapy in gynecology
7	IUD	Chemotherapy in gynecology
8	Birth asphyxia & neonatal Resuscitation	Endoscopy in gynecology
9	RCH	Imaging techniques in gynecology
10	Vital statistics	Diseases of breast gynecology

9TH TERM TUTORIALS TOPICS

Sl. No.	Obstetrics	Gynecology
1	Anaemia in pregnancy	Physiological & Pathological vaginal disorder
2	Cardiac disease	Prolapse
3	Dm in pregnancy	Male infertility
4	APH	Female infertility
5	Previous LSCS	Puberty

6	Preterm labour	Sex & Inter sexuality
7	PROM,PPROM	Contraception-I
8	Post term pregnancy	Contraception – II
9	Gynaecologica disorders in pregnancy	Sterilization procedure
10	Drugs in pregnancy	Low back ache

8TH TERM SMALL GROUP DISCUSSION TOPICS:

1. HYPERTENSION IN PREGNANCY

Group I- Preeclampsia: Definition, etiopathogenesis, diagnosis

Group II-Pre Eclampsia: Management

Group III-Gestational HT

Group IV-Chronic HT

2. PROLAPSE UTERUS

Group I- Etiology, clinical features

Group II-Diagnosis, classification, investigation

Group III-conservative Management

Group IV- Definitive management & complication

3. CONTRACEPTION

Group I-Natural & Barrier methods

Group II- Injectables & implants

Group III-Oral Contraceptive pills

Group IV-IUCD – Cu-T

4. MTP

Group I- Definition, Indication

Group II-MTP Act

Group III-Methods (First & second trimester)

Group IV-Complication

5. ANTENATAL CARE

Group I-Definition objectives, schedule of visits

Group II- care at 1st visit

Group III-care at follow up visit

Group IV- Advise during pregnancy

9TH TERM SMALL GROUP DISCUSSION TOPICS

1. TREATMENT OF LABOUR

Group I- 1st stage

Group II-2nd Stage

Group III-3rd Stage

Group IV-4th Stage

2. MECHANISM OF LABOUR (SKILL LAB)

Group I- Occipito Anterior

Group II - Occipito posterior

Group III-Breech

Group IV- Face & Brow

3. 3RD STAGE COMPLICATIONS

Group I- Atonic PPH

Group II-Traumatic PPH

Group III-Retained placenta

Group IV-Inversion

4. CARCINOMA CERVIX

Group I- Etiological clinical features

Group II-Investigations, complications

Group III-Staging & management

Group IV- Prevention

5. OVARIAN TUMORS

Group I- Benign: etiology clinical features

Group II-Benign: investigation & treatment

Group III-Malignant: etiology clinical features

Group IV-Malignant: investigation & treatment

Topics for Integrated Teaching for 8th Term

Sl. No	Topics	Departments
1	Hypertension in pregnancy	Physiology Medicine OBG
2	Nutrition & anemia in Pregnancy	Biochemistry Pathology Medicine OBG
3	Rational use of drugs & prescription in pregnancy	Pharmacology OBG
4	Reproduction & child health programme (RCH)	Community medicine OBG
5	Screening for genital malignancies	Community medicine Pathology OBG

Topics for Integrated Teaching for 9th Term

Sl. No	Topics	Departments
1	Cardiac disease in pregnancy	Physiology Medicine OBG
2	Tuberculosis of genital tract	Pathology Medicine/Chest & TB Surgery OBG
3	Acute abdomen	Surgery Radiology OBG
4	Fetal monitoring & Neonatal resuscitation	Paediatrics OBG
5	Ultrasound in Obstetrics & Gynecology	Radiology OBG

SCHEME OF EXAMINATION: OBSTETRICS AND GYNAECOLOGY

Internal Assessment: Total marks: 100, (Theory 50 and clinical 50)

Theory: 50 marks

Total 5 theory tests will be conducted. The 9th term examination preceding the University examination will be preliminary examination. 6th term and 8th term ending tests will have MCQs as a part of theory evaluation (minimum of 10 marks). Average of any two best marks obtained in the notified internal examinations will be taken into consideration for calculating internal assessment. The total marks be reduced to 50 and sent to the university.

