

# PONDICHERRY UNIVERSITY

## REGULATIONS ON GRADUATE MEDICAL EDUCATION (AMENDMENT), 2008-Part III

### CHAPTER 1

#### **GENERAL CONSIDERATIONS AND TEACHING APPROACH**

1. Graduate medical curriculum is oriented towards training students to undertake the responsibilities of a physician of first contact who is capable of looking after the preventive, promotive, curative & rehabilitative aspect of medicine.
2. With wide range of career opportunities available today, a graduate has a wide choice of career opportunities. The training, though broad based and flexible should aim to provide an educational experience of the essentials required for health care in our country.
3. To undertake the responsibilities of service situations which is a changing condition and of various types, it is essential to provide adequate placement training tailored to the needs of such services as to enable the graduates to become effective instruments of implementation of those requirements. To avail of opportunities and be able to conduct professional requirements, the graduate shall endeavour to have acquired basic training in different aspects of medical care.
4. The importance of the community aspects of health care and of rural health care services is to be recognized. This aspect of education & training of graduates should be adequately recognized in the prescribed curriculum. Its importance has been systematically upgraded over the past years and adequate exposure to such experiences should be available throughout all the three phases of education & training. This has to be further emphasized and intensified by providing exposure to field practice areas and training during the internship period. The aim of the period of rural training during internship is to enable the fresh graduates to function efficiently under such settings.
5. The educational experience should emphasize health and community orientation instead of only disease and hospital orientation or being-concentrated - on-curative -aspects. As such all the basic concepts of modern scientific medical education are to be adequately dealt with.
6. There must be enough experiences to be provided for self learning. The methods and techniques that would ensure this must become a part of teaching-learning process.
7. The medical graduate of modern scientific medicine shall endeavour to become capable of functioning independently in both urban or rural environment. He/she shall endeavour to give emphasis on fundamental aspects of the subjects taught and on common problems of health and disease avoiding unnecessary details of specialization.
8. The importance of social factors in relation to the problem of health and diseases should receive proper emphasis throughout the course and to achieve this purpose, the educational process should also be community based than only hospital based. The importance of population control and family welfare planning should be emphasized throughout the period of training with the importance of health and development duly emphasized.
9. Adequate emphasis is to be placed on cultivating logical and scientific habits of thought, clarity of expression and independence of judgment, ability to collect and analyse information and to correlate them.
10. The educational process should be placed in a historic background as an evolving process and not merely as an acquisition of a large number of disjointed facts without a proper perspective. The history of Medicine with reference to the

evolution of medical knowledge both in this country and the rest of the world should form a part of this process.

11. Lectures alone are generally not adequate as a method of training and are a poor means of transferring / acquiring information and even less effective at skill development and in generating the appropriate attitudes. Every effort should be made to encourage the use of active methods related to demonstration and on first hand experience. Students will be encouraged to learn in small groups, through peer interactions so as to gain maximal experience through contacts with patients and the communities in which they live. While the curriculum objectives often refer to areas of knowledge or science, they are best taught in a setting of clinical relevance and hands on experience for students who assimilate and make this knowledge a part of their own working skills.
12. The graduate medical education in clinical subjects should be based primarily on out-patient teaching, emergency departments and within the community including peripheral health care institutions. The out-patient departments should be suitably planned to provide training to graduates in small groups.
13. Clinics should be organized in small groups of preferably not more than 10 students so that a teacher can give personal attention to each student with a view to improve his skill and competence in handling of the patients.
14. Proper records of the work should be maintained which will form the basis for the students' internal assessment and should be available to the inspectors at the time of inspection of the college by the Medical Council of India.
15. Maximal efforts have to be made to encourage 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. Every attempt be made to de-emphasize compartmentalisation of disciplines so as to achieve both horizontal and vertical integration in different phases.
16. Every attempt is to be made to encourage students to participate in group discussions and seminars to enable them to develop personality, character, expression and other faculties which are necessary for a medical graduate to function either in solo practice or as a team leader when he begins his independent career. A discussion group should not have more than 20 students.
17. Faculty member should avail of modern educational technology while teaching the students and to attain this objective, Medical Education Units/ Departments be established in all medical colleges for faculty development and providing learning resource material to teachers.
18. To derive maximum advantage out of this revised curriculum, the vacation period to students in one calendar year should not exceed one month, during the 4 ½ years Bachelor of Medicine and Bachelor of Surgery (MBBS) Course.

### **OBJECTIVE OF MEDICAL GRADUATE TRAINING PROGRAMME**

**NATIONAL GOALS:** At the end of undergraduate program, 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.

## **INSTITUTIONAL GOALS:**

(I) In consonance with the national goals each medical institution should evolve institutional goals to define the kind of trained manpower (or professionals) they intend to produce. The undergraduate students coming out of a medical institute should:

- a) be competent in diagnosis and management of common health problems of the 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 rationale for different therapeutic modalities, be familiar with the administration of the "essential drugs" and their common side effects.
- d) be able to appreciate the socio-psychological, cultural, economic and environmental factors affecting health and develop humane attitude towards the patients in 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.
- f) be familiar with the basic factors which are essential for the implementation of the National Health Programmes including practical aspects of the following:
  - i) Family Welfare and Material and Child Health(MCH) (**Appendix A**)
  - ii) Sanitation and water supply
  - iii) Prevention and control of communicable and non-communicable diseases
  - iv) Immunization
  - v) Health Education
- g) acquire basic management skills in the area of human resources, materials and resource management related to health care delivery.
- 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.
- j) be competent to work in a variety of health care settings.
- k) have personal characteristics and attitudes required for professional life such as personal integrity, sense of responsibility and dependability and ability to relate to or show concern for other individuals.

(II). All efforts must be made to equip the medical graduate to acquire the skills as detailed in **APPENDIX B**.

## CHAPTER II

### ADMISSION, SELECTION, MIGRATION AND TRAINING

**ADMISSION TO THE MEDICAL COURSE – Eligibility Criteria:** No Candidates shall be allowed to be admitted to the Medical Curriculum of first Bachelor of Medicine and Bachelor of Surgery (MBBS) Course until:

1. He/She shall complete the age of 17 years on or before 31<sup>st</sup> December, of the year admission to the MBBS course.
2. He/She has passed qualifying examination as under :-

**a) Candidates passing the examination in piece-meal (compartmental) are not eligible for admission.**

- b) The higher secondary examination or the Indian School Certificate Examination which is equivalent to 10+2 Higher Secondary Examination after a period of 12 years study, the last two years of study comprising of physics, Chemistry, Biology and Mathematics or any other elective subjects with English at a level not less than core course of English as prescribed by the National Council of Educational Research and Training after the introduction of the 10+2+3 years educational structure as recommended by the National Committee on education.

Note: Where the course content is not as prescribed for 10+2 education structure of the National Committee, the candidates will have to undergo a period of one year pre-professional training before admission to the Medical colleges;

or

- a) The intermediate examination in science of an Indian University/Board or other recognized examining body with Physics, Chemistry and Biology which shall include a practical test in these subjects and also English as a compulsory subject.

or

- b) The pre-professional/pre-medical examination with Physics, Chemistry and Biology, after passing either the higher secondary school examination, or the pre-university or an equivalent Examination. The pre-professional/pre-medical examination shall include a practical test in Physics, Chemistry and Biology and also English as a compulsory subject.

or

- c) The first year of the three years degree course of a recognized university, with Physics, chemistry and Biology including a practical test in three subjects provided the examination is a "University Examination" and candidate has passed 10+2 with English at a level not less than a core course.

or

- d) 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) and further that he/she has passed the earlier qualifying examination with the following subjects – Physics, Chemistry, Biology and English.

or

- e) Any other examination which, in scope and standard is found to be equivalent to the intermediate science examination of an Indian University/Board, taking Physics, Chemistry and Biology including practical test in each of these subjects and English.

**3. The percentage of NRI students to be admitted for MBBS shall not exceed 15% of total intake.**

The following guidelines shall be followed for admission to NRI students

- i) Admission to the NRI seats may be made on the basis of the marks in the qualifying examination.
- ii) NRI financially supporting the candidate must be a blood relation such as Father/Mother/Brother/Sister/Uncle/Aunty only.
- iii) Applicants for admission under NRI Quota shall not have completed 21 years of age as on the 1st of July of the respective academic year.
- iv) Candidate must furnish the Xerox copies of the following supporting documents:-
  - a) NRI Status Certificate of the financial supporter issued by the Embassy of respective Country under their seal.
  - b) NRI Bank Account Pass Book of the financial supporter
  - c) Passport of the Financial Supporter
  - d) Nativity Certificate of the Financial Supporter

**Note:**

- The pre-medical course may be conducted either at Medical College, or a science College.
- Marks obtained in Mathematics are not to be considered for admission to MBBS Course.
- After the 10+2 course is introduced, the integrated courses should be abolished.

**SELECTION OF STUDENTS:**

The selection of students to medical college shall be based solely on merit of the candidate.

**Procedure for selection to MBBS course shall be as follows:-**

- i) In case of admission on the basis of qualifying examination under clause (1) based on merit, candidate for admission to MBBS course must have passed in the subjects of Physics, Chemistry, Biology & English individually and must have obtained a minimum of 50% marks taken together in Physics, Chemistry and Biology at the qualifying examination. In respect of candidates belonging to Scheduled Castes, Scheduled Tribes or Other Backward classes. The marks obtained in Physics, Chemistry and Biology taken together in qualifying examination be 40% instead of 50% as above.
- ii) In case of admission on the basis of Competitive entrance examination a candidate must have passed in the subjects of Physics, Chemistry, Biology and English individually and must have obtained a minimum of 50% of marks taken together in Physics Chemistry and Biology at the qualifying examination as mentioned in clause (2) of regulation 4 and in addition must have come in the merit list prepared as a result of such competitive entrance examination by securing not less than 50% marks in Physics, Chemistry and Biology competitive examination. In respect of candidates belonging to Schedule Caste, Schedule Tribes or other Backward Class the marks obtained in Physics, Chemistry, and Biology taken together in qualifying examination and competitive entrance examination be 40% instead of 50% as stated above.

Provided that a candidate who has appeared in the qualifying examination the result of which has not been declared, he may be provisionally permitted to take up the competitive entrance examination and in case of selection for admission to the MBBS course, he shall not be admitted to that course until he fulfils the eligibility criteria.

#### **MIGRATION:**

1. Migration of students from one medical college to another medical college may be granted on any genuine ground subject to the availability of vacancy in the college where migration is sought and fulfilling the other requirements laid down in the Regulations, Migration would be restricted to 5% of the sanctioned intake of the college during the year. No migration will be permitted on any ground from one medical college to another located within the same city.
2. Migration of students from one college to another is permissible only if both the colleges are recognized by the Central Government under section 11(2) of the Indian Medical Council Act, 1956 and further subject to the condition that it shall not result in increase in the sanctioned intake capacity for the academic year concerned in respect of the receiving medical college.
3. The applicant candidate shall be eligible to apply for migration only after qualifying in the first professional MBBS examination. Migration during clinical course of study shall not be allowed on any ground.
4. For the purpose of migration, an applicant candidate shall first obtain 'No Objection Certificate' from the college where he is studying for the present and the University to which that college is affiliated and also from the college to which the migration is sought and the University to which that college is affiliated. He/She shall submit his application for migration within a period of one month of passing (declaration of results of the first professional MBBS Examination) along with the above cited four 'No Objection Certificates' to: (a) the Director of Medical Education of the State, if migration is sought from one college to another within the same State or (b) the Medical Council of India, if the migration is sought from one college to another located outside the state.
5. A student who has joined another college on migration shall be eligible to appear in the 2<sup>nd</sup> professional MBBS examination only after attaining the minimum attendance in that college in the subjects, lectures, seminars, etc. required for appearing in the examination prescribed under Regulation 12(1).

#### **Note 1:**

The State Governments / Universities / Institutions may frame appropriate guidelines for grant of No Objection Certificate or migration, as the case may be, to the students subject to provisions of these regulations.

#### **Note 2:**

Any request for migration not covered under the provisions of these Regulations shall be referred to the Medical Council of India for consideration on individual merits by the Director (Medical Education) of the State or the Head of Central Government Institution concerned. The decision taken by the Council on such requests shall be final.

#### **Note 3:**

The College / Institutions shall send intimation to the Medical Council of India about the number of students admitted by them on migration within one month of their joining. It shall be open to the Council to undertake verification of the compliance of the provisions of the regulations governing migration by the Colleges at any point of time.

#### **Training Period and Time Distribution**

1. Every student shall undergo a period of certified study extending over 4 ½ academic years divided into 9 semesters, (i.e. of 6 months each) from the date of commencement of his study for the subjects comprising the medical curriculum to the date of completion of examination and followed by one year compulsory rotating internship. Each semester will consist of approximately 120 teaching days of hours each college working time, including one hour of lunch.
2. The period of 4 1/2 years is divided into three phases as follows:-
  - a) **Phase-1** (two semesters) – consisting of Pre-clinical subjects (Human Anatomy, Physiology including Bio-Physics, Biochemistry and introduction to Community Medicine including Humanities). Besides 60 hours for introduction to Community Medicine including Humanities, rest of the time shall be somewhat equally divided between Anatomy and Physiology plus Biochemistry combined (Physiology 2/3 and Biochemistry 1/3)
  - b) **Phase-II** (3 semester) – consisting of para – clinical/clinical subjects.

During this phase teaching of para-clinical and clinical subjects shall be done concurrently.

The para-clinical subjects shall consist of Pathology, Pharmacology, Microbiology, Forensic Medicine including Toxicology and part of Community Medicine.

The clinical subjects shall consist of all these detailed below in Phase III.

Out of the time for Para-clinical teaching approximately equal time be allotted to Pathology, Pharmacology, Microbiology and Forensic Medicine and Community Medicine combined (1/3 Forensic Medicine and 2/3 Community Medicine) See Appendix C.

- c) **Phase-III** (Continuation of study of clinical subjects for seven semesters after passing Phase-1)

The clinical subjects to be taught during Phase II and III are Medicine and its allied specialties, Surgery and its allied specialties, Obstetrics and Gynaecology and Community Medicine. Besides clinical posting as per schedule mentioned herewith, rest of the teaching hours be divided for didactic lectures, demonstrations, seminars, group discussions, etc. in various subjects.

The Medicine and its allied specialties training will include General Medicine, Pediatrics, Tuberculosis and Chest, Skin and Sexually Transmitted Diseases, Psychiatry, Radio-diagnosis, Infectious diseases etc. The Surgery and its allied specialties training will include General Surgery, Orthopedics Surgery including Physiotherapy and Rehabilitation, Ophthalmology, Otorhinolaryngology, Anesthesia, Dentistry, Radio-therapy etc. The Obstetrics & Gynecology training will include family medicine, family welfare planning etc.

3. The first 2 semester (approximately 240 teaching days) shall be occupied in the Phase 1 (pre-clinical) subjects and introduction to a broader understanding of the perspectives of medical education leading to delivery of health care. No student shall be permitted to join the Phase II (Pare-clinical/clinical) group of subjects until he has passed in all the Phase 1 (Pre-clinical) subjects for which he will be permitted not more than four chances (actual examination), provided four chances are completed in three years from the date of enrollment.
4. After passing pre-clinical subjects, 1 ½ year (3 semesters) shall be devoted to para-clinical subjects.

Phase II will be devoted to para-clinical and clinical subjects, along with clinical posting. During clinical phase (Phase III) pre-clinical and para clinical teaching will be integrated into the teaching of clinical subjects where relevant.

5. Didactic lectures should not exceed one third of the time schedule; two third schedule should include practical, clinical or/and group discussions. Learning process should include living experiences, problem oriented approach, case studies and community health care activities.
6. Universities shall organize admission timings and admission process in such a way that teaching in first semester starts by 1st of August each year.
7. Supplementary examination may be conducted within 6 months so that the students who pass can join the main batch and the failed students will have to appear in the subsequent year.
8. Maximal duration permitted to complete MBBS Course is 8 years. An extension of 3½ years only is allowed beyond the scheduled time for that batch of MBBS in which the candidate was enrolled.
9. In case of a candidate discontinuing in the middle and wishing to rejoin, the period of absence will be condoned only if a prior permission has been sought from the University before discontinuing.
10. Beyond this stipulated period, Mercy chance for any candidate due to prolonged illness, family problem, natural calamities, etc. will be made only by the Vice-Chancellor of the University.

### **Subjects covered during different Phases of MBBS**

(Detailed syllabus is given separately)

#### **Phase I (Pre-Clinical subjects)**

1. Human Anatomy
2. Human Physiology
3. Biochemistry
4. Introduction to Humanities and Community Medicine

#### **Phase II (Para-Clinical subjects)**

1. Pathology
2. Microbiology
3. Pharmacology
4. Forensic Medicine including Toxicology
5. Community Medicine

#### **Phase II & III (Clinical subjects)**

1. Medicine and its allied specialities
  - a) Medicine
  - b) Paediatrics
  - c) Psychiatry
  - d) Dermatology & STD
  - e) Tuberculosis and Respiratory diseases
2. Surgery and its allied specialities
  - a) Surgery
  - b) Orthopaedics
  - c) Radiodiagnosis and Radiotherapy
  - d) Oto-Rhino-Laryngology
  - e) Ophthalmology
3. Obstetrics & Gynaecology
4. Family Planning (Training in Family Planning should be emphasized in all the three phases and during internship)
5. Community Medicine
6. Emergency Medicine (This must be a general department. Till such time a full fledged department is created this may be under the control of the department of anaesthesia.)