Clinical: 50 marks:

There will be ward leaving examinations at the end of each posting. Average of any two best marks obtained in the ward leaving examinations shall be reduced to 30 marks. Each clinical assessment card carries 20 marks. Average of all the marks will be reduced to 10 marks .ANC, Labour, PNC, Gynecology and family planning cases have to be recorded in the record book and 10 marks are allotted to record book.

WARD LEAVING TEST PATTERNS

1st POSTING: case presentation (history taking and examination) (50 marks)

2nd POSTING: case presentation (50 marks)

3rd POSTING (8th term): OSCE (10 marks) , case presentation(50marks) and viva(40 marks)

9th term (preliminary examination): case presentation (60 marks) and viva (40 marks).

The internal assessment marks, both theory and practical obtained by the candidates should be sent to the university at least fifteen days prior to the commencement of theory examination. Note that, a student shall secure at least 35% marks of the total marks fixed for internal assessment in a particular subject in order to be eligible to appear in final university examination.

UNIVERSITY EXAMINATION:

Total marks: 400 (Theory 200, Viva-voce 40 and clinical 160)

Theory (written paper):

The distribution of topics and weightage of marks for University examination.

PAPER - I (OBSTETRICS)

TOTAL MARKS: 100

TOPIC	MARKS
General obstetrics	20
High risk	50
Abnormal labour	15
Operative obstetrics & MTP	10
Recent advances	5

PAPER – II (GYNAECOLOGY)

TOTAL MARKS: 100

TOPIC	MARKS
Development of genital tract & its abnormalities	5
Reproductive endocrinology	25
Genital infections	10
Genital lesions (benign & malignant)	25
Endometriosis & infertility	10
Urogynaecology	10
Contraception	5
Operative gynaecology	5
Recent advances	5

There shall be two papers each carrying 100 marks. The pattern of questions would be of three types.

1. Long essay, 2 questions each question carrying 10 marks = 20 marks
2. Short essay questions 10 x each question carrying 5 marks = 50 marks
3. Short answer questions, 10 x each question carrying 3 marks = 30 marks

Clinical: 160 marks Two cases

The distribution of marks for clinical cases

History taking	-	15 marks
Clinical examination	-	15 marks
Probable diagnosis based on history and examination-		20 marks
Relevant investigations	-	10 marks
Management	-	20 marks

One long case of Obstetrics and one long case of Gynaecology - 80 marks each.

Viva-voce: 40 marks

Components are:

Instruments	-	10
Specimen,X-ray,USG	-	10
Dummy & pelvis	-	10
Family planning & drugs	-	10

Suggested cases for practical examination:

A) Obstetrics:

1. Normal antenatal case
2. Normal postnatal case
3. Post Cesarean case
4. Previous LSCS
5. Hyper emesis gravidarum
6. Anemia in pregnancy
7. Hypertension in pregnancy
8. Preterm labour
9. Rh negative pregnancy
10. Cardiac disease in pregnancy
11. Twin pregnancy
12. Malpresentations (breech)
13. Abortion

B) Gynecology:

1. Mass per abdomen
2. Mass per vagina (Prolapse)
3. White discharge per vagina
4. Postmenopausal bleeding
5. Fibroid
6. Adenomyosis
7. DUB
8. Ca cervix
9. Ovarian tumours
10. PID
11. Infertility

RECOMMENDED BOOKS:**Obstetrics:**

1. Mudaliar & Menon, Clinical Obstetrics, Sarala Gopalan, Vanita Jain, 12th edition, University Press.
2. Dutta D.C., Text book of Obstetrics 8th edition, Jaypee Publication.
3. Holland and Brews, Textbook of Obstetrics. 4th Edition, B. I. Publication, New Delhi,

Reference books:

1. Williams Obstetrics — Cunningham, Bloom, Sponge, et al 24th edition, Mc Craw Hill education Publication.
2. Fernando Arias Amarnath Bhide, savaratanum Arulkumaran et al 4th edition, Elsevier publication.
3. Munro Kerr's operative obstetrics, Thomas F, Baskett Andrew, Savratanum Arulkumaran, 12th edition, Bailliere Tindall, London.