**Phase Distribution and Timing of Examinations:-**

6 Months	6 Months	6 Months	
1	2		1st professional Examination (during <b>Second semester</b> )
3	4	5	IIInd Professional examination (during fifth semester)
6	7		IIIrd professional Part I (during 7 <sup>th</sup> semester)
8	9		IIIrd professional Part II (Final professional during 9 <sup>th</sup> semester)

Note:

- Passing in 1<sup>st</sup> Professional is compulsory before proceeding to Phase II training.
- A students who fails in the 2<sup>nd</sup> professional examination, shall not be allowed to appear in 3<sup>rd</sup> Professional Part I examination unless he passes all subjects of 2<sup>nd</sup> Professional examination.
- A student shall not be allowed to appear for 3<sup>rd</sup> Professional (Part II) examination unless he passes all subjects of 3<sup>rd</sup> Professional Part I Examination, but can undergo training in 8<sup>th</sup> and 9<sup>th</sup> semesters.
- The student is expected to complete the course within 8 years after which he will not be allowed to appear for any examination.

**During third to ninth semesters, clinical postings of three hours duration daily as specified in the Table is suggested for various departments, after Introductory Course in Clinical Methods in Medicine and Surgery of two weeks each for the whole class.**

Subjects	3 <sup>rd</sup> Semester (Wks)	4 <sup>th</sup> Semester (Wks)	5 <sup>th</sup> Semester (Wks)	6 <sup>th</sup> Semester (Wks)	7 <sup>th</sup> Semester (Wks)	8 <sup>th</sup> Semester (Wks)	9 <sup>th</sup> Semester (Wks)	Total (Wks)
General Medicine ***	6	-	4	-	4	6	6	26
Paediatrics	-	2	-	2	2	4	-	10
Tuberculosis And Chest Diseases	-	2	-	-	-	-	-	02
Skin & STD	-	2	-	2	-	2	-	06
Psychiatry	-	-	2	-	-	-	-	02
Radiology*	-	-	-	-	2	-	-	02
General **** Surgery	6	-	4	-	4	6	6	26
Orthopaedics**	-	-	4	4	-	-	2	10
Ophthalmology	-	4	-	4	-	-	2	10
Ear Nose And Throat	-	4	-	4	-	-	-	08
Obstetrics and Gynaecology***** including Family Planning	2	4	4	-	4	4	6	24
Community Medicine	4	4	-	4	-	-	-	12
Casualty	-	-	-	2	-	-	-	02
Dentistry	-	-	-	-	2	-	-	02
<b>Total (in Weeks)</b>	<b>18</b>	<b>22</b>	<b>18</b>	<b>22</b>	<b>18</b>	<b>22</b>	<b>22</b>	<b>142</b>

- Clinical methods in Medicine and Surgery for whole class will be for 2 weeks each respectively at the start of 3<sup>rd</sup> semester

\* This posting includes training in Radiodiagnosis and Radiotherapy where existent.

\*\* This posting includes exposure to Rehabilitation and Physiotherapy.

\*\*\* This posting includes exposure to laboratory medicine and infectious diseases.

\*\*\*\* This posting includes exposure to dressing and Anesthesia.

\*\*\*\* This includes maternity training and Family medicine and the 3rd semester posting shall be in Family Welfare Planning.

# **ANATOMY**

**CHAPTER III**  
**CURRICULUM (SUBJECT-WISE)**

**PHASE I**

**PRE-CLINICAL SUBJECTS**

In the teaching of these subjects stress shall be laid on basic principles of the subjects with more emphasis on their applied aspects.

**ANATOMY**

The subject of anatomy is taught under the following heads:

1. Gross anatomy
2. Microanatomy
3. Embryology and Genetics
4. Neuroanatomy

**Total number of teaching hours** is approximately 712 hrs.

**Distribution of teaching hours** for theory and practicals are as follows:

	<b>Subject</b>	<b>Approximate No. of hours taught</b>
1.	<u>General Anatomy</u>	
	Lectures Demonstration	11 hrs 22 hrs
2.	<u>Upper Limb</u>	
	Lecture Demonstration	16 hrs 10 hrs
	Dissection	40 hrs
3.	<u>Lower Limb</u>	
	Lecture Demonstration	16 hrs 10 hrs
	Dissection	40 hrs
4.	<u>Thorax</u>	
	Lecture Demonstration	15 hrs 12 hrs
	Dissection	30 hrs
5.	<u>Abdomen, Pelvis, Perineum</u>	
	Lecture Demonstration	35 hrs 24 hrs
	Dissection	50 hrs
6.	<u>Head &amp; Neck</u>	
	Lecture Demonstration	35 hrs 24 hrs
	Dissection	50 hrs
7.	<u>Neuroanatomy</u>	
	Lecture Demonstration/Dissection	12 hrs 40 hrs
8.	<u>Microanatomy</u>	
	Lecture Practical	30 hrs 60 hrs
9.	<u>Embryology</u>	
	Lectures Practicals	30 hrs 10 hrs
10.	<u>Genetics</u>	
	Lectures	06 hrs

	Practicals	04 hrs
<u>Postnatal Growth &amp; Development</u>		
11.	Lectures	04 hrs
	Practicals	06 hrs
12.	Cross sectional Anatomy	05 hrs
13.	Radiological anatomy	10hrs
14.	Surface anatomy	08 hrs
15.	Notified tests - 8	24 hrs
16.	Revision	10 hrs
17.	Send-up Examination	18 hrs
<b>Total No. of teaching hours in Anatomy = 712 hrs (Theory and Practicals)</b>		

### DEPARTMENTAL OBJECTIVES

The MBBS students, at the end of the course in Anatomy, should be able to:

1. Point out and state the gross anatomical features of various structures and organs of the human body.
2. Recognize and state the histological features of various tissues and organs of the human body with functional correlation.
3. State the development of various structures of the human body, differentiate abnormal development and interpret the formation of various congenital anomalies.
4. State the basic principles of genetics and understand the basis of genetic disorders.
5. Point out the features of various appearances of the normal human body in skiagrams after routine radiological investigations.
6. Outline the internal structures in relation to the external or surface features of the body.
7. State the features of normal postnatal growth and recognize any variation.
8. Apply the basic knowledge of anatomy in the practice of medical sciences and demonstrate an interest in continuing to learn advances in anatomy and apply the same in medical practice.
9. Stain a paraffin section of any tissue or organ with hematoxylin and eosin and interpret the observations.
10. Embalm and preserve the dead body.
11. Identify the prominent anatomical structures in the living human being and draw inferences for the purpose of anatomical diagnosis of the disease.

## **COURSE CONTENT**

### **I. GROSS ANATOMY**

#### **I (a) OSTEOLOGY**

##### **Must know:**

- Names of the bones of the body and their position;
- Classification of the bones with examples;
- General features of the bone;
- Types of ossification and normal development;
- Microscopic anatomy of bone;
- General pattern of blood supply;
- Ossification of the bones of limbs.

#### **I (b) MUSCULAR SYSTEM**

##### **Must know:**

- Classification and identification of the muscles of the body (except muscles of the vertebral column)
- Main attachments, nerve supply and action;
- Microscopic anatomy of muscles and the nerve terminations.

##### **Desirable to know:**

- Details of attachment of the muscles;
- Ultra structural features of muscles;
- Mechanism of the movement caused by the muscle/muscles, various forces exerted by them.

#### **I (c) ARTHROLOGY**

##### **Must know:**

- Classification of joints,
- General features of different types of joints;
- Detailed study of major joints of the limbs and movements.

##### **Desirable to know:**

- Microscopic anatomy of articular cartilage;
- Maintenance of articular cartilages;
- Blood supply to nerve terminals in the articular cartilage.

#### **I (d) CARDIO-VASCULAR SYSTEM**

##### **Must know:**

- Position, parts of the heart;
- Names of the blood vessels and their distribution in the body;
- Normal development of heart and major blood vessels of the body.

##### **Desirable to know:**

- Developmental anomalies ;
- Valvular defects and their effects;
- Pathogenesis of the anomalies.

#### **I (e) RESPIRATORY SYSTEM AND THE ORGANS**

##### **Must know:**

- Position, parts, relations,
- Blood supply,
- Microscopic anatomy,
- Blood air barrier,
- Normal development.

#### **I (f) DIGESTIVE SYSTEM AND THE ORGANS**

##### **Must know:**

- Position, parts, relations,

- Blood supply, nerve supply,
- Normal development,
- Microscopic anatomy;
- Sphincters of gastrointestinal system.

**Digestive system (GIT):**

General organization, oral cavity, lip, cheek, tongue, taste buds, associated salivary glands. Layers of tubular digestive tract, esophagus, stomach, small intestine, gastro esophageal junction, gastro duodenal junction, large intestine, anal canal and rectoanal junction. Liver, internal organization of liver, liver lobule, liver acinus, significance of zonation in liver acinus, liver sinusoids, detailed structure of hepatocyte, bile canaliculi, bile ducts, gall bladder, bile duct and pancreas.

**I (g) GENITO-URINARY SYSTEM AND THE ORGANS**

**Must know:**

- Parts, position, relations,
- Blood supply nerve supply,
- Normal development,
- Microscopic anatomy;
- Electron microscopy of renal glomerulus.

**I (h) ENDOCRINE SYSTEM AND INDIVIDUAL ENDOCRINE GLANDS**

**Must know:**

- Parts, location, relations,
- Blood supply, nerve supply,
- Microscopic anatomy;
- Normal development.

**I (i) NERVOUS SYSTEM AND ITS COMPONENTS**

**Must know:**

- Meninges, Dural reflections & venous sinuses, Subarachnoid cisterns,
- Parts of Brain and Spinal cord
- Spinal cord - Tracts, position, functions and applied significance
- Brain stem – Nuclei, Tracts, position, connections and applied significance
- Cerebellum - Nuclei, Tracts, position, connections and applied significance
- Cerebrum – Functional areas, Blood supply
  - White mater of cerebrum
  - Basal ganglia – Nuclei, connections, blood supply applied significance
  - Diencephalons – Nuclei, connections, blood supply applied significance
- CSF formation, drainage & applied significance
- Ventricles,
- Limbic system.

**Desirable to know:**

- Reticular formation,
- Correlation of microscopic anatomy function,
- Development anomalies.

**3. SPECIAL SENSORY ORGANS**

**Must know:**

- Gross Anatomy and Micro Anatomy of eyeball, ear, nose, skin and tongue.

**Desirable to know:**

- Anatomy of the various nerve tracts and pathways concerned with these five sensory organs.

#### 4. LYMPHATIC SYSTEM

**Must know:**

- Gross anatomy of the different groups of the lymph nodes of the body and structures drained by each group.
- Gross anatomy of the major lymphatics specially about thoracic duct and its tributaries.

#### I (a) RADIOLOGICAL ANATOMY

**Must know:**

- Identification of normal anatomical features in skiagrams.

**Desirable to know:**

- Identification of the normal anatomical features in special investigations.

#### I (b) SECTIONAL ANATOMY

**Must know:**

- Anatomical features at the following vertebral levels
  - Transverse section Cervical 5 & 7,
  - Thoracic 2, 4, 7, 10, 12,
  - Lumbar 1,3 & 5.
  - Sacral 3.

**Desirable to know:**

- Median sagittal of head section of head and neck;
- Median sagittal section of brain;
- horizontal section of brain at the level of 4<sup>th</sup> ventricle foramen.
- Coronal section of cerebrum at the level of the central sulcus and splenium.

#### I (c) SURFACE ANATOMY

**Must know:**

- Study of the surface features of the body
- Projection of the outline of heart,
- Lungs, pleura and important blood vessels and nerves.

**Desirable to know:**

- Location of the various arterial pulses in the living.

### II. EMBRYOLOGY

#### GENERAL EMBRYOLOGY

**Must know:**

- Definition of embryology;
- Gestation period: subdivisions;
- Definition of gonads; testis, ovary;
- Definition of gamete: sperm, ovum;
- Definition of gametogenesis;
- Migration of primordial germ cells into indefinite gonad;
- Spermatogenesis; structure of sperm,
- Oogenesis; structure of ovum; growth of follicles.

**Desirable to know:**

- Sperm in the male genital tract;
- Sperm in the female genital tract;
- Activation and capacitation of sperm ovum in the female genital tract;
- Events of uterine and ovarian cycles.

#### First Week of Development

**Must know:**

- Definition, process of fertilization – approximation,
- Contact and fusion of gametes (sperm and ovum);

- Formation of zygote;
- Cleavage division;
- Formation of morula;
- Formation of blastocyst;
- Site of implantation;
- Formation of decidua - its subdivisions.

**Desirable to know:**

- Result of fertilization;
- Fate of endometrium;
- Preimplantation changes of endometrium;
- In vitro fertilization;
- Types of implantation;
- Abnormal sites of implantation.

**Second Week of Development**

**Must know:**

- Differentiation of embryoblast and trophoblast;
- Changes in the embryoblast – bilaminar germ disc;
- Changes in the trophoblast;
- Formations of cytotrophoblast,
- Syncytiotrophoblast,
- Amniotic membrane, yolk sac,
- Extra embryonic mesoderm and extra embryonic coelom and connecting  
Stalk,
- Formation of chorion,
- Amniotic cavity, primary yolk sac cavity;
- Appearance of prochordal plate.

**Third Week of Development**

**Must know:**

- Appearance of primitive streak and primitive node;
- Formation of intraembryonic mesoderm resulting in a trilaminar germ disc;
- Formation of notochord;
- Formation of buccopharyngeal and cloacal membranes;
- Formation of pericardial bar; formation of paraxial,
- Intermediate and lateral plate mesoderm and formation of secondary yolk sac
- Intraembryonic coelom;
- Formation of allantoic diverticulum;
- Derivatives of ectoderm, endoderm and mesoderm.

**Desirable to know:**

- Formation of neurenteric canal.

**Fourth to Eighth Week of Development**

**Must know:**

- Formation of somites;
- Formation of neural tubes;
- Cephalocaudal folding; lateral foldings;
- Formation of a cylindrical body,
- Stomodeum, proctodeum, gut and vitelline duct;
- Subdivision of gut into foregut, midgut and hindgut.

**Desirable to know:**

- Reversal of structures,
- Ducts, head fold and tail fold;
- Changes in external body form to human appearance.

### **Third to Tenth Month of Development**

**Must know:**

- Maturation of tissues and organs and rapid growth of body.

**Desirable to know:**

- Estimation of age; horizons of development.

### **Placenta**

**Must know:**

- Formation of placenta, decidua basalis;
- Formation of chorionic villi;
- Formation of chorion frondosum;
- Formation of chorion laeve;
- Features of placenta;
- Placental circulation;
- Functions of placenta.

**Desirable to know:**

- Abnormalities;
- Placenta barrier;
- Ultrastructural features;
- Types of placenta.

### **Umbilical Cord**

**Must know:**

- Formation of umbilical cord; features of umbilical cord.

**Desirable to know:**

- Abnormalities.

### **Amniotic Cavity**

**Must know:**

- Amniotic cavity and membrane;
- Amniotic fluid – functions;
- Expansions of amniotic cavity and fusion with chorion;
- Chorion laeve with decidua capsularis;
- Decidua capsularis with parietalis;
- Obliteration of chorionic and uterine cavities;
- Function of fused foetal membranes to dilate cervical canal.

**Desirable to know:**

- Abnormalities;
- Obliteration of chorionic and uterine cavities;
- Abnormalities of chorion.

**Must know:**

- Formation of twins: types

**Desirable to know:**

- Arrangement of foetal membranes, Conjoined twins.

### **Teratology**

**Must know:**

- Genetical and environment factors for congenital malformations.

**Desirable to know:**

- Mode of actions of teratogenes, critical periods.

## ***SYSTEMIC EMBRYOLOGY***

**Must know:**

- Normal development of each system.

**Desirable to know:**

- Developmental abnormalities; pathogenesis of the anomalies.

**Must know:**

- Development of the individual organs of digestive system,
- Genital system,
- Urinary system,
- Respiratory system,
- Cardiovascular system,
- Nervous system and special sensory organ and endocrine glands and mammary gland.

**Desirable to know:**

- Development of skeletal system,
- Muscular system and derivatives of coelomic cavities.

**Must know:**

- Formation of the congenital anomalies of various organs.

**Desirable to know:**

- Pathogenesis of the anomalies.

**Must know:**

- Development of face and the pharyngeal arches
- Associated congenital anomalies.

**Desirable to know:**

- Development of lymphatic system;
- Development of the integumentary system.

### III. MICRO ANATOMY

**Must know:**

- General Histology, Study of the basic tissue of the body.

**Desirable to know:**

- Functional correlation of the structural components of the organs.

**Must know:**

- Systemic Histology,
- Structures of the organs of the various systems.
- To identify the structural components of the above after haematoxylin and eosin staining under compound light microscope.
- Electron microscopy of glomerulus.
- To stain the given tissue or organ of paraffin section with H&E and identify the features of the same.

**Desirable to know:**

- Identification of the cellular components in an electron micrograph.

### GENERAL HISTOLOGY

**Cell:**

Detailed structure of cell  
Components and their functional mechanisms.

#### Primary Tissues

**Epithelium:**

Microscopic characteristics,  
Types, functions, distribution,  
Basal lamina, Cell junctions,  
Specialization of the cell surface and their structural details and functions;  
metaplasia.

**Connective tissue:**

Cells, fibers and their structural features and functions.  
Intercellular substances, amorphous ground substance,  
Types of connective tissue (loose areolar tissue, dens connective tissue)  
and their distribution.

Specialized connective tissue:

Cartilage: different types of cartilages and their functions and distribution.

Bone: Cells, bone matrix, structural feature of compact and cancellous bone, their distribution, and functions, ossification, blood supply of a long bone.

**Muscle:**

General features, detailed structure of : skeletal muscle,  
Molecular mechanisms of contraction,  
Innervations of skeletal muscle, Neuromuscular junction,  
Morphological and histochemical basis of classification into type I and type II muscle fibers and their significance,  
Structural and functional characteristics of cardiac and smooth muscle;  
Innervations of cardiac and smooth muscle.

**Nervous tissue:**

Structural characteristics of a neuron, axon and dendrites.  
Different types of neurons and their specific structural and functional features and distribution.  
Axonal transport, synapse, morphological and functional characteristics of different types of synapses.  
Neuroglia: types, structure and functions, blood brain barrier.  
Brief cytoarchitecture of the central nervous system,  
Regeneration in CNS with particular emphasis on stem cells.  
Sensory and autonomic ganglia,  
Peripheral nerves, myelin and myelination,  
Degeneration and regeneration in peripheral nerves.

**Systemic Histology of various organs/organ systems**

**Exocrine glands:**

Characteristics, simple and compound gland;  
Types of secretions, modes of secretion,  
Detailed structural feature of a serous secreting cell and mucous secreting cell, Serous and mucous acini, duct system,  
Features of salivary glands,  
Exocrine pancreas,  
Sweat and sebaceous glands,  
Mammary gland,  
Bulbourethral gland etc.

**Circulatory system:**

Structural features of heart;  
Conducting and distributing arteries and arterioles;  
Types of capillaries, their structural features and distribution and micro circulation.  
Detailed structure of endothelium;  
Structural characteristics of large and small veins and  
Venules arterio-venous shunts,  
Lymphatics.

**Respiratory system:**

Structural feature of nose,  
Nasopharynx, larynx, trachea,  
Principal bronchi,  
Lung including intrapulmonary bronchi, bronchioles,  
Alveolar ducts, atria, alveoli,  
Blood-air-barrier.  
Functions of different parts of respiratory system.

**Skin and nerve-end-organs:**

Thick, thin and hairy, skin,  
Cell renewal and pigmentation of skin,  
Skin appendages,  
Healing of skin wounds,  
Sensory receptors of skin.  
Functions of skin.

**Immune system and lymphoid organs:**

Lymphocytes, their subtypes and functions.  
Humoral and cell mediated immunity.  
Thymus, lymph nodes, spleen,  
Tonsils and other mucous associated lymphoid follicles.

**Digestive system (GIT):**

General organization, oral cavity, lip, cheek, tongue, taste buds, Salivary glands.  
Layers of tubular digestive tract,  
Esophagus, gastroesophageal junction,  
Stomach, small intestine,  
Gastroduodenal junction, large intestine,  
Anal canal and rectoanal junction.  
Liver, internal organization of liver, liver lobule, liver acinus,  
Significance of zonation in liver acinus,  
Liver sinusoids, detailed structure of hepatocyte,  
Bile canaliculi, bile ducts, gall bladder,  
Bile duct and pancreas.

**Endocrine glands:**

Thyroid, parathyroid,  
Islets of Langerhan's gland,  
Adrenal cortex and medulla, their structural details, functional mechanisms,  
Hypophysis cerebri, cell types secretion and their functions,  
Hypophyseal portal circulation,  
Common endocrine disorders.

**Urinary system:**

Detailed microscopic structure of kidney, cortex, medulla, pyramids,  
Medullary rays, cortical columns,  
Glomerulus, nephron, glomerular filtration  
Juxtaglomerular apparatus, its structural features and functions,  
Renal interstitium,  
Collecting ducts, renal sinus, minor and major calyces,  
Microcirculation of kidney,  
Histophysiology of the kidney,  
Renal pelvis and ureters, urinary bladder and urethra.

**Female reproductive system:**

Ovary, ovarian stroma, primary and secondary graafian follicles,  
Functions of various constituents and structural details of graafian follicles,  
Corpus luteum and its functions, corpus albicans.  
Oviducts, uterus, arterial supply of uterus, cyclic changes in uterine endometrium, fertilization,  
Vagina, female external genitalia  
Mammary glands.

**Male reproductive system:**

Testes, spermiogenesis, spermatozoon,

Cycle of seminiferous epithelium,  
Sertoli cells, interstitial tissue leydig cells,  
Histophysiology of testes,  
Epididymus, vas deferens,  
Prostrate, seminal vesicles, penis.

**Nervous system:**

Cross section of spinal cord at various levels  
Cross section of Medulla Oblongata at Pyramidal decussation  
Sensory decussation  
Mid Olive  
Cross section of Pons at Upper & Lower level  
Cross section of Mid brain at sup. & Inf. Colliculus levels  
  
Histology of Cerebral & Cerebellar cortex

**Special senses:**

Structure of Retina, Cornea, Sclero corneal junction and Optic nerve  
Structure of Organ of Corti, Vestibular apparatus.  
Structure of Olfactory epithelium

**IV. MEDICAL GENETICS**

**Molecular Biology**

**Must know:**

- Nucleus, DNA, chromosomes,
- Classification, karyotype,
- Chromosomal aberrations.

**Desirable to know:**

- Pathogenesis of chromosomal aberrations and their effects,
- Recombinant DNA.

**Must know:**

- Clinical Genetics,
- Pedigree charting,
- Dermatoglyphics,
- Buccal smear,
- Down's syndrome,
- Klinefeller syndrome,
- Turner syndrome,
- Genetic markers.

**Desirable to know:**

- Genetic counseling, Population genetics. Practical genetics.

**V. POSTNATAL GROWTH AND DEVELOPMENT**

**Must know:**

- Meaning of the terms like growth,
- Development etc.;
- Principles of growth and development;
- Types of postnatal growth,
- Periods of growth and development and factors influencing them.
- Assessment of growth and development.

**Desirable to know:**

- Milestones of development.
- Growth and development during adolescence.

**SKILLS**

1. Location of arterial pulses of the superficial temporal artery, common carotid artery, axillary artery, brachial artery, radial artery, femoral artery, popliteal artery, posterior tibial artery and dorsalis pedis artery.

2. Palpation/location of great auricular nerve, ulnar nerve and common peroneal nerve.
3. Palpation and identification of the bony prominences around shoulder, elbow, wrist, hip, knee and ankle.
4. Identification/location of internal jugular vein, median cubital vein, dorsal venous arch of hand, great saphenous vein, small saphenous vein and dorsal venous arch of foot.
5. Location and surface anatomy of scrotal part of vas deferens, lungs, heart, liver, spleen and kidneys.
6. Identification of the structures in exposed parts of the eyeball, nose and oral cavity.
7. Staining of paraffin sections with H&E.
8. Buccal smear examination for sex chromatin.
9. Identification of normal and abnormal Karyotyping.

#### AREAS FOR INTEGRATED TEACHING

S.No.	Area/subject	Collaborating departments
1.	Anatomical basis of birth control measures	Obstetrics & Gynaecology, Community Medicine & Surgery
2.	Postnatal growth and development	Paediatrics and Community Medicine
3.	Antenatal growth and development	Obstetrics & Gynaecology
4.	Genetic disorders	Various clinical departments
5.	Medical genetics	Biochemistry
6.	Neuro-anatomy	Physiology
7.	Sex differences and age changes in bones	Forensic Medicine
8.	Normal and abnormal cells (cytology)	Pathology
9.	Anatomy of some important and common Clinical syndromes	Various clinical department
10.	Kinesiology – Movements at various joints	Orthopaedics
11.	Embryology basis of important and common Congenital anomalies	Pediatrics and Obstet & Gynaecology

**LIST OF BOOKS RECOMMENDED**

	<b>Title</b>	<b>Author</b>
<b>Gross Anatomy</b>	Cunningham's manual of Practical Anatomy (Vol. I, II & III)	Romanes
	Clinically oriented Anatomy	Moore & Dalley
	Clinical Anatomy by Regions	Richard Snell
	Last's Anatomy 11th	Sinnathamby
	Grants Method of Anatomy, 11th Edition	Basmajian
<b>Histology</b>	Wheater Functional Histology 5thEd	Young's
	Basic Histology Text & Atlas, 10th Edition	Junqueira
	Atlas of Histology with functional correlation. International Edition 9 <sup>th</sup> (2000).	Di Fiore's
<b>Embryology</b>	Medical embryology	Jan Langman
	Developing Human Clinically Oriented Embryology	Moore, Persaud
	Before we are born: Essentials of Embryology & Birth Defects. 6th Edition	Moore, Persaud
<b>Neuro Anatomy</b>	Clinical Neuro Anatomy 6th Ed	Snell
	Neuro anatomy	Carpenter
	The Human Nervous System: An Anatomical View Point, 7 <sup>th</sup> Edition, 1998. <i>Publ. Harper &amp; Row</i>	Murray L Barr & Keirman
<b>Genetics</b>	Genetics in Medicine 6thEd	Thompson & Thompson
	Emery's Elements of Medical Genetics, 11th Ed	Mueller
	Medical Genetics 3rd Ed	Jorde
<b>Postnatal growth and development</b>	Teaching Manual on "Postnatal growth and development"	WHO Project IND/MCH/003/1984-85

**Internal Assessment:** These assessments in theory and practical are held as given below:

<b>Test</b>	<b>Topics</b>
<b>1<sup>st</sup> Notified test</b>	- General Anatomy, Histology, Embryology and Upper Limb
<b>2<sup>nd</sup> Notified test</b>	- General Histology, Embryology and Lower Limb
<b>Terminal Exam</b>	- Gross Anatomy of Limbs, Abdomen, Pelvis & Perineum,
<b>4<sup>th</sup> Notified test</b>	- Gross Anatomy of Thorax, related Histology and Embryology
<b>5<sup>th</sup> Notified Test</b>	- Gross Anatomy of Head & Neck (I), related Histology and Embryology
<b>6<sup>th</sup> Notified test</b>	- Gross Anatomy of Head & Neck (II), related Histology and Embryology
<b>7<sup>th</sup> Notified test</b>	- Neuroanatomy, related Histology and Embryology

**Send up Examination**

**Paper I**

General Anatomy, Embryology, Histology  
Gross Anatomy of Limbs, Abdomen, Pelvis & Perineum  
related Systemic Histology & Embryology and  
Medical Genetics

**Paper II**

Gross Anatomy of -  
Head & Neck, Neuroanatomy, Thorax  
related Systemic Histology & embryology  
Postnatal Growth and Development

<b>Test</b>	<b>Marks</b>			<b>Total</b>
	<b>Theory</b>	<b>Practicals</b>	<b>Viva voce</b>	
<b>1<sup>st</sup> Notified test</b> -	80 marks	10 Marks	10 Marks	100

<b>2<sup>nd</sup> Notified test</b> -	80 marks	10 Marks	10 Marks	100
<b>Terminal Exam</b> -	100 marks	40 Marks	20 Marks	160
<b>4<sup>th</sup> Notified test</b> -	80 marks	10 Marks	10 Marks	100
<b>5<sup>th</sup> Notified Test</b> -	80 marks	10 Marks	10 Marks	100
<b>6<sup>th</sup> Notified test</b> -	80 marks	10 Marks	10 Marks	100
<b>7<sup>th</sup> Notified test</b> -	80 marks	10 Marks	10 Marks	100
<b>Send up Examination</b>				
<b>Paper I</b>	50 marks	40 Marks	20 Marks	160
<b>Paper II</b>	50 marks			

[\*Internal Assessment is calculated as average of n-1 ("n" is total no. of tests conducted)  
For theory and Practicals separately]

# **Human Physiology including Bio- Physics**

# **HUMAN PHYSIOLOGY INCLUDING BIO-PHYSICS**

## **PHYSIOLOGY**

### **Learning Objectives**

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

1. Describe the normal functions and regulation of all organ systems in the body.
2. Apply this knowledge to understand the maintenance of homeostasis in the body.
3. Describe the physiological responses and adaptations to environmental stressors.
4. Apply the knowledge of the physiology of reproduction to promote the National Family Welfare Programme.
5. Apply this knowledge to understand the Patho-physiology, and treatment of disease.
6. Co-relate knowledge of Physiology with other medical disciplines.
7. Acquire skills to perform experiments, which demonstrate various physiological phenomena.
8. Analyze and interpret data obtained from experiments in Physiology.

### **Course Content-Theory**

#### **General Physiology**

##### **Must know:**

Concept of homeostasis, milieu interieur, physiological norms, their range and control. Structure and functions of the cell membrane.

Mechanism and modes of transport across cell membrane, and the capillary wall.

Intercellular communication, Membrane receptors, second messengers and signal transduction.

Body fluid compartments and their measurements. Fluid and electrolyte balance.

##### **Desirable to know:**

Structure and function of the cell and its organelles, Ageing.

#### **Blood**

##### **Must know:**

Composition and functions of blood.

Functions of plasma proteins, red cells, white cells, and thrombocytes.

Haemopoiesis and factors regulating it. Erythropoiesis and its regulation.

Classification of anaemias and principles of management of anaemia due to deficiency of iron Vitamin B12, and folic acid.

Erythrocyte sedimentation rate and factors affecting it.

Classification and functions of leukocytes. Types and mechanism of immunity.

RBC lifespan, Fragility and Tissue Macrophage system

Structure and functions of platelets and their role in coagulation.

Hemostasis and its disorders. Role of vascular endothelium in blood coagulation.

Anticlotting mechanisms. Anticoagulants and their mechanism of action.

Blood groups: ABO, Rh and MN systems, Clinical importance, Blood transfusion and blood banking . Formation, composition and functions of lymph.

##### **Desirable to know:**

Haemoglobin, Bilirubin metabolism, Jaundice and Complement system. AIDS

#### **Nerve Muscle Physiology**

##### **Must know:**

Structure of neuron and neuroglia.  
Forces affecting the movement of ions across the cell membrane.  
Genesis of the resting membrane potential, and conduction of the nerve impulse.  
Classification of nerve fibers.  
Nerve block, degeneration and regeneration of nerve fibers.  
Structure and transmission across the neuromuscular junction. Drugs affecting neuromuscular transmission. Disorders of the neuromuscular junction -Myasthenia Gravis.  
Effects of denervation.  
Structure of sarcomere. Events in skeletal muscle contraction and relaxation. Types of skeletal muscle fibers. Motor units. EMG. Gradation of skeletal muscle force (summation and recruitments). Length- tension relationship.  
Structure of smooth muscle. Types of smooth muscle. Electrical activity of smooth muscle. Mechanism of contraction and relaxation of smooth muscle. Plasticity. Neural and chemical control of smooth muscle.  
Structure of cardiac muscle. Electrical potentials of cardiac muscle, length – tension relationship of cardiac muscle.

**Desirable to know:**

Recording procedure of membrane potentials. EMG, Voltage clamp technique. Oxygen debt, Thermal changes during muscle contraction. Energy sources for muscle contraction.

**Excretory System**

**Must know:**

Structure and functions of the of nephron and Juxtaglomerular apparatus.  
Renal blood flow and its measurement and regulation. Concepts of plasma clearance.  
Glomerular filtration, measurement, and factors affecting GFR.  
Reabsorption of essential nutrients: Glucose, sodium, potassium, calcium, phosphate, bicarbonate and water.  
Secretion of substances like hydrogen and potassium. Excretion of metabolites.  
Concentration of urine. Mechanism of diuresis, and action of diuretics.  
Role of kidney in fluid and electrolyte balance and acid- base balance.  
Innervation of bladder, Micturition, Cystometrogram and disorders of micturition.  
Atonic, autonomic and automatic bladder. Functions of Skin

**Desirable to know:**

Non-excretory functions of the kidney.  
Renal functions tests. Renal failure, Principles of dialysis.

**Digestive System**

**Must Know:**

Functional anatomy of the gastrointestinal tract (G.I.T) structure and innervation of G.I.T.  
Gastrointestinal hormones – gastrin, cholecystokinin – pancreozymin, secretin.  
Gastrointestinal movements-Mastication, deglutition,  
Gastric motility, gastric emptying and vomiting.  
Motility of small intestine, large intestine, defecation.  
Gastrointestinal secretions – salivary, gastric, pancreatic, biliary and intestinal secretions-formation and composition, their function in digestion, regulation of secretion.  
Pathophysiology of diseases of the lower esophageal sphincter, peptic ulcer, jaundice, Gall stones, malabsorption syndrome, adynamic ileus, megacolon, constipation, diarrhoea

**Desirable to know:**

Other Gastrointestinal hormones, Digestion and absorption of carbohydrates, proteins and nucleic acids, electrolytes and water, lipids, vitamins, minerals, iron, calcium.

**Endocrine System**

**Must know:**

General principles of regulation of endocrine gland secretions.

Secretion, Chemical nature, mechanism of action, physiological actions and consequences of altered secretion of the hormones of the hypothalamus, anterior pituitary, posterior pituitary, thyroid, parathyroid, adrenal cortex, adrenal medulla, endocrine pancreas and gonads.

Physiology of growth. Role of hormones in stress.

**Desirable to know:**

Synthesis, transport and metabolism of all hormones. Hormone receptors and blockers. Functions of thymus and pineal glands. Physiological actions of local hormones.

**Male and Female Reproduction**

**Must Know:**

Control of onset of puberty. Pubertal changes in male and female. Menopause.

Actions of pituitary gonadotropins and prolactin in males and females.

Functional anatomy of male internal and external genitalia . Blood- testes barrier.

Spermatogenesis. Composition of semen. the male sexual act.

Actions and regulation of testosterone, and Control of testicular function.

Functional anatomy of female internal and external genitalia.

Cyclical changes in ovary, uterus, cervix, vagina and breast during menstrual cycle and hormonal regulation of the menstrual cycle.

Chemical nature, actions and regulation of secretion of estrogen, progesterone.

Indicators of ovulation. Common menstrual abnormalities.

Principles and methods of contraception in male and female.

Fertilization , implantation. Physiological changes in pregnancy and hormonal control of pregnancy. Foetoplacental unit. Physiology of parturition.

Hormonal control of breast development after puberty and during pregnancy.

Control of milk secretion and milk ejection, and effect of lactation on menstrual cycle.

**Desirable to know:**

Sex differentiation and development of genitalia in the embryo. Some examples of aberrant sex differentiation due to 1. Chromosomal abnormalities 2. Hormonal abnormalities. Composition of human milk and colostrum.

**Cardiovascular System.**

**Must know:**

Organization of cardiovascular system. Functional anatomy of heart and blood vessels.

Properties of cardiac muscle. Action potentials recorded from different tissues of heart.

Origin and spread of cardiac impulse.

**Normal ECG:** methods of recording, mechanism of production of different ECG waves in different leads. Physiologic basis of ECG, ECG abnormalities in common cardiac diseases and in electrolyte disturbances.

**Cardiac cycle:** Mechanical events, Heart sounds. Jugular venous pulse, arterial pulse. Cardiac output: definition, physiological variations, principles of measurement and regulation. Basic principles of heart- lung preparation. Heart rate: Regulation, normal value and physiological variations.

**Principles of hemodynamics.**

Arterial, arteriolar, venous and capillary circulation.

**Blood pressure:** definition, types, variations and methods of measurement.

Integrated regulation of cardiovascular system.

**Regional circulation:** cerebral, coronary, cutaneous, visceral, muscle and fetal circulation. Pathophysiology of hypertension, heart failure, shock and the physiologic basis of their management. Cardiac function tests. Cardiopulmonary resuscitation.

### **General Topics**

Cardiovascular changes during: 1. Change in posture 2. Muscular exercise 3. Valsalva maneuver 4. Change of altitude 5. Change in environmental temperature 6. Drowning 7. Space flight

### **Desirable to know:**

His bundle Electrogram and vectorcardiogram. Cardiac catheterization. Physiological changes in valvular disease. Principles of echocardiography.

### **Respiration.**

#### **Must Know:**

Functional anatomy of respiratory system.  
Mechanics of respiration. Surfactant, Compliance.  
Lung volumes and capacities. Pulmonary function tests.  
Pulmonary circulation, normal values and regulation.  
Content and partial pressure of oxygen and carbon dioxide in inspired air, expired air, alveolar air, arterial blood and venous blood.  
Diffusion of gases in lungs and factors affecting it. Ventilation – perfusion ratio.  
Anatomical and physiological dead space and their significance.  
Oxygen and carbon dioxide transport, oxygen hemoglobin dissociation curve, and factors affecting it.  
Neural, reflex and chemical regulation of respiration.  
Types of hypoxia and physiological basis of their classification.  
Principles of ventilatory support. Oxygen therapy and hyperbaric oxygen.  
Pathophysiology of common respiratory disorders.

### **General Topics.**

Periodic breathing, respiratory adjustments during breath holding, hyperventilation, muscular exercise, cyanosis, hypercapnea, hypocapnea, asphyxia, high altitude, increased barometric pressure, drowning.

### **Desirable to know:**

Work of breathing. Non-respiratory functions of the lung.

### **Central Nervous System.**

#### **Must know:**

Organization and functional anatomy of central nervous system.  
Neuronal organization and function at the levels of spinal cord.  
Synaptic transmission. Reflexes, muscle spindle, regulation of muscle tone  
Sensory receptors and initiation of impulses in sense organs and ascending sensory pathways for different sensory modalities. Physiology of pain.  
Nuclei and functions of thalamus.  
Brain stem reticular system. Sleep, wakefulness, and EEG.  
Organization of motor system. Descending tracts, corticospinal tract, and effects of lesions at different levels.  
Functional anatomy, physiology, and functions of basal ganglia, cerebellum and vestibular apparatus. Effects of clinical and experimental lesions at various levels of neural axis.  
Nuclei of hypothalamus and their functions. Regulation of body temperature.  
Limbic system, connections, and physiological functions.  
Functional areas of cerebral cortex.  
Higher functions-Conditioned reflexes, learning, memory and speech and its disorders.  
Formation, circulation and functions of CSF. Concept of blood- brain-barrier.  
Organization and functions autonomic nervous system.  
Facilitatory and inhibitory neurotransmitters.

### **Desirable to know:**

Recent neurotransmitters. Evoked potentials. Hemispheric specialization. Disorders of memory. Disorders of CSF formation and circulation.

## **Special Senses**

### **Must know:**

Functional anatomy of the eyeball. Intra – ocular tension.  
Structure and functions of retina. Visual pathways and effect of lesion at various levels.  
Role of visual cortex in vision.  
Principles of optics. Role of various refractory media in image formation. Errors of refraction. Mechanism of accommodation. Light reflex and the Near response.  
Rod and cone pigments and sequence of events in phototransduction. Dark adaptation.  
Visual acuity. Field of vision.  
Colour vision and its theories. Colour blindness and its inheritance. Eye movements.

### **Desirable to know:**

Electrical responses in rods and cones. Electrophysiology of vision, and colour vision.  
Electroretinogram. Neurotransmitters in retina and visual cortex.

## **Hearing**

### **Must know:**

Functional anatomy of external, middle and internal ear.  
Functions of external, middle and inner ear.  
Auditory pathways. Electrical responses in hair cells and genesis of action potentials in afferent nerve fibers. Mechanism of hearing. Sound waves, their pitch and loudness.  
Sound transmission and theories of hearing. Tympanic reflex, and masking.  
Role of auditory cortex in hearing. Sound localization.  
Types of deafness. Tests for hearing.

## **Smell**

### **Must know:**

Receptors and pathways for smell. Cortical and limbic areas associated with smell.  
Physiology of olfaction. Odor discrimination. Abnormalities of olfaction.

## **Taste**

### **Must know:**

Receptors and pathways for taste. Basic taste modalities and receptor stimulation. Taste threshold and intensity discrimination. Flavor. Substances evoking primary taste sensations. Abnormalities of taste.

### **Course Content - Practical**

The following list of experiments and demonstrations is not exhaustive. Additional experiments can be included as and when feasible and required.

## **Haematology**

### **Practicals**

#### **Must know:**

1. Principles of microscopy and use of microscope.
2. Total red cell count
3. Estimation of hemoglobin and calculation of blood indices.
4. Total leucocyte count
5. E.S.R & P.C.V
6. Preparation and staining of a blood smear
7. Performing differential leucocyte count and Arneth count
8. Absolute eosinophil count
9. Bleeding time and clotting time
10. Blood grouping – ABO & Rh

## **Demonstrations**

### **Must Know:**

1. Methods of collection of blood
2. Reticulocyte count
3. Platelet count.
4. Osmotic fragility of red cells

## **Nerve and Muscle**

### **Practicals**

### **Must Know:**

1. Mosso's ergography: Calculation of work done and effect of rate of work done on muscle fatigue.
2. Calculation of mechanical efficiency by i) bicycle ergometry and ii) treadmill.

## **Demonstrations**

### **Must know:**

1. Study of appliances used in amphibian practicals.
2. Recording of muscle twitch and calculation of velocity of nerve impulse in the frog gastrocnemius – sciatic preparation.
3. Demonstration of phenomenon and site of fatigue in gastrocnemius – sciatic preparation of frog.
4. Electromyography and nerve conduction in humans.
5. Strength – Duration curve.
6. Effect of ions and drugs on small intestine of rabbit.

## **Reproduction**

### **Demonstrations**

#### **Must know:**

1. Changes in the vaginal epithelium, cervical mucus and the endometrium in different phases of menstrual cycle.
2. Pregnancy diagnostic tests.
3. Morphology and motility of human sperms.
4. Effect of hormones on uterine contractions in mammals.

## **CVS**

### **Practicals**

### **Must know:**

1. Measurement of blood pressure.
2. Effect of posture and exercise on Blood pressure and heart rate.
3. ECG recording.
4. Clinical examination of CVS
5. Autonomic function tests: Valsalva maneuver, response to isometric exercise, deep breathing difference.
6. Cardiac function tests

## **Demonstrations**

### **Must know:**

1. Effect of drugs and vagal stimulation on frog heart.
2. Properties of Cardiac muscle.
3. Capillary circulation in the frog web.

4. Perfusion of mammalian heart and effect of ions on it.

### **Respiration**

#### **Practicals**

##### **Must know:**

1. Clinical examination of respiratory system.
2. Pulmonary function tests including spirometry.
3. Measurement of chest expansion, breath holding time and maximum respiratory pressures.
4. Stethography.
5. Respiratory changes during exercise.

##### **Desirable to know:**

1. Donder's model to demonstrate mechanics of respiration.
2. Cardiopulmonary resuscitation.
3. Basal metabolic rate.

#### **Nervous system**

#### **Practicals**

##### **Must know:**

1. Examination of sensory functions
2. Examination of motor functions including reflexes
3. Examination of cranial nerves.

#### **Demonstrations**

##### **Desirable to know:**

1. EEG
2. Evoked potentials
3. Decerebrate and spinal frog.

### **Special senses**

#### **Practicals**

##### **Must know:**

1. Acuity of vision
2. Colour vision
3. Perimetry
4. Tests for hearing.
5. Tests for smell and taste

#### **Demonstrations**

##### **Desirable to know:**

1. Ophthalmoscopy
2. Audiometry

### **Topics for Integrated Teaching**

**CNS:** The teaching of entire system to be integrated with anatomy  
Anesthesiology: Pain

**Psychiatry:** EEG, sleep  
Special senses: Ophthalmology and ENT.

**CVS:**  
Medicine / Cardiology: Blood pressure and hypertension, heart failure.

Surgery: Shock.

**Respiratory system:**

Anaesthesiology: CPR  
DTCD Pulmonary function tests  
Blood:  
Microbiology: Immune mechanisms.

**Digestion:**

Surgery / Medicine Gastric secretion and peptic ulcer.

**Excretion:**

Urology Principles of Dialysis, Urinary bladder and its disordered functions.

**Endocrines:**

Medicine/endocrinology: Diabetes mellitus, thyroid disorders.

**Reproduction:**

The teaching of entire system to be integrated with the department of Obstetrics and Gynecology.

**General Physiology:**

**Anatomy/Biochemistry:** Cell, cell membrane, transport across cell membrane.

**Medicine:** Temperature regulation and pyrexia of unknown origin.

**Teaching learning Methods**

Lectures, Small group discussion,  
Problem-solving exercise, Video clips, Self-learning.  
Practicals including demonstrations

**Learning Resource Materials.**

Textbooks, Reference books, Internet sources, Practical Record

**BIO-PHYSICS**

(a) **GOAL & OBJECTIVES:** The broad goal of teaching Biophysics to undergraduate students is that they should understand basic physical principles involved in the functioning of body organs in normal and diseased conditions.

Total time for teaching Biophysics	= 5 hours
Out of which: 1. Didactic lectures	= 3 hours
2. Tutorial/group discussion	= 1 hour
3. Practical	= 1 hour

**(b) Topic distribution**

(1) Lectures:

- (i) Physical principles of transport across cell membranes and across capillary wall.
- ii) Biopotentials.
- iii) Physical principles governing flow of blood in heart and blood vessels. Also physical principles governing flow of air in air passages.

2. Tutorial/group discussion: On the topic covered in didactic lectures.

3. Practicals:

Demonstration of:

- a) Biopotential on oscilloscope
- b) Electro Encephalogram (EEG)
- c) Electro Myelogram (EMG)
- d) Electro Cardiogram (ECG)

# **BIOCHEMISTRY**

# **BIOCHEMISTRY**

## **DEPARTMENT OBJECTIVES**

At the end of the learning period of one year in Biochemistry, the student shall be able to:

1. State the gross biochemical functions of the various systems of the human body.
2. recognize and state the correlation of the anatomical and Physiological features of the human body with biochemical functions.
3. state the biochemical basis for the normal and abnormal functioning of the human body.
4. point out the nature of biochemical defects in various disease states commonly encountered in clinical practice.
5. apply the biochemical knowledge so acquired in the practice of medical sciences.
6. continue to learn advancements in biochemistry and apply the same in medical practice as and when warranted.
7. develop an attitude to arrive at a provisional diagnosis of various biochemical disorders that can be encountered in clinical practice and motivate the affected persons in the community for proper management on the basis of the biochemical knowledge so acquired.
8. to perform qualitative and quantitative analysis of substances of biochemical importance in the human system and interpret the results.

## **COURSE CONTENT**

### **1. EUKARYOTIC CELL STRUCTURE**

#### **Must know:**

Cellular compartments – cellular environment organisation and composition of eukaryotic cells, functional role of subcellular organelles and membranes.

### **2. CARBOHYDRATE CHEMISTRY**

#### **Must know:**

Definition, classification and nomenclature of carbohydrates, structure of glucose, biological importance and properties of glucose, fructose, galactose, lactose, maltose, sucrose, ribose, starch, inulin, glycogen, aminosugars, deoxy sugars, heteropolysaccharides.

#### **Desirable to know:**

Sialic acids, blood group substances, carbohydrates of cell membranes.

### **3. LIPID CHEMISTRY**

#### **Must know:**

Definition, classification, nomenclature of lipids, biological importance and properties of saturated and unsaturated fatty acids, triacylglycerol, phospholipids, glycolipids, prostaglandins, leukotrienes, thromboxanes, glycerol, sterols, lipoprotein-structural characteristics, classification and biological importance. Characterisation of lipid, Rancidity, free radicals, lipid peroxidation and antioxidants.

#### **Desirable to know:**

Structure and functions of biological membrane, liposomes.

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#### 4. PROTEIN CHEMISTRY

**Must know:**

Definition, classification, composition of proteins, amino acids, their classification and properties, protonic equilibria of amino acids, separatory techniques for amino acids and proteins – biologically important small peptides, conformation of proteins – levels of structural organisation. Plasma proteins, & Structure and functions of immunoglobulin

**Desirable to know:**

Structure of amino acids.

#### 5. STRUCTURE – FUNCTION RELATIONSHIP OF PROTEINS

**Must know:**

Oxygen transport proteins – myoglobin structure and function – structural basis of physiological function of hemoglobin – co-operative binding, Bohr effect, role of 2,3 BPG, fetal haemoglobin, modification of Hb structure and disease – glycosylated haemoglobin, HbS, HbM, HbC, Thalassemias, Collagen structure and function.

#### 6. NUCLEIC ACIDS

**Must know:**

Definition, structural description and functions of nucleic acids, their constituents and derivatives in our body. Biologically important nucleotides and their significance – synthetic analogues of purines and pyrimidines of medical importance.

#### 7. ENZYMES

General characteristics of enzymes, enzyme nomenclature, mechanism of enzyme catalysis, enzyme kinetics, enzyme inhibition, organisation of multienzyme systems, regulation of enzyme activity in vivo, factors influencing enzyme activity, clinical enzymology.

Co-enzymes: Definition, concepts of cosubstrate, second substrate, role of co-enzymes in group transfer reactions, classification and biological significance.

**Desirable to know:**

Isolation, of enzymes and Structure of coenzymes

#### 8. VITAMINS

Definition, classification, chemistry, occurrence, sources, metabolism, daily requirements, functions, deficiency manifestations, of A, D, E, K, Thiamin, Riboflavin, Niacin, Pantothenic acid, Biotin, Folic acid, Cobalamin, Pyridoxin, antivitamins, and hypervitaminosis.

#### 9. DIGESTION AND ABSORPTION

**Must know:**

Mechanism of digestion and absorption in gastrointestinal tract of carbohydrates, lipids, proteins, amino acids, vitamins, factors influencing digestion and absorption, role of dietary fibre.

**Desirable to know:**

Alterations in mechanisms of digestion and absorption leading on to disease process.

## 10. INTRODUCTION TO INTERMEDIARY METABOLISM

### Must know:

Definition, bioenergetics – entropy, free energy, coupled reactions, high energy compounds, oxidation-reduction reactions – definition, redox potential, electron carriers, compartmentalization of metabolic pathways in cells and the biologic advantage of such compartmentalization.

Stages of catabolism of molecules:

- i) Break down with no energy trap
- ii) Break down with some force energy trap
- iii) Final pathway consisting of Citric acid cycle, electron transport chain and oxidative phosphorylation.

Phosphorylation at the substrate level. Description, localization, organization of electron transport and uncouplers of oxidative phosphorylation, basic concepts of mechanism of oxidative phosphorylation, and inhibitors of electron transport chain.

- a) **Carbohydrates (without stress on structures):** An overview and regulatory steps of glycolysis, glycogenesis, glycogenolysis, gluconeogenesis, HMP shunt, uronic acid pathway, interconversion of hexoses, metabolism of fructose and galactose, blood glucose homeostasis, overview of common disorders of carbohydrate metabolism and their clinical significance, diabetes mellitus and relevant biochemical investigations & oral glucose tolerance test.
- b) **Lipids:** Overview of fatty acid synthesis, oxidation, ketosis, metabolism of triacyl glycerol, Phospholipids Prostaglandins, lipoproteins and cholesterol, biochemical basis of atherosclerosis, hyperlipoproteinemias, fatty liver obesity, role of adipose tissue, lipotropic factors and hypolipidemic drugs fatty liver.
- c) **Proteins and amino acids:** Basic concepts of disposal of nitrogen, transamination, deamination, urea cycle, overview of disposal of carbon skeleton of amino acids – glycine, tryptophan, tyrosine, phenylalanine, histidine, sulphur containing amino acids. Common inborn errors of amino acid metabolism. Synthesis of biologically important compounds from amino acids.
- d) Integration of metabolism of carbohydrates, lipids and amino acids, common metabolic pathway (TCA cycle).
- e) **Nucleotides, purines and pyrimidines:** Origin of constituents in the formation of purines, pyrimidines and nucleotides, regulatory influences, breakdown of purine and pyrimidines, biochemical basis and laboratory diagnosis of gout. Purine salvage pathways, secondary hyperuricemia.
- f) Chemistry, Synthesis & Breakdown of hemoglobin, biochemical basis of jaundice, classification and their importance, bile pigments and their importance; overview of biochemical basis of porphyrias, hepato biliary function tests.
- g) **Minerals:** Sources, daily requirements, absorption, biochemical functions and deficiency manifestations of calcium, phosphorus, iron fluorides, magnesium, copper, zinc, iodine, sodium, potassium and chloride, selenium, chromium, and cobalt.
- h) **Nutrition:** Calorie requirements, qualitative and quantitative requirements, specific dynamic action, BMR, factors influencing BMR, respiratory quotient, biological value of proteins, formulation and computation of energy requirements for a medical student, balanced and adequate diets, formulation of diets in health and diseases, protein and protein energy malnutrition, obesity, starvation.
- i) Outline of detoxification mechanisms in human body.

### Desirable to know:

Methods of investigations of intermediary metabolism; detailed aspects of metabolism of carbohydrates, rare disorders related to metabolism including glycogen storage disease; Rare disorders related to lipid metabolism. Detailed step in the breakdown of amino acids and rare inherited disorder related to amino acid metabolism.

Foodtoxins and additives; adulteration of foods, nutrification and fortification of foods; Basic concepts of total parenteral nutrition.

#### **IV) ORGAN FUNCTION TEST:**

##### **Must know:**

- a) Constituents in urine, renal functions tests, concept of clearance tests.
- b) Regulation of fluid and electrolyte balance, disorders associated with laboratory parameters in diagnosis of fluid and electrolyte disorders. Oral Rehydration solution.
- c) Acid base balance, blood buffers, regulation of blood pH, role of erythrocytes, lungs and kidneys in regulation of acid base balance, acidosis, alkalosis of respiratory and non-respiratory origin, laboratory parameters in diagnosis of acid base disorders.
- d) Gastric and pancreatic function tests and laboratory diagnosis of common gastric and pancreatic disorders.
- e) Thyroid function tests.
- f) Endocrinology: Mechanism of action and metabolic role of hormones.

##### **Desirable to know:**

Detailed knowledge of porphyrias; Role of radio isotopes in Medicine; Fetoplacental unit; biochemical tests of fetal maturity and abnormalities.

#### **V) Molecular Biology & Immunology**

##### **Must know:**

- (a) Basic biochemical concept of immunology.
- (b) Overview of cell cycle, DNA replication, transcription and protein biosynthesis, mutations, DNA damage and repair mechanisms, blotting techniques.  
General principles of recombinant DNA technology and its practical applications in medicine. Outline of biochemical basis of Carcinogenesis.

##### **Desirable to know:**

Immunodiagnostic methods, Regulation of genetic expression in eukaryotes Inhibitors of protein synthesis, post translational modifications, gene therapy.

#### **LIST OF PRACTICALS**

1. General properties of carbohydrates and reactions of glucose, fructose, lactose, maltose, starch and dextrans.
2. Colour reactions of proteins, precipitation reactions of proteins.
3. Reactions to understand the properties of albumin, globulin, casein, gelatin and Peptone.
4. Qualitative analysis of milk and egg.
5. Normal constituents of urine.
6. Abnormal constituents of urine.
7. Spectroscopic identification of hemoglobin and its derivatives.
8. Schemes of identification of carbohydrates, proteins and substances of biochemical importance.
9. Analysis of a food mixture.
10. Principles and application of the principle in chromatography, electrophoresis, RIA and ELISA.
11. Quantitative estimation of glucose, urea, creatinine and total proteins in blood.

12. Demonstration of bilirubin estimation, prothrombin time determination, working of autoanalyser, blood gas analyser.

At the end of the practical classes in Biochemistry, the student shall be able to:

- a) Identify the osazones of glucose, fructose, lactose and maltose, the color reactions of amino acids and the responsible functional groups.
- b) Suggest suitable / relevant biochemical investigations for diagnosis/confirmation of a patient with jaundice, acute renal failure, nephrotic syndrome, proteinuria, edema, myocardial infarction, metabolic acidosis, metabolic alkalosis, respiratory acidosis, respiratory alkalosis, glycosuria, hypothyroidism, hyperthyroidism.
- c) Calculate
  - (i) albumin: globulin ratio with the values of total protein and albumin provided.
  - (ii) Urea and creatinine clearance with the parameters provided.
  - (iii) The RF value for any carbohydrate or amino acid from a given chromatogram.
- d) Interpret
  - (i) Normal electrophoretic pattern and pattern related / associated with cirrhosis of liver, nephrotic syndrome, multiple myeloma, mono and polyclonal gammopathies.
  - (ii) Values obtained after an oral glucose tolerance test in normal and diabetic states.
  - (iii) Laboratory data in pancreatitis, myocardial infarction, various types of jaundice, acute renal failure, nephrotic syndrome, proteinurias, acidosis, alkalosis, hypo and hyperthyroidism.
- e) Mention/list the uses of some of the common instruments like centrifuges colorimeters pH meters, flame photometers, thermostatic water baths etc. used in biochemistry laboratory.

#### TOPICS FOR INTEGRATED TEACHING

Topics	Departments
1. Molecular and functional organisation of cell	Anatomy and Physiology
2. Digestion and absorption	Physiology
3. Endocrinology and	Physiology, Pathology
4. Fluid, Electrolyte and acid-base homesostasis	Clinical departments
5. Nutrition and Dietetics	Clinical departments Dietetics, Community Medicine, Paediatrics
6. Genetics	Anatomy
7. Function tests	Clinical departments, Physiology

These topics are not exclusive but suggestive. The integrated teaching program shall be spread over the entire MBBS course. Emphasis and reinforcement of basic concepts shall be done during the period of clinical postings of the students. Similarly over view of the applied aspects shall be taken care during the 1<sup>st</sup> and 2<sup>nd</sup> Semesters of MBBS course.

#### LIST OF BOOKS SUGGESTED FOR READING

Author / Editor	Title of the Book	Publishers
1. Robert K. Murray, Daryl K.	Harper's Biochemistry	Lange Mc Graw Hall

Graner, Victor W. Rodwell.

2. D.M. Vasudevan. Sreekumari S. Delhi.	Text book of Biochemistry for Medical students.	Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
3. Chatterjee & Shinde Delhi.	Text book of Medical Biochemistry.	Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
4. Albert L. Company Lehninger, David	Principles of Biochemistry	W.H. Freeman and Company
5. Lubert Stryer Company	Biochemistry	W.H. Freeman and Company
6. Devlin (Thomas M)	Text book of Biochemistry with Clinical correlation.	John Wiley & Sons.

#### **INTERNAL ASSESSMENT**

a) Total number of notified tests	:	8
b) Total number of notified practicals	:	4

The notified tests taken for computing internal assessment in theory examination shall compulsorily include the terminal examinations conducted at the end of 1<sup>st</sup> and 2<sup>nd</sup> Semesters. The formula to be followed is  $(n-1)$  where n represents the total number of notified tests, 1 represents the lowest scored by the candidate in the notified tests.

The marks obtained by the candidates in all the notified tests will be notified to the students.

# **PATHOLOGY**

**PHASE II**  
**PARA CLINICAL SUBJECTS**  
**PATHOLOGY**

**I. Goal**

The broad goal of the teaching of undergraduate student in Pathology is to provide the students with a comprehensive knowledge mechanisms and cause of disease, in order to enable him/her to achieve a complete understanding of the natural history and clinical manifestations of the disease

**II. Learning Objectives**

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

1. Understand the concepts of cell injury and changes produced thereby in different tissue and organs and the capacity of the human body for healing.
2. Understand the normal homeostatic mechanisms, the derangements of these mechanisms and the effects on the human system.
3. Understand the etiopathogenesis, the pathological effects and the clinico-pathological correlation of common infectious diseases and non-infectious diseases like degenerative, metabolic, and immunologic conditions.
4. Understand the concepts of neoplasia with reference to the etiology, gross and microscopic features, diagnosis and prognosis in different tissues and organs of the body.
5. Correlate normal and altered morphology (macro and microscopic) of different organs in different diseases to the extent needed for understanding the disease process and their clinical significance.
6. Understand the common hematological disorders and the investigations necessary to diagnose them and determine their prognosis.
7. Describe the rationale and principles of technical procedures of diagnostic pathological laboratory tests.
8. Perform and interpret in a proper manner certain simple clinico-pathological procedures on blood, urine and other biological fluid samples.
9. Know the principles of collection, handling, storage and dispatch of clinical samples from patients in a proper manner.

**III. Course contents**

**III A. General Pathology**

**III A 1. Cell Injury**

**Must know**

- a) Cause and mechanism: Ischemic, Toxic, Free- radical induced, Apoptosis
- b) Reversible cell injury: Types, morphology, hyaline and fatty change
- c) Irreversible injury: Necrosis and gangrene
- d) Calcification: Dystrophic and metastatic
- e) Extra cellular accumulations: Amyloidosis – classification, pathogenesis, morphology and pigment deposition such as melanin, bilirubin, hemosiderin and carbon

**III A 2. Inflammation and Repair**

**Must know**

Acute inflammation: Features, Causes, vascular, cellular events and morphological variants  
Inflammatory cells and mediators  
Chronic inflammation: Causes, types, non-specific and Granulomatous with examples  
Wound healing and repair by primary and secondary union and factors modifying them.  
Healing at specific sites like bone

**III A 3. Hemodynamic disturbances****Must know**

Oedema: Pathogenesis and types  
Chronic venous congestion: Lung, Liver and Spleen  
Thrombosis and Embolism: Formation, Types and Fate, Effect on tissues  
Infarction: Types and Common sites  
Shock: Pathogenesis, types and morphology

**III A 4. Growth Disturbance and Neoplasia****Must know**

Atrophy, Hypertrophy, Hyperplasia, Aplasia, Malformation, Metaplasia  
Dysplasia and Intraepithelial Neoplasia including carcinoma in situ, Premalignant conditions  
Neoplasia: Causes, Classification, Histogenesis and molecular basis, Biological behaviour, Benign versus Malignant, Nomenclature  
Malignant Neoplasms: Grade and Stage, metastasis and invasion  
Carcinogenesis: Environmental carcinogens, viral, chemical, occupational, hereditary  
Laboratory Diagnosis of cancer, Tumor markers, Paraneoplastic syndromes  
Gross and microscopic features, clinical correlation, mode of spread and prognosis of common benign and malignant tumors.

**Desirable to know**

Tumor and host interaction, Tumor immunology

**III A 5. Immunopathology****Must know**

Immune system: Organization, cells, antibodies and regulation  
Hypersensitivity: types and examples  
Immune deficiency: primary and secondary  
Autoimmune Diseases both organ specific and systemic with specific examples like SLE, Hashimoto thyroiditis  
Organ Transplantation: Immunologic basis of rejection, Graft versus Host reaction

**Desirable to know**

Specific Organ Transplantation like Bone marrow, Stem cell, Renal  
Use of immunopathology in laboratory diagnosis like immunofluorescence, immunohistochemistry, flow cytometry

**Note:** The topic of immunopathology is generally also covered in details by Microbiology and Biochemistry Departments, hence it would be useful to integrate with the other departments and prepare specific departmental objectives so as to avoid overlap in the matter taught.

**III A 6. Infectious Diseases****Must know**

Etiopathogenesis, gross and microscopic features, clinicopathological correlation, relevant

investigations and complications of commonly prevalent infections like Mycobacterial diseases: Tuberculosis and Leprosy  
Bacterial Diseases: Pyogenic, Typhoid, Meningococcal, Syphilis, Bacillary Dysentery  
Fungal diseases, Actinomyosis, Rhinosporidiosis, Opportunistic infections  
Parasitic diseases: Malaria, Filaria, Kala Azar, Amebiasis, Cysticercosis, Hydatid  
Viral diseases: Herpes, Hepatitis, Rabies, Dengue  
HIV infection and AIDS: Aetiology, Mode of transmission, Diagnostic procedure and handling of infected material and health education

**Note:** The above mentioned infections are also covered in details by Microbiology Departments, hence it would be useful to integrate with them and prepare specific departmental objectives so as to avoid overlap in the matter taught

### **III A 7. Miscellaneous Disorders**

#### **Must know**

Autosomal and sex-linked disorders  
Metabolic disorders like Diabetes Mellitus, Lysosomal Storage disorders  
Nutritional disorders – Protein Energy Malnutrition, Vitamin deficiency  
Occupational and environmental pathology – Radiation Injury, Pneumoconiosis

#### **Desirable to know**

Pathology of alcohol and smoking  
Cystic fibrosis  
Obesity

### **III B Systemic Pathology**

#### **III B 1. Hematopathology**

##### **Must know**

Constituents of blood and bone marrow, regulation of hematopoiesis  
Anemia: Classification and clinical features, Laboratory approach  
Nutritional anemia: Iron deficiency, Vitamin B12 and Folate deficiency  
Hemolytic Anemia:  
    Classification and Laboratory diagnosis  
    Thalassemia, Hemoglobinopathy like Sickle cell anemia  
    Hereditary Spherocytosis, G6PD deficiency  
    Acquired hemolytic anemia: Autoimmune hemolytic and Microangiopathic hemolytic anemia, hemolytic disease of newborn  
Aplastic Anemia, PNH, Pancytopenia, myelophthisic anemia  
Leucocyte disorders like Leucocytosis, Leukemoid reaction, Leucopenia  
Leukemia: Acute and Chronic – classification and diagnosis  
Other chronic myeloproliferative disorder  
Myelodysplastic syndromes  
Hemostatic disorders: Platelet deficiency, ITP, Coagulation disorders like Hemophilia, Von Willebrand Disease, DIC  
Plasma cell dyscrasia  
Blood transfusion practice: Grouping, Cross Matching, Donor selection, Component therapy, Rational Use of blood transfusion, Adverse reactions and transmissible infections

#### **III B 2. Cardiovascular Pathology**

##### **Must know**

Rheumatic Heart Disease  
Infective endocarditis  
Hypertension  
Atherosclerosis and Ischemic heart Disease

**Desirable to know**

Congenital Heart Diseases like VSD, ASD, Fallot's Tetralogy, PDA  
Pericardial Diseases  
Cardiomyopathy  
Vasculitis and Aneurysm  
Cardiac tumors like Myxoma

**III B 3. Respiratory Pathology**

**Must know**

Structure of bronchial tree and alveoli, normal and altered lung function, concept of obstructive and restrictive lung disease  
Inflammatory diseases of lung like Chronic Obstructive Pulmonary disease, Emphysema, Chronic Bronchitis, Bronchial Asthma, Bronchiectasis  
Pneumonia  
Lung Abscess  
Pulmonary Tuberculosis  
Lung tumors: etiopathogenesis and types

**Desirable to know**

Hyaline Membrane Disease and ARDS  
Interstitial lung disease  
Nasopharyngeal and Laryngeal tumors  
Mesothelioma

**III B 4. Pathology of Gastrointestinal tract**

**Must know**

Oral pathology: Leucoplakia, Premalignant conditions and Carcinoma  
Salivary gland pathology: Common benign and malignant tumors, Sjogren Syndrome  
Diseases of esophagus: Barrett Esophagus and Carcinoma  
Gastritis – types, H. Pylori infection  
Tumors of stomach: benign and malignant  
Inflammatory diseases of intestine: Typhoid, Tuberculosis, Amebic colitis, Ulcerative colitis, Crohn's disease  
Intestinal tumors: Polyps, Carcinoma, Lymphoma and Carcinoid  
Appendicitis

**Desirable to know**

Hirschsprung disease  
Malabsorption diseases  
Pancreatitis and Pancreatic tumors

**III B 5. Liver and Biliary Tract pathology**

**Must know**

Jaundice: types, etiopathogenesis, differential diagnosis  
Hepatitis: Acute and Chronic, Pathology  
Cirrhosis: Etiology, classification, Post necrotic, alcoholic, metabolic Morphology, complications  
Alcoholic liver disease  
Gall bladder diseases: Cholecystitis, cholelithiasis, carcinoma  
Tumors of liver: hepatocellular carcinoma, metastasis

**Desirable to know**

- a) Liver function tests
- b) Liver failure
- c) Portal hypertension

**III B 6. Lymphoreticular Pathology**

**Must know**

- a) Lymphadenopathy – Causes, Lymphadenitis, infectious and non-infectious
- b) Lymphoma: Hodgkin and Non- Hodgkin – classification scheme and morphology of selected lymphomas
- c) Diseases of spleen – splenomegaly, hypersplenism

**III B7. Urinary tract pathology****Must know**

- a) Renal function tests
- b) Urinalysis
- c) Acute and Chronic renal failure
- d) Glomerulonephritis: Post streptococcal, Crescentic, Secondary
- e) Nephrotic Syndrome
- f) Acute tubular necrosis
- g) Urinary tract infection and Pyelonephritis
- h) Nephrolithiasis
- i) Renal tumors : Renal cell carcinoma, Wilms Tumor
- j) Urinary bladder: cystitis, urothelial carcinoma

**Desirable to know**

- a) Renal vascular disorders
- b) Polycystic kidney disease
- c) End-stage renal disease
- d) Renal tuberculosis

**III B 8. Pathology of Reproductive System****Must know**

- a) Diseases of cervix: Cervical carcinoma, PAP stain, Screening and diagnosis
- b) Hormonal influences and histology of different phases of endometrium
- c) Endometrial hyperplasia and carcinoma, Smooth muscle tumor, Endometriosis
- d) Trophoblastic diseases: Hydatidiform mole and Choriocarcinoma
- e) Ovarian tumors
- f) Diseases of breast – fibrocystic disease, Fibroadenoma, Breast Carcinoma, Phylloides tumor
- g) Disease of penis- premalignant and carcinoma
- h) Nodular hyperplasia of prostate and carcinoma prostate
- i) Tumors of testis

**Desirable to know**

- a) Semen analysis and investigation of infertility
- b) Pelvic inflammatory disease
- c) Vulval and vaginal diseases
- d) Genital tuberculosis

**III B 9. Pathology of Musculoskeletal system****Must know**

- a) Osteomyelitis – Acute, chronic, tuberculosis
- b) Metabolic bone disease – Rickets, Osteomalacia, Osteoporosis
- c) Tumors: Classification, Osteosarcoma, Chondrosarcoma, Giant cell tumor, Ewing's sarcoma, Metastatic bone tumors

**Desirable to know**

- a) Pagets disease of bone
- b) Muscular dystrophies
- c) Arthritis: Rheumatoid, Osteoarthritis, Tuberculous
- d) Tumors of jaw: like Ameloblastoma

### **III B 10 Endocrine Pathology**

#### **Must know**

- a) Non neoplastic lesions of thyroid: Thyroid function tests, Iodine deficiency, Goitre, Autoimmune thyroiditis, Myxedema and thyrotoxicosis
- b) Tumors of thyroid
- c) Adrenal diseases: Hyperfunction and hypofunction, Tumors
- d) Parathyroid hyperplasia and adenoma
- e) Pituitary hyperfunction and hypofunction, tumors
- f) Multiple endocrine neoplasia

### **III B 11. Neuropathology**

#### **Must know**

- a) CSF and its disturbance
- b) Inflammatory disorders: Meningitis and Brain abscess
- c) CNS tumors: Astrocytoma and Meningioma: classification

#### **Desirable to know**

- a) Degenerative diseases like Alzheimer's and PRION disease
- b) Cerebrovascular diseases: Hemorrhage, Aneurysm, Infarction
- c) Traumatic lesions
- d) Peripheral neuropathy and demyelinating diseases

### **III B 12. Miscellaneous**

#### **Must know**

- a) Skin tumors like Melanoma, Basal cell carcinoma, Squamous cell carcinoma

#### **Desirable to know**

- Bullous lesions of skin
- Dermatological conditions like Psoriasis, cutaneous tuberculosis
- Diseases of eye like Retinoblastoma

### **IV Acquisition of Skills**

- a) Be able to collect, store and transport materials for various pathological tests including histopathology, cytopathology, hematopathology, Blood bank and clinical pathology in a proper manner.
- b) Describe accurately and arrive at a logical diagnosis of common macroscopic
- c) specimens (gross appearance) such as pneumonia, cirrhosis, gangrene etc
- d) Interpret and arrive at a conclusive diagnosis in the microscopic analysis of common diseases like tuberculosis, carcinoma, acute inflammation etc.
- e) Perform with accuracy and reliability various hematological procedures such as Hemoglobin estimation, Total and differential leucocyte count, peripheral smear staining and reporting.
- f) Calculate red cell indices and interpret the significance
- g) Perform independently complete examination of urine and detect abnormal findings and interpret the results
- h) Perform independently grouping of blood.
- i) Be aware of the procedure for common tests like Bleeding time, Clotting time, ESR, PCV, bone marrow examination, semen analysis and interpret abnormal findings.
- j) Interpret abnormal laboratory (biochemical, hematological and serological) values
- k) of common diseases.
- l) Adopt universal precautions for self protection against HIV and hepatitis

### **V Teaching and learning methodology**

The stress should be on teaching basic fundamentals of the disease process and applied aspects relevant to the clinical subjects

a) General Pathology – Taught in semester one (July to December)

Taught with the help of didactic lectures followed by practical pertaining to the topic. Besides microscopic examination of slides, fresh specimens obtained during surgical operations may be shown.

Students to be encouraged to do self learning and small topics may be given to them in advance for group discussion and presentation.

At the end of one topic tutorials may be arranged to facilitate learning

b) Hematology and Systemic Pathology – Second and Third Semester (January to May and June to November of the subsequent year)

The following modalities may be adopted

1. Didactic lecture
2. Case based discussion
3. Clinicopathological conferences
4. Practical demonstration of gross and microscopic features of cases
5. Seminars where the students are encouraged to speak and discuss on various topics that are allotted to them in advance.
6. Fortnightly tutorials where the students will be asked to prepare a topic and the tutor will ask questions, discuss problems and clarify doubts regarding the topic.
7. Other modalities that should be encouraged include Problem Based learning, Integrated teaching modules and self-learning tools including web-based learning.

## **VI Practicals**

1. One third of the allotted practical hours be devoted to:

- a) Perform a complete urine examination and detect abnormalities and correlate clinically.
  - b) Perform with accuracy and reliability various hematological procedures such as Hemoglobin estimation, Total and differential leucocyte count, peripheral smear staining and reporting and blood grouping
  - c) Observing or performing under guidance tests like bleeding time, Clotting time, ESR, PCV, bone marrow examination, semen analysis and interpret abnormal findings.
- A. One third of the practical hours allotted should be devoted to Identify and interpret gross and microscopic feature of:
- a) Acute inflammation like acute appendicitis, pneumonia, meningitis
  - b) Chronic cholecystitis
  - c) Granulomatous inflammation like tuberculosis
  - d) Granulation tissue and Ulcer
  - e) Typhoid, tuberculous and amebic ulcers
  - f) Common infections like Leprosy, Malaria, Filarial lymphnode, Rhinosporidiosis, Hydatid disease, Actinomycosis, Mycetoma, Molluscum contagiosum
  - g) Fatty liver, Amyloidosis, Venous congestion of lung, liver and spleen
  - h) Types of necrosis
  - i) Common benign and malignant tumors like Squamous cell carcinoma, Basal cell carcinoma, Adenocarcinoma, Hemangioma, Lipoma, Melanoma, metastatic tumors etc

- j) Common systemic diseases like Cirrhosis, Pyelonephritis, Peptic ulcer, Rheumatic Heart Disease, Bronchiectasis, Osteomyelitis
- k) Specific tumors of various organs like Cervical cancer, Uterine leiomyoma, Seminoma, Osteosarcoma etc

B. One third of the allotted practical hours to be devoted to

- a) Discussion of case studies based on the actual clinical and laboratory findings of patients along with gross and microscopic findings wherever applicable to learn clinicopathological correlation.
- b) Observation of post mortem examination if undertaken and discuss the clinicopathological correlation. In case clinical post mortems are not available then got-up specimens may be arranged to enable students to appreciate such cases.

Notified tests including send-up: Total 6

1. Mid Semester Test One – Middle of third semester
2. End of third semester Test
3. Mid Semester Test Two - Middle of fourth semester
4. End of fourth semester Test
5. Mid semester Test Three – Middle of fifth semester
6. End of fifth semester - Send-up Examination

The three End semester test should be based on the university exam pattern with theory, practical and oral examinations.

The three mid-term tests may be based on Multiple Choice Questions, Short Structured theory test, OSPE, or even Orals. Multiple Choice Questions are to be encouraged in the formative assessments as much as possible.

For the calculation of internal assessment for theory, the average marks secured by the candidate in all the tests including the send-ups minus one test with the lowest score (n-1) will be taken.

For the calculation of internal assessment for practical, the average marks secured by the candidate in all the tests including the send-ups minus one test with the lowest score (n-1) will be taken.

A candidate has to secure at least 35% or more in the internal assessment for theory and practical to be eligible for appearing in the final examination.

### **VIII Areas of integrated teaching**

Anemia – Medicine, Gynecology, Pediatrics  
 Bleeding disorders - Medicine, Pediatrics  
 Tuberculosis – Medicine, DTCD  
 Nephrotic and Nephritic syndromes – Medicine  
 Cirrhosis – Medicine, Surgery  
 Ischemic heart disease – Medicine, Cardiology  
 Diabets Mellitus – Medicine  
 Jaundice – Medicine, Surgery, Pediatrics  
 Peptic ulcer - Surgery  
 Carcinoma breast - Surgery  
 Splenomegaly - Medicine  
 Leukemia – Medicine, Pediatrics  
 Bone tumors -Orthopedics  
 Carcinoma Cervix - Gynecology

HIV/AIDS – Medicine, Microbiology  
Leprosy - Dermatology  
Autoimmune diseases – Medicine

**IX Suggested Books for reading**

- a) Robbin's Pathologic Basis of Disease *Ramzi S. Cotran, Vinay Kumar, Stanley L Robbins* WB Saunders Co., Philadelphia.
- b) Basic Pathology Robbins *WB Saunders Co., Philadelphia*
- c) General Pathology *JB Walter, MS Israel.* Churchill Livingstone, Edinburgh.
- d) Underwood's Pathology, International Student Edition
- e) Text book of Pathology by Harsh Mohan
- f) Practical Pathology by Uma Chaturvedi and Tejindar Singh

# **MICROBIOLOGY**

## MICROBIOLOGY

### **Learning objectives:**

At the end of the course, the learner shall be able to understand the infectious diseases in terms of their etiology, pathogenesis, and laboratory diagnosis in order to efficiently treat, prevent and control the disease. To achieve this, the student should be able to:

1. Describe mechanism of host-parasite relationship.
2. Enumerate normal microbial flora and its importance in health and disease.
3. Describe etiology and pathogenesis of common infectious diseases.
4. Describe etiology and pathogenesis of opportunistic infections.
5. Choose appropriate laboratory investigation to support clinical diagnosis with respect to proper sample collection, timing and transport of the specimens.
6. Describe suitable antimicrobial agents for treatment.
7. Understand the mechanism of immunity to infections.
8. Explain scope of immunotherapy and vaccines for prevention of infectious disease
9. Perform simple tests to arrive at rapid diagnosis.
10. Apply appropriate method of sterilization, disinfection and biomedical waste disposal in hospital and community practice.
11. Explain the importance of National Health Programmes for prevention of communicable diseases

### **Course Contents**

#### **The student must know the following principles in:**

##### **General Microbiology:**

- General concepts of infectious diseases prevalent in India (morbidity , mortality data)
- Significant milestone in history of infectious diseases
- Definitions pertaining to infectious diseases. (eg:host, parasite, endogenous, exogenous, transmission, routes, source, reservoir etc)
- Classification of microbes form clinical view point
- Normal human microbial flora of and its importance in health and disease.
- Bacterial cell: anatomy, physiology and genetics in relation to virulence and human infections and diagnosis.
- Sterilization, disinfections and standard precautions in patient care and disease prevention.
- Bacteriophage in relation to virulence and epidemiology.
- Antimicrobials, mode of action, testing, interpretation of results and rational use, mechanism of resistance.

##### **Immunology:**

- Immune apparatus, lymphoid organs, Immunobiology
- Antigen and antibody.
- Ag+Ab-reactions, serology and immunological assays.
- Cell and humoral immunity in health and disease
- Hypersensitivity
- Immunodeficiency
- Tumor immunity / transplantation an auto-immunity
- Immunotherapy

##### **Systematic Bacteriology:**

- Gram positive / Negative cocci / Bacilli, Vibrio, Campylobacter, Helicobacter associated with human infections.

Mycobacteria.  
Anaerobic bacteria  
Spirochaetes  
Chlamydia, Rickettsia, Mycoplasma  
Miscellaneous bacteria of clinical importance.  
Legionella, Listeria etc.

**Virology:**

- General properties, structure, replication, classification.
- Virus, host interaction and pathogenesis
- Antiviral agents.
- General concepts in laboratory diagnosis of viral infections.
- Herpes, Adeno, Arbo, Picorna, Orthomyxo, Paramyxo, Rabies, HIV, Hepatitis,
- Miscellaneous virus of medical importance: (Rota, Corona, etc)
- Viral vaccines.
- Pox, slow and oncogenic.
- Opportunistic viral infection.

**Parasitology:**

- General concepts and definition of key terms, infections of national prevalence.
- Protozoal infections prevalent in India:  
Intestinal,  
Blood  
Genital  
Other protozoal infections
- Helminthes (Intestinal and tissue) prevalent in India.  
Cestodes,  
Nematodes:  
Trematodes.
- Opportunistic Parasitic infection.

**Mycology:**

- General properties and classification of fungal diseases, pathogenesis, approach to laboratory diagnosis (sample collection, identification), antifungal agents  
Opportunistic fungal infections.

**Applied Microbiology:**

- CNS Infections: Acute and chronic meningitis, encephalitis and brain abscess.
- PUO/FUO: Infective and non infective causes and approach to diagnosis.
- Sepsis
- Diarrhoeal diseases (including food poisoning)
- Respiratory Tract Infection (Upper & Lower)
- UTI
- Wound infections
- Skin and soft tissue infections
- Eye and ear infections
- Sexually transmitted infections
- Female genital tract infections
- Infections in immuno-compromised individuals
- Bone and Joint infections
- Hospital Associated Infections and its prevention. (Universal precaution and hospital waste management
- Zoonotic diseases.
- National Programmes of Communicable Diseases.
- Investigation of outbreaks and notification
- Congenital infections

Bacteriology of food, water and milk

**SKILLS**

**The student should be able to perform the following skills independently:**

1. Collection of relevant clinical samples.
  - Blood for culture and serological test
  - urine for culture
  - Swabs for microscopy and culture
  - Body fluids for microscopy and culture
2. Storage and transport of the clinical specimens
3. Preparation of smears from clinical material
4. Microscopic Examination – Gram stain.  
Ziehl – Neelsen stain  
Stool for ova and cyst  
Blood smear for parasites  
(MP, Mf).  
Albert stain for diphtheria

**Under supervision**

- India ink of CSF for Cryptococcus
  - Modified Z-N stain for M.leprae.
  - KOH for fungal elements
5. Standard (universal precaution): hand wash, asepsis and antisepsis.
  6. Biomedical waste disposal: Needle, sharps disposal, infectious material
  7. Interpretation of Microbiology reports:  
Serology: VDRL, HIV, Hepatitis, ASO, RF, Widal Test.
  8. Antibiotic sensitivity: Rational use of antibiotics

**METHOD OF ASSESSMENT:**

Modified essay question, Microscopic examination, Short answer question, MCQs, Problem solving exercises, OSPE, Records Review, Checklist and Oral viva Voce

**TEACHING LEARNING METHODS:**

Structure interactive sessions, small group discussion, Role play, Practical including demonstration, Problem based exercise, video clips, written case scenario, Self learning tools, interactive learning and e-modules.

**TIME OF EVALUATION:**

Summative examination of microbiology should be at the end of 5<sup>th</sup> semester and formative assessment at the end of 3<sup>rd</sup> & 4<sup>th</sup> semesters. Practical and viva examinations can be held in between term. MCQs for midterm assessment. Average of the examinations held is to be calculated for Internal assessment.

**LEARNING RESOURCE MATERIAL:**

Text books, Reference books, Practical notebooks, Internet resources and video films etc.

**Suggested horizontal integration:**

1. PUO
2. Diarrhoea
3. Tuberculosis
4. Wound infections
5. Eye and Ear infections
6. CNS infection
7. Zoonotic diseases
8. Congenital infections
9. Female Genital Tract Infections

**Suggested Books in Microbiology:**

Text book of Microbiology by Jawetz

Text book of Microbiology by Greenwood  
Text book of Microbiology by Ananthnarayan & Paniker  
Text book of Parasitology by D R Arora  
Text book of Parasitology by R Bhatia & R L Ichpujani

# PHARMACOLOGY

## PHARMACOLOGY

### **OBJECTIVES:**

#### **(a) Knowledge & Intellectual skills**

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

1. Understand the general principles of drug action and handling of drugs by the body in normal individuals including children, elderly, women during pregnancy & lactation; special situations like renal, hepatic disease and genetic variations.
2. Prescribe drugs rationally by:
  - a) Understanding the importance of both non-drug treatment and drug treatment.
  - b) Selecting and prescribing drug(s) based on suitability, tolerability, efficacy and cost according to the needs of the patient for prevention, diagnosis and treatment of common ailments.
  - c) Choose the most appropriate formulation for the clinical condition.
  - d) Use antimicrobials judiciously for therapy and prophylaxis.
  - e) Avoid simultaneous use of drugs resulting in harmful interaction (s)
3. Prescribe drugs for the control of fertility and be aware of the effects of drugs on the foetus.
4. Apply pharmacokinetic principles in clinical practice pertaining to the drugs used in commonly encountered clinical conditions and essential medicines.
5. Prescribe rationally, in a legible manner, using appropriate format and terms, medicines for common ailments and all National Health programmes.
6. Foresee, prevent and manage adverse drug events and drug interactions
7. Understand and implement the essential medicines concept for improving the community health care.
8. Principles of pharmacoeconomics
9. Sensitization to evidence based medicine
10. Describe the clinical presentation and management of common poisonings including bites and stings.
11. Judiciously use "over the counter" drugs and be aware of ill effects of social use of intoxicants.
12. Prescribe drugs (s) for the control of fertility.

#### **(b) Psychomotor Skills:**

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

1. Write a correct, complete and legible prescription for common ailments including the diseases in the National Health Programmes.
2. Calculate the drug dosage using appropriate formulae for an individual patient.
3. Administer the required dose of different drug formulations using appropriate devices and techniques (e.g., hypodermic syringes, inhalers, transdermal patches etc).
4. Advise and interpret the therapeutic monitoring reports of important drugs
5. Recognize and report adverse drug reactions to suitable authorities.
6. Analyse critically, drug promotional literature for proprietary preparations, in terms of the (a) pharmacological actions of their ingredients (b) claims of pharmaceutical companies (c) economics of use (d) rational or irrational nature of fixed dose drug combinations.
7. Retrieve drug information from appropriate sources, especially electronic resources.

#### **(c) Attitudes & Communication skills:**

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

1. Communicate to patients regarding the optimal use of drug formulations, devices and storage of medicines.
2. Follow the drug treatment guidelines laid down for diseases covered under the

National Health Programmes and be capable of initiating, monitoring treatment, recording progress, and assessing outcomes.

3. Motivate patients with chronic diseases to adhere to the line of management outlined by the health care provider.
4. Appreciate the relationship between cost of drugs and patient compliance.
5. Exercise caution in prescribing drugs likely to produce dependence and recommend the line of management.
6. Understand the legal aspects of prescribing drugs.
7. Evaluate the ethics, scientific procedures and social implications involved in the development and introduction of new drugs.

## **COURSE CONTENTS**

### **Must know**

#### **General Pharmacology**

Pharmacology: Definition, scope, various branches  
General principles and mechanism of drug action  
Concept of therapeutic Index and margin of safety  
Drug nomenclature

#### **Clinical Pharmacology – Basic Concepts**

Scope and relevance of clinical pharmacology  
Routes of administration of drugs, drug delivery system  
Pharmacokinetics – Absorption, Distribution, Metabolism, Excretion  
Bioavailability and bioequivalence  
Factors modifying drug action and drug dosage  
Drug interactions, Pharmacogenomics, Pharmacogenetics  
Adverse Drug Reactions, Pharmacovigilance,  
Therapeutic drug monitoring & Adherence  
Essential drugs and fixed dose drug combinations, Pharmacoeconomics, Rational drug use, P-drugs  
Drugs and drug combinations that are banned in India

### **Desirable to know**

Molecular mechanism of drug action  
Drug Regulation & Drug Acts, Legal aspects, Inventory Control  
Phases of clinical trials  
Drug dose relationships and basic principles of bioassay and biostandardisation.

#### **Autonomic Pharmacology**

### **Must know**

1. Outline the general principles of autonomic neurotransmission –enumerate the various types and sub-types of receptors and their agonists and antagonists, their therapeutic indications, contraindications, common side effects
2. Outline steps in the pharmacotherapy of organophosphorous and atropine poisonings, pharmacotherapy of glaucoma and myasthenia gravis.
3. Skeletal muscle relaxants.

#### **Autacoids and related drugs**

Definition, How they differ from hormones, actions of autacoids.  
Histamine receptor antagonists, their pharmacological actions, indications, adverse effects and precautions.  
Pharmacology of drugs acting on prostaglandins, 5-HT receptors, Leukotrienes, Platelet Activating Factors and Bradykinins.

#### **Central Nervous System, Psychopharmacology, Drugs used in Anaesthetic Practice**

#### **Introduction to CNS, Neurotransmitters**

Drugs used in epilepsy, selection of appropriate drug for various types of epilepsy and adverse effects of drugs.  
Hypnotics used currently in clinical practice, indications, contraindications, adverse effects, drug interactions  
Opioid analgesics: Pharmacological actions, indications, contraindications, adverse effects and drug interactions of commonly used analgesics  
Non-steroidal anti-inflammatory drugs (NSAIDs): Pharmacological actions, indications, contraindications, adverse effects and drug interactions of commonly used drugs.  
Drugs used in the treatment of Parkinson's disease: anticholinergic agents, dopamine agonists, MAOI, COMTI; their indications, contra-indications, adverse effects and drug interactions  
Drugs used in other neurodegenerative disorders.  
Disease modifying agents in the treatment of rheumatoid arthritis  
Pharmacology of ethanol and methanol poisoning  
Agents used in the treatment of gout (acute and chronic)  
Drugs used for psychosis, anxiety, depression, and manic depressive illness  
Drugs of addiction/abuse and dependence  
General anaesthetics; Cardinal features, merits and demerits of commonly used anaesthetics, drug interactions  
Pre-anaesthetic adjuvants: uses, indications, contraindications, adverse effects and drug interactions  
Local Anaesthetic agents: Pharmacological basis, adverse drug reactions, indications and complications of spinal anaesthesia  
Neuroleptanalgesia, Disassociative anaesthesia  
Endogenous opioid peptides, and their functions, opioid receptors and their subtypes; Centrally acting muscle relaxants, Directly acting muscle relaxants.

### **Cardiovascular system**

1. Antihypertensive drugs, their mechanism of action, adverse drug reactions, drug interactions and basis of combining commonly used drugs
2. Management of Hypertensive emergencies
3. Pharmacology of calcium channel blockers
4. Drugs affecting Renin Angiotensin system, Nitric oxide donors and inhibitions
5. Approaches to treatment of myocardial Infarction and unstable angina: Drugs used in treatment of angina pectoris
6. Vasoactive Peptides
7. Drug treatment of peripheral vascular diseases
8. Pharmacology of vasodilators and cardiac glycosides; usage in CHF
9. Classification of Ant-arrhythmic drugs, they Pharmacological actins & indication
10. Treatment of paroxysmal supraventricular tachycardia, Atrial dysrhythmias, sudden cardiac arrest and ventricular fibrillation.
11. Properties and indications of plasma expanders
12. Drug treatment of shock

### **Diuretics**

Diuretics: Calcification, mechanism of action, pattern of electrolyte excretion under their influence  
Short term side effects and long term complications of diuretic therapy  
Therapeutic uses of diuretics

### **Drugs affecting blood and blood formation**

Anti-anaemic drugs: Mechanisms of iron absorption from GIT and factors modifying it, adverse drug reactions, oral and parenteral preparations, treatment of iron deficiency anaemia, pharmacology of folic acid, vitamin B12, vitamin K, erythropoietin

Anticoagulants: Calcification Mechanisms of action of heparin and oral anticoagulants, indications, monitoring of therapy and the treatment of bleeding due to their overdose, drug interactions.

Drugs inhibiting platelet aggregations, their indications and precautions for their use.

Fibrinolytics and anti-fibrinolytics: Indications, adverse reactions Coagulants, local

haemostatics.

Hypolipoproteinemia drugs: Mechanism of actions, adverse drug reaction and indications

### **Respiratory system**

Drugs used in the treatment of bronchial asthma, mechanism of action, common side effects and precautions to be taken during their use.

Antitussives: pharmacological actions, indications, contraindications and common side effects.

Expectorants and mucolytic agents: mechanism of actions, side effects and precautions to be taken.

### **Gastro-intestinal system**

Classification of drugs used in Acid peptic diseases, pharmacotherapy of peptic ulcer, their mechanism of actions, adverse drug reactions, contra-indications and precautions.

Antiemetic agents: mechanism of actions, uses, side effects.

Pharmacological basis of use of drugs in diarrhea, ORS.

Drugs used in ulcerative colitis.

Drugs used in constipation, their limitations and hazards of their use.

Appetite stimulants, drugs used in obesity.

Drugs for biliary and pancreatic disease.

### **Drugs acting on Endocrine System**

Anterior Pituitary and Posterior Pituitary hormones, melatonin

Thyroid hormones and antithyroid drugs: Pharmacological actions, indications, contraindications and side effects.

Drugs used for pharmacotherapy of diabetes mellitus, mechanism of actions, contraindications, precautions during the use and side effects. Management of iatrogenic hypoglycemia and diabetic ketoacidosis

Sex hormones, their analogues and antagonists, uses in replacements and pharmacotherapy, outlining the rationale for such use, contraindications and side effects

Pharmacological approaches to contraception, side effects, precautions during use and contraindications

Uterine relaxants, and uterine stimulants, indications, side effects, contraindications

Hormones of adrenal cortex, their synthetic analogues, pharmacological actions, therapeutic uses, precautions, side effects and contraindications

Hormones and drugs affecting calcium metabolism, therapeutic indications, contraindications and side effects

Drugs used in the treatment of infertility

### **Chemotherapy**

General principles of chemotherapy, classification of chemotherapeutic agents, rational use of antimicrobial agents, indications for prophylactic and combined uses of antimicrobials

Chemotherapeutic agents: penicillins, cephalosporins, other  $\beta$ -lactams,  $\beta$ -lactamase inhibitors, aminoglycosides, broad spectrum antimicrobial agents, quinolones, sulphonamides, Macrolides and other newer drugs; their mechanism of actions, side effects, indications, resistance, drug interactions

Antiseptics, disinfectants and their use based on their pharmacological properties

Anticancer drugs, mechanism of actions, indications, side effects, contraindications, precautions

### **Toxicology**

General principles of treatment of poisoning including snake bite and animal stings.

Heavy metal poisoning and heavy metal antagonists

Management of over dosage with commonly used therapeutic agents

### **Miscellaneous**

Vaccines, Drugs modulating Immune system  
Vitamins

## **Part II (Clinical Pharmacology and Therapeutics)**

### **National Health programmes like:**

1. Tuberculosis
2. Leprosy
3. HIV and STD
4. Malaria
5. Syphilis and gonorrhoea
6. RCH programme
7. Upper and lower respiratory infections
8. Diarrhea
9. Filariasis
10. Anaemia
11. Diabetes Mellitus

### **Infective / Parasitic conditions**

1. Influenza
2. Urinary Tract infections
3. Typhoid and other GIT infections
4. Amoebiasis, other protozoal infections
5. Worm infestations
6. Fungal Infections

### **Other topics:**

1. Treatment of pain
2. Treatment of insomnia
3. Treatment of cough
4. Treatment of fever of unknown origin (PUO)
5. Drugs used in labour
6. I.V. fluids
7. Clinical uses of glucocorticoids
8. P-drug or how to select a drug for a given patient in a given situation
9. Essential drugs
10. Drug therapy in special situations (pregnancy, lactation, children, geriatrics, renal and hepatic diseases)

### **SKILLS:**

#### **Able to do independently**

1. Dosage forms
  - Oral
  - Parenteral
  - Topical & Others
2. Routes of drug administration, setting up an intravenous drip
3. Calculation of drug dosage
4. Sources of drug information – how to retrieve information
5. ADR monitoring
6. Therapeutic Drug Monitoring
7. Critical appraisal of drug promotional literature
8. Essentials of Clinical trials
9. Communicating to patients on the proper use of medication
10. Selection of P drug
11. Prescription writing, prescription auditing and standard treatment protocols
12. Essential drugs list

13. Use of drugs in pregnancy, lactation children and elderly
14. Use of drugs in liver disease and renal disease
15. Ethics in clinical trials, therapy
16. Preparation of test dose for penicillin solution
17. Preparation and use of oral rehydration solution
18. Informed Consent Form
19. Computer assisted learning (CAL)

#### **Teaching –Learning Methods:**

**The following objectives will be covered using theory lectures,**

Small group discussions, simulated clinical case discussions, therapeutic auditing, problem based learning, e-learning and any other teaching learning method which the teacher chooses to select. An overlap between theory and practical classes will serve to reinforce and complement the two. Points not covered in theory can be covered during practical classes.

**Suggested areas for integrated teaching in Pharmacology are as follows:**

1. Hypertension
2. Glaucoma
3. Myasthenia gravis
4. Tuberculosis
5. HIV infection & AIDS
6. Peptic ulcer
7. Toxicology
8. Vaccines
9. Diabetes
10. Nutritional deficiencies, Anemia
11. Parochial asthma
12. PUO
13. Pain
14. Insomnia

#### **Recommended books for undergraduates**

- 1) Basic and Clinical Pharmacology Lange publications by Bertram G Katzung
- 2) Pharmacology by H P Rang, M M Dale, J M Ritter, P K Morore
- 3) Principles of Pharmacology by H L Sharma, K K Sharma
- 4) Essentials of Medical Pharmacology K D Tripathi
- 5) Pharmacology and Pharmacotherapeutics – By Goodman & Gilman (reference)
- 6) Clinical Pharmacology – Laurence, Bennet & Brown.

**At the end of practicals the students should acquire the following skills and knowledge:**

1. Appreciate the effects of mydriatics, miotics and local anesthetics on the eye.
2. Be able to instill correctly eye drops, measure pupillary diameter, test for light and corneal reflex.
3. Recognise the effects of general anesthesia in the rat.
4. Evaluate the effects of skeletal muscle relaxants, e.g. diazepam using the rota rod or an inclined plane on the mouse.
5. Appreciate the extrapyramidal side effects of antipsychotics in mouse (catatonia).
6. Evaluate the analgesic effects of NSAIDs and opioids on the rat using the tail- clip method.
7. Write a prescription for common diseases in the proper format. Write a prescription for elderly, children, in pregnant and lactating women.
8. Audit a given prescription.
9. Interpret and manage drug- interaction problems.
10. Criticize and evaluate pharmaceutical company's' literature.
11. Calculate doses of commonly used drugs according to age.
12. Recognise signs and symptoms of common drug over dosage and poisons and

how to treat them.

13. Calculate the cost- effectiveness of various drug regimen for common illness.
14. Interpret graphs and charts of experimental and Clinical Pharmacology.

**Notified tests including send-up: Total 6**

1. Mid Semester Test One – Middle of third semester
2. End of third semester Test
3. Mid Semester Test Two - Middle of fourth semester
4. End of fourth semester Test
5. Mid semester Test Three – Middle of fifth semester
6. End of fifth semester - Send-up Examination

The three End semester test should be based on the university exam pattern with theory, practical and oral examinations.

The three mid-term tests may be based on Multiple Choice Questions, Short Structured theory test, OSPE, or even Orals. Multiple Choice Questions are to be encouraged in the formative assessments as much as possible.

For the calculation of internal assessment for theory, the average marks secured by the candidate in all the tests including the send-ups minus one test with the lowest score (n-1) will be taken.

For the calculation of internal assessment for practical, the average marks secured by the candidate in all the tests including the send-ups minus one test with the lowest score (n-1) will be taken.

A candidate has to secure at least 35% or more in the internal assessment for theory and practical to be eligible for appearing in the final examination.

Criteria for appearing in the University Examination:

75 % attendance in the subject. No condonation will be allowed below this limit.

35% marks in internal assessment for both theory and practicals.

# **FORENSIC MEDICINE**

## FORENSIC MEDICINE

### **Learning Objectives**

At the end of the course in Forensic Medicine, the learner shall be able to: -

1. Identify, examine and prepare report or certificate in medico-legal cases / situations in accordance with the law of land.
2. Perform medico-legal postmortem examination and interpret autopsy findings and results of other relevant investigations to logically conclude the cause, manner and time since death.
3. Be conversant with medical ethics, etiquette, duties, rights, medical negligence and legal responsibilities of the physicians towards patients, profession, society, state and humanity at large.
4. Be aware of relevant legal / court procedures applicable to the medico-legal / medical practice.
5. Preserve and dispatch specimens in medico-legal / post mortem cases and other concerned materials to the appropriate Government agencies for necessary examination.
6. Manage medico-legal implications, diagnosis and principles of therapy of common poisons.
7. Be aware of general principles of environmental, occupational and preventive aspects of toxicology.

### Course contents

#### **Forensic Medicine (Forensic Pathology)**

1. Definition of Forensic Medicine and Medical Jurisprudence.
2. Courts in India and their powers: Supreme Court, High Court, Sessions Court, Additional Sessions Court, Magistrate's Courts.
3. Court procedures: Summons, conduct money, oath, affirmation, perjury, types of witnesses, recording of evidence, conduct of doctor in witness box,
4. Medical certification and medico-legal reports including dying declaration.
5. Death:
  - a) Definition, types; somatic, cellular and brain – death.
  - b) Natural and unnatural deaths.
  - c) Suspended animation.
6. Change 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.
7. Inquest: Inquest by police, magistrate.
8. Identification:
  - a) Definition,
  - b) Identification of unknown person, dead bodies and remains of a person by age, sex, stature, dental examination, scars, moles, tattoos, dactylography, DNA typing and personal belonging including photographs.
9. Exhumation. (Desirable to know)
10. Medico-legal autopsies:
  - a) Definitions of medico-legal and clinical/pathological autopsies.
  - b) Objectives, procedures, formalities of medico-legal autopsies.
  - c) Preservation of articles of importance, during autopsy.
  - d) Preservation of body fluids & viscera in suspected poisoning.
11. Mechanical injuries or wounds:

- a) Definition, classification of mechanical injuries; description of blunt force, sharp force and firearm injuries.
- b) Medico-legal aspects of injuries, differences between antemortem and post-mortem injuries, estimation of age of different types of injuries, defence injuries, hesitation cuts; fabricated injuries; simple and grievous hurt, suicidal/accidental/homicidal injuries; causes of death by mechanical injuries.
- 13. Regional injuries: Injuries to Head, Neck, Thorax, Abdomen, Pelvis, Genitalia, Vertebral column and Bones.
- 13. Injuries due to physical agents, and their medico-legal importance; cold, heat, electricity and lightning, explosions and radioactive substances.
- 14. Asphyxial deaths: Definition, causes, types, post-mortem appearances and medico-legal significance of hanging, strangulation, suffocation and drowning.
- 15. Deaths due to starvation.
- 16. Sexual Offences: Virginity, rape, unnatural sexual offences; sexual perversions.
- 17. Criminal abortion, Medical Termination of Pregnancy, Act 1971.
- 18. Infant and childhood deaths: Viability, determination of age of foetus, live birth, still birth and dead born child, sudden infant death syndrome, child abuse, medico-legal aspects of precipitate labour.
- 19. Biological fluids:
  - a) Blood – Preservation, dispatch of samples, importance of blood group in disputed paternity, hazards of blood transfusion.
  - b) Seminal stains – Preservation and dispatch of samples.

## **FORENSIC PSYCHIATRY**

1. Definition and brief overview of common mental illnesses.
2. True and feigned mental illness.
3. Civil and criminal responsibilities of a mentally ill person.
4. Indian Mental Health Act, 1987 with special reference to admission, care and discharge of a mentally ill person. (Desirable to know)

## **MEDICAL JURISPRUDENCE**

1. Indian Medical Council and State Medical Councils; their functions and disciplinary control.
2. Rights and privileges and duties of a registered medical practitioner, Disciplinary proceedings and penal erasure.
3. Professional conduct, Etiquette and Ethics in medical practice.
4. Professional secrecy, privileged communication.
5. Medical Negligence: civil and criminal negligence, contributory negligence, vicarious liability, res ipsa loquitur, prevention of medical negligence and defences in medical negligence suits.
6. Consent: Types, informed consent, age in relation to consent, consent in relation to mental illness and alcohol intoxication, emergency and consent.
7. The Pre-natal Diagnostic Techniques Act (Prohibition of sex selection).
8. Human Organ Transplant Act, 1994.

9. Consumer Protection Act, 1994.
10. Certification of births, deaths, illness and fitness.

## **TOXICOLOGY**

1. General aspects of poisoning: Duties of doctor in cases of poisoning, medico-legal autopsy in poisoning, preservation and dispatch of viscera for chemical analysis. Role of Forensic Science Laboratory in brief.
2. Types of poisons, diagnosis, principles of therapy and medicolegal aspects of:
  - a) Corrosive poisons: strong mineral acids and organic acids.
  - b) Metallic poisons: Lead, Arsenic, Mercury and Copper.
  - c) Animal poisons: Snake and scorpion bites.
  - d) Deliriant: Dhatura, Cannabis and Cocaine.
  - e) Somniferous agents: Opium, Morphine and other opioids
  - f) Inebriants: Methyl and ethyl alcohol.
  - g) Asphyxiant poisons: Carbon monoxide, Carbon dioxide, Methane and cyanides.
  - h) Anesthetic agents. (Desirable to know)
  - i) Cardiac poisons: Cerebra thevetia and Nerium odorum.
  - j) Miscellaneous: Aspirin, paracetamol, barbiturates, diazepam, antihistaminics, anti-depressants and kerosene oil.
  - k) Insecticides: Organophosphorus compounds, Carbamates and Organochloro compounds.
  - l) Food poisoning.
  - m) Drug abuse and dependence.

### **Desirable to know following poisonings:**

- a) Inorganic non metallic poisons: Phosphorous.
- b) Organic vegetable irritants: Abrus precatorious, Capsicum, Calotropis, Semicarpus anacardium, Croton.
- c) Cardiac Poisons: Aconite,
- d) Convulsants: Strychnine.
- e) Paralytic agents, Curare.
- f) War gases and Industrial gases.
- g) Chloral hydrate.
- h) Mechanical poisons.

## **SKILLS**

### **Able to perform independently under guidance.**

1. Prepare proper certificates of birth and death.
2. Diagnose and manage common acute and chronic poisonings.
3. Age estimation from bones, x-rays and dentition (mock exercise).
4. Examination of injuries, weapons and report writing (mock exercise).
5. Examination of an alcohol intoxicated person and report writing (mock exercise).

### **Able to Assist**

1. Prepare dying declaration.
2. Give evidence in a court of law as an expert witness.
3. Collect and do proper labeling, preservation and dispatch of medicolegal specimens.
4. Perform the medico-legal duties in case of poisoning
5. Examination of victim and accused in sexual offences and report writing. (mock exercise).
6. Study of specimens of poisons.
7. Study of wet specimens.

### **Observe**

1. Observing of ten medico-legal autopsies and enter the reports in practical record.

**Suggested topics for e-learning:**

1. Examination of an injured patient and report writing.
2. Examination of victim of sexual assault and report writing.

**Suggested topics for integrated teaching**

1. Death and dying
2. Organ transplant
3. Poisoning
4. Ethical & Medico legal issues in clinical practices
5. Child abuse
6. HIV/AIDS
7. Alcoholism

**METHOD OF ASSESSMENT:**

Modified essay question, Microscopic examination, Short answer questions, MCQs, Problem solving exercises, OSPE, Records Review, Checklist and Structured Oral Viva Voce

**TEACHING LEARNING METHODS:**

Structured interactive sessions, Small group discussion ., Practical including demonstrations, Problem based exercises, Video clips, Written case scenario, Self learning tools, Interactive learning and e-modules

**TIME OF EVALUATION:**

There should be regular formative assessment. Formative assessment, day-to-day performance should be given greater importance. Examination of Forensic Medicine & Toxicology should be at the end of 5th semester and formative assessment in the middle of 3rd, 4th and 5th semester and summative assessment at the end of 5th semester.

**LEARNING RESOURCE MATERIALS**

Text books, Reference books, Practical note books, Internet resources, Video films etc.

**Suggested Textbooks for Forensic Medicine & Toxicology**

1. Text book of Forensic Medicine by Parik.
2. Text book of Forensic Medicine and Toxicology by V.V. Pillay, 15th Edition, Paras Medical Publishing, Hyderabad.
3. Fundamentals of Forensic Medicine and Toxicology by R. Basu, Publishers-Books and Allied (P) Ltd, Kolkata.
4. Guharaj Forensic Medicine, 2nd Edition by P.V.Guharaj, Edited by M.R. Chandran, Orient Longman, Hyderabad.
5. The essentials of Forensic Medicine & Toxicology by Dr. K.S. Narayanareddy- Latest edition

**Reference Books:**

1. Modi's Medical Jurisprudence and Toxicology, 23rd Edition, Edited by K. Mathiharan and A.K. Patnaik, Eastern Book Company, Lucknow.
2. Knight's Forensic Pathology, 3rd Edition, Edited by Pekka Saukko and Bernard Knight, Arnold Publication, London, Co-published by Oxford Publications, USA.

**Internet:**

1. Journal of Indian Congress of Forensic Medicine & Toxicology at [www.icfmt.org/](http://www.icfmt.org/)

**OBJECTIVE FOR PRACTICAL EXAMINATIONS**

1. The students at the end of the day should be well versed with the practical aspects in the trauma center and the Hospital.

2. The duty of issuing of the different certificates like drunkenness, sexual assault, age, injury etc.
3. Intimation to the police of all types of medicolegal cases.
4. Conducting autopsy on the foetus and opining its age.
5. Conducting medicolegal autopsies and arriving at an opinion.
6. What viscerae to be collected in a case of poisoning. How to pack them. What is chain of custody.
7. Should have knowledge of the common poisons which are abused and should be able to identify them.
8. Should be able to examine a weapon and comment on what type of injuries it can cause and whether the injuries at post mortem are the injuries caused by this weapon.
9. Examine Skeletal remains and opine regarding it.
10. Examining X'rays to determine the age of an individual and certifying.
11. Appliances and instruments for treating a case of poisoning and instruments for performing a medicolegal autopsy.
12. Identify Soft specimens pathological and caused by trauma.

### **OSPE's**

1. Injury certificate.
2. Age Certification.
3. Drunkenness Certification.
4. Examination of Accused and Potency certification in a case of sexual assault /Examination of the Victim in a case of sexual assault.
5. Age & Sex determination from bones with reasons.
6. Age determination from X-ray with reasons.
7. Death certificate.
8. Interpretation of the autopsy reports.

### **SHORT OSPE'S**

1. Wet specimen
2. Weapon.
3. Photograph.
4. Poison.
5. Appliance/Autopsy instrument
6. Medical sickness and fitness from medical leave certificate.
7. Viscera Packing.
8. Interpretation of the age of foetus.

### **Notified tests including send-up: Total 6**

1. Mid Semester Test One – Middle of third semester
2. End of third semester Test
3. Mid Semester Test Two - Middle of fourth semester
4. End of fourth semester Test
5. Mid semester Test Three – Middle of fifth semester
6. End of fifth semester - Send-up Examination

The three End semester test should be based on the university exam pattern with theory, practical and oral examinations.

The three mid-term tests may be based on Multiple Choice Questions, Short Structured theory test, OSPE, or even Orals. Multiple Choice Questions are to be encouraged in the formative assessments as much as possible.

For the calculation of internal assessment for theory, the average marks secured by the candidate in all the tests including the send-ups minus one test with the lowest score (n-1) will be taken.

For the calculation of internal assessment for practical, the average marks secured by the candidate in all the tests including the send-ups minus one test with the lowest score (n-1) will be taken.

A candidate has to secure at least 35% or more in the internal assessment for theory and practical to be eligible for appearing in the final examination.

Criteria for appearing in the University Examination:

75 % attendance in the subject. No condonation will be allowed below this limit.

35% marks in internal assessment for both theory and practicals.

**COMMUNITY  
MEDICINE  
INCLUDING  
HUMANITIES**

## **COMMUNITY MEDICINE INCLUDING HUMANITIES**

### **DEPARTMENTAL OBJECTIVES:**

By the completion of training, the student shall be able to:

- 1) Appreciate the physical, social, psychological, economic and environmental aspects of health and disease.
- 2) Apply the clinical skills to recognize and manage common health problems including their physical, emotional and social aspects at the individual and family levels and deal with medical emergencies at the community level.
- 3) Define and manage the health problems of the community he/she serves. To achieve this, the student will be able to:
  - a) Organize elementary epidemiological studies to assess the health problems in the area. For this, he should be able to design a study, collect data, analyze it with statistical tests and make a report and participate in a health information system.
  - b) Prioritize the most important problems and help formulate a plan of action to manage them under National Health Programme guidelines including population control and family welfare programme. He should be able to assess and allocate resources and implement and evaluate programmes.
  - c) Organize prevention and control of communicable and non-communicable diseases.
  - d) Organize health care services for special groups like mothers, infants, under-five children and school children.
  - e) Organize health care in case of calamities.
- 4)
  - a) Work as an effective member of the health team;
  - b) Coordinate with and supervise other members of the health team and maintain liaison with other agencies.
- 5) Plan and implement health education programmes.
- 6) Perform administrative functions of health centers.
- 7) Promote community participation especially in areas of disease control, health education and implementation of national programmes.
- 8) Appreciate his/her limitations, recognize situations calling for referral to higher centers and be willing to refer patients for further consultations at the appropriate moment to appropriate centers.

### **COURSE CONTENT**

#### **I Concepts in Health:**

##### **Must know:**

1. Definition of health; appreciation of health as a relative concept; determinants of health.
2. Characteristics of agent, host and environmental factors in health and disease and the multifactorial etiology of disease.
3. Understanding of various levels of prevention with appropriate examples.
4. Indices used in measurement of health.
5. Health situation in India - especially the demography, mortality and morbidity profile and the existing health facilities in health services.

##### **Desirable to know:**

- 1 Difficulties in measurement of health.

#### **II Epidemiology:**

##### **Must know:**

1. Use of basic epidemiological tools to make a community diagnosis of the health situation in order to formulate appropriate intervention measures.
2. Epidemiology: definition, concepts and its role in health and disease.
3. Definition of the terms used in describing disease, transmission and control.

4. Natural history of a disease and its application in planning intervention.
5. Modes of transmission and measures for prevention and control of communicable and non-communicable diseases.
6. Principal sources of epidemiological data.
7. Definition, calculation and interpretation of the measures of frequency of diseases and mortality.
8. Common sampling techniques, simple statistical methods for the analysis, interpretation and presentation of data, frequency distribution, measures of central tendency, measures of variability.
9. Need and uses of screening tests.
10. Accuracy and clinical value of diagnostic and screening tests (sensitivity, specificity, predictive values).
11. Planning, collecting, analyzing and interpreting data to reach a community diagnosis.
12. Epidemiology of communicable and non-communicable diseases of public health importance and their control.
13. Epidemiologic basis of national health programmes.
14. Awareness of programmes for control of non-communicable diseases.
15.
  - a) Planning and investigation of an epidemic of a communicable disease in a community setting.
  - b) Institution of control measures and evaluation of the effectiveness of these measures.

**Desirable to know:**

1. Various types of epidemiological study designs.
2. The derivation of normal values and the criteria for intervention in case of abnormal values.
3. Planning an intervention programme with community participation based on the community diagnosis.
4. Applications of computers in epidemiology.

**III. Epidemiology of specific diseases (Communicable & non-communicable diseases):**

The specific objectives of selected communicable diseases of public health importance for which National Disease Control/Eradication Programmes have been formulated are described here.

For the rest of the diseases, the individual teacher would formulate the objectives while drawing the lesson plans. The idea of formulating objectives for a few diseases is to highlight their importance and to emphasize certain learning outcomes.

**Must know:**

1. Extent of the problem, epidemiology and natural history of the disease.
2. Relative public health importance of a particular disease in a given area.
3. Influence of social, cultural and ecological factors on the epidemiology of the diseases.
4. Control of communicable and non-communicable diseases by:
  - a) 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.
  - b) Principles of planning, implementing and evaluating control measures for the diseases at the community level bearing in mind the relative importance of the diseases.
5. Institution of programmes for the education of individuals and communities.
6. Investigating a diseases epidemic.
7. Awareness of the National diseases Control Programmes.

**Desirable to know:**

1. Level of awareness, causation and prevention of disease among individuals and communities.
2. Control of communicable and non-communicable diseases by diagnosing and treating a case and in doing so demonstrate skills in:
3. Understand the principles of measures to control a disease epidemic.
4. Training health workers in (i) disease surveillance, (ii) control and treatment, (iii) health education.
5. Managerial skills in the areas of (i) supervision, (ii) collection and compilation of data, (iii) maintenance of records, (iv) transmission of data.

In addition to the above, the student should have the following additional skills for each disease:

These are general principles which are applicable to all the communicable and non-communicable diseases/conditions.

Though the list of diseases is quite long, here are names of some important communicable and non-communicable diseases/conditions which need to be taught. Needless to say, the emphasis on these diseases/conditions will vary from place to place. They are: Poliomyelitis, Infective hepatitis, ARI, T.B., Malaria, Filariasis, STDs and AIDS, Diarrhoeal diseases, Kala Azar, Mental health, Coronary heart disease, Blindness, Hypertension, Leprosy.

**IV. Biostatistics:****Must know:**

- a) The scope and uses of biostatistics.
- b) Collection, classification and presentation of statistical data.
- c) Analysis and interpretation of data.
2. Obtaining information, computing indices (rates and ratio) and making comparisons.

**Desirable to know:**

1. Apply statistical methods in designing controls
  - a) choosing of appropriate controls
  - b) applying tests of significance
  - c) use of statistical tables.

**V. Entomology:****Must know:**

1. Role of vectors in the causation of diseases.
2. Steps of management of a case of insecticide toxicity.

**Desirable to know:**

1. Identifying features of and mode of transmission of vector borne diseases.
2. Methods of vector control with advantages and limitations of each
3. Mode of action, dose and application cycle of commonly used insecticides.

**VI. Environmental Studies and Sanitation:****Must know:**

- a) Awareness of the concept of safe and wholesome water.
- b) Awareness of the requirements of a sanitary source of water.
- c) Understanding the methods of purification of water on small scale with stress on chlorination of water.
- d) Various biological standards.
- e)

**Note:**

**Desirable to know:**

1. Physical, chemical standards; tests for assessing quality of water.
2. Disposal of solid waste, liquid waste, both in the context of urban and rural conditions in the country.
3. Problems in the disposal of refuse, sullage and sewage.
  - a) Sources, health hazards and control of environmental pollution
  - b) Influence of physical factors – like heat humidity, cold, radiation and noise – on the health of the individual and community.
  - c) Standards of housing and the effect of poor housing on health.
  - d) Large scale purification of water.

**VII. Reproductive & Child Health (RCH):**

**Must know:**

1. Need for specialized services.
2. Magnitude of morbidity and mortality in a given area.
3. Local customs and practices during pregnancy, child birth and lactation.
4. Concepts of 'high risk' and 'MCH Package', 'Child surgical and Safe Mother-hood', 'Integrated Child Development Scheme' and other existing regional programmes.
5. Under-5: morbidity, mortality, high risk and care of under-5
6. Monitoring of growth and development and use of Road to Health Chart.
7. Organisation, implementation and evaluation of programmes for mothers and children as per National Programme guidelines; supervising health personnel; maintaining records; performing nutritional assessment; promoting breast feeding.

**Desirable to know:**

Genetics and Community Health

**VIII. Demography