Gynaecology:

1. Shaw's A Text book of Gynaecology, Padubidri VG, Shirish N Daftary, 16th edition, Elsevier publication
2. Dutta DC, Text book of Gynaecology, 6nd edition,

Reference books

1. Jeffcoate's Principles of Gynaecology, Pratap kumar, Narendra malhotra, 8th edition, Jaypee publication.
2. Williams Gynaecology Hoffman, John, Joseph et al, 2nd edition, Mc Craw Hill education Publication.
3. Shaw's operative Gynaecology, Christopher Hudson, Marcus Setchell, 7th edition, Elsevier publication.

SECTION – IV
MEDICAL ETHICS

INTRODUCTION

Medical ethics is a systematic effort to work within the ethos of medicine, which has traditionally been service to sick.

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. Doctor and health professionals are confronted with many ethical problems. It is, therefore necessary to be prepared to deal with these problems.

In keeping with its goal to improve quality of education, BLDE University, recommends introduction of medical ethics in the regular teaching of M.B.B.S. course beginning from first year and continuing till internship.

OBJECTIVES

The objectives of teaching medical ethics should be to enable to students develop the ability to:

1. Identify underlying ethical issues and problems in medical practice.
2. Consider the alternatives under the given circumstances, and make decisions based on acceptable moral concepts and also traditions practices.

	Course Content	Department	Hours
1	Introduction to Medical Ethics What is Ethics? What are values and norms Relationship between being ethical and human fulfilment? How to form a value system in one's personal and professional life? Hemmans, Heteronomous Ethics and Autonomous Ethics Freedom and Personal Responsibility	Pathology	2
2	Definition of Medical Ethics Difference between medical ethics and bioethics Major Principles of Medical Ethics Beneficence = fraternity Justice = equality	Pathology	2

	Self determination (autonomy) = liberty		
3	Perspectives of Medical Ethics The Hippocratic oath The Declaration of Helsinki The WHO Declaration of Geneva International code of Medical Ethics (1983) Medical Council of India Code of Ethics	Physiology	2
4	Ethics of the Individual The patient as a person The Right to be respected Truth and Confidentiality The Autonomy of decision	Surgery	2
	The concept of disease, health and healing The Right to health Ethics of Behaviour modification The Physician Patient relationship Organ donation	Community Medicine	2
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 Fertilisation (IVF) Artificial Insemination by Husband (AIFI) Artificial insemination by Donor (AID) Surrogate motherhood Semen Intrafallopian Transfer (SIFT) Gamete Intrafallopian Transfer (GIFT) Zygote Intrafallopian Transfer (ZIFT) Genetic Engineering	OBG	6

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	Medical Education Department	6
7	Death and Dying Use of life-support systems Death awareness The moment of death Prolongation of life Ordinary and extraordinary life support Advanced life directives Euthanasia — passive and active Suicide — the ethical outlook The right to die with dignity	Anaesthesia	4
8	Professional 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 care	Surgery	4
9	Research Ethics Animal and experimental research Human experimentation Human volunteer research Informed Consent, Drug trails	Pharmacology	4
10	Ethical work-up of cases Gathering all scientific factors Gathering all human factors Gathering all value factors Identifying areas of value conflict setting of priorities Working out criteria towards decisions	All clinical departments	6
		Total hours	40

SECTION – V
ANNEXURES

ANNEXURE - 1

**Different Methods Recommended for
Internal Assessment by MCI**

The Medical Council of India has given some examples of methods for internal assessment of student, which may be followed by the colleges. They are;

1. Credit for preparation and presentation of seminars by students
2. Preparation of clinical case for presentation.
3. Clinical case study / problems solving exercises.
4. Participation in project for health care in the community
5. Proficiency in conducting a small research project or assignment.
6. Multiple choice questions (MCQ) test after completion of a chapter / system.
7. Each item shall be objectively assessed and recorded. Some of the items can be assigned as homework/vacation work.

ANNEXURE - 2

A comprehensive list of skills recommended as desirable for Bachelor of Medicine and Bachelor of Surgery (MBBS) Graduate:

(By Medical Council of India in Regulations on Graduate Medical Education, 1997)

I. Clinical evaluation

1. To be able to take a proper and detailed history.
2. To perform a complete and thorough physical examination and elicit clinical signs.
3. To be able to properly use the Stethoscope, Blood pressure apparatus, Otoscope, Thermometer, Nasal speculum etc;
4. To be able to perform internal examination—per rectum (PR), per vaginum (PV) dc;
5. To arrive at a proper provisional clinical diagnosis.

II. Bed side diagnostic tests

1. To do and interpret haemoglobin (Hb), total count (TC). erythrocyte sedimentation rate (ESR), blood smear for parasites, urine examination / albumin / sugar / ketones / microscopy;
2. Stool exam for ova and cysts;

3. To do Gram's stain and Ziehl-Neelsen stain for AFB;
4. To do skin smear for lepra bacilli;
5. To do and examine a wet film vaginal smear for Trichomonas.Vaginalis;
6. To do a skin scraping and Potassium hydroxide (KOH) stain for fungal infections;
7. To perform and read Mantoux test.

III. Ability to carry out procedures

1. To conduct CPR (Cardiopulmonary resuscitation) and First aid in newborns, children and adults.
2. To give subcutaneous (SC) / Instramuscular (TM) / Intravenous (IV) injections and start Intravenous (IV) infusions.
3. To pass a nasogastric tube and gixe gastric lavage.
4. To administer oxygen — by mask / catheter.
5. To administer enema.
6. To pass a urinary catheter male and female
7. To insert flatus tube.
8. To do pleural tap, ascitic tap and lumbar puncture.
9. Insert intercostal tube to relieve tension pneurnothorax.
10. To relieve cardiac tamponade.
11. To control external haernorrhage.

IV. Anaesthetic Procedures

1. Administer local anesthesia and nerve block
2. Be able to secure airway patency, administer oxygen by Ambu bag.

V. Surgical Procedure

1. To apply splints, bandages and plaster of Paris (POP) slabs;
2. To do incision and drainage of abscesses;
3. To perform the management and suturing of superficial wounds;
4. To carry our minor surgical procedures, e.g. excision of small cysts and nodules, circumcision, reduction of paraphimosis, debridement of wounds etc.,
5. To perform vasectomy,
6. To manage anal fissures and give injection for piles.

VI. Obstetric Procedures

1. To perform thorough antenatal examination and identify high risk pregnancies.
2. To conduct normal delivery;
3. To apply low forceps and perform and suture episiotomies;
4. To insert and remove IUD's and to perform tubectomy.

VII. Paediatrics

1. To assess new born and recognize abnormalities and IUG retardation;
2. To perform immunization;
3. To teach infant feeding to mothers;
4. To monitor growth by the use of 'road to health chart' and to recognize development retardation.
5. To assess dehydration and prepare and administer Oral Rehydration Therapy (ORT);
6. To recognize ART clinically;

VIII. ENT Procedures

1. To be able to remove foreign bodies;
2. To perform nasal packing for epistaxis;
3. To perform tracheostomy;

IX. Ophthalmic Procedures

1. To invert eyelids;
2. To give subconjunctival injection;
3. To perform epilation of eye-lashes;
4. To measure the refractive error and advise correctional glasses;
5. To perform nasolacrimal duct syringing for patency.

X. Dental Procedures

1. To perform dental extraction

XI. Community Health

1. To be able to supervise and motivate, community and para-professionals for corporate efforts for the health care;
2. To be able to carry on managerial responsibilities, e.g. Management of stores. indenting, stock keeping and accounting;
3. Planning and management of health camps;
4. Implementation of national health programmes;
5. To effect proper sanitation measures in the community, e.g. disposal of infected garbage, chlorination of drinking water;
6. To identify and institute control measures for epidemics including its proper data collecting and reporting;

XII. Forensic medicine including toxicology

1. To be able to carry on proper medico legal examination and documentation of injury and age reports.
2. To be able to conduct examination for sexual offences and intoxication;
3. To be able to preserve relevant ancillary materials for medico legal examination;
4. To be able identify important post-mortem finding in common un-natural deaths.

XIII. Management of emergencies

1. To manage acute anaphylactic shock:
2. To manage peripheral vascular failure and shock;
3. To manage acute pulmonary oedema and LVF:
4. Emergency management of drowning, poisoning and seizures;
5. Emergency management of bronchial asthma and status asthmaticus;
6. Emergency management of hyperpyrexia;
7. Emergency management of comatose patients regarding airways, positional prevention of aspiration and injuries:
8. Assess and administer emergency management of burns.

ANNEXURE - 3

CATEGORIES OF BIO-MEDICAL WASTE

SCHEDULE-I

(See Rule 5)

**Waste Category No.	Waste Category ** Type	Treatment & Disposal ** Options
Category No. 1	<u>Human Anatomical Waste</u> (human tissues, organs body parts)	Incineration ^o / deep burial*
Category No.2	<u>Animal waste</u> (animal tissues, organs, body parts, carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, colleges discharge from hospitals, animal houses)	Incineratin ^o / deep burial*

Category No.3	<u>Microbiology & biotechnology Waste</u> (wastes from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures.)	Local autoclaving/micro-waving/incineration ^o
Category No.4	<u>Waste sharps</u> (needles, syringes, scalpels, blades, glass etc., that may cause puncture and cuts. This includes both used and unused sharps)	Disinfection (Chemical treatment ^{oo} /auto claving/micro-waving and mutilation/shredding ^{aa}
Category No.5	<u>Discarded Medicines and Cytotoxic drugs</u> (waste comprising of outdated, contaminated and discarded medicines)	Incineration ^o /destruction and drugs disposal in secured landfills
Category No.6	<u>**Soiled Waste</u> (items contaminated with blood and body fluids including cotton, dressings, soiled plaster casts, liners, beddings, other material contaminated with blood)	Incineration ^o autoclaving/micro-waving
Category No.7	<u>Solid Waste</u> (waste generated from disposable items other than the waste**sharps such as tubings, catheters, intravenous sets, etc.)	Disinfection by chemical treatment ^{oo} autoclaving/micro-waving and mutilation/shredding ^{aa}
Category No.8	<u>Liquid Waste</u> (waste generated from laboratory and washing, cleaning, housekeeping and disinfecting activities	Disinfection by chemical treatment ^{oo} and discharge into drains
Category No.9	<u>Incineration Ash</u> (ash from incineration of any bio-medical waste)	Disposal in municipal landfill
Category No.10	<u>Chemical Waste</u> (chemicals used in production of biologicals, chemicals used in disinfectin as insecticides etc.,)	Chemical treatment ^{oo} and discharge into drains for liquieds and secured landfill for solids

** As per Bio-Medical Waste (Management & Handling) (Second Amendment) Rules, 2000, dated 2nd June, 2000.

^{oo} Chemicals treatment using at least 1% hypochlorite solution or any other equivalent chemical reagent. It must be ensured that chemical treatment ensures disinfection.

^{aa} Mutilation/shredding must be such so as to prevent unauthorized reuse.

^o There will be no chemical pretreatment before incineration. Chlorinated plastics shall not be incinerated.

* Deep burial shall be an option available only in towns with population less than five lakhs and in rural areas.

**COLOUR CODING AND TYPE OF CONTAINER
FOR DISPOSAL OF BIO-MEDICAL WASTES**

SCHEDULE – II

(See Rule 5)

Colour Coding	Type of Container	Waste Category	Treatment Options as per Schedule-I
Yellow	Plastic bag	Cat. 1, Cat.2, Cat.3, Cat.6.	Incineration/deep burial
Red	Disinfected container/plastic bag	Cat.3, Cat.6, Cat.7.	Autoclaving/Micro-waving chemical Treatment.
Blue/White Translucent	Plastic bag/puncture proof container	Cat.4, Cat.7.	Auto claving/Micro- waving/Chemical Treatment and destruction/shredding
Black	Plastic Bag	Cat.5, and Cat.9 and Cat.10 (solid)	Disposal in secured landfill

Notes:

1. Color coding of waste categories with multiple treatment options as defined in Schedule-I shall be selected depending on treatment option chosen, which shall be as specified in Schedule-I.
2. Waste collection bags for waste types needing incineration shall not be made of chlorinated plastics.
3. Categories 8 and 10 (liquid) do not require containers / bags.
4. Categories 3 if disinfected locally need not be put in containers / bags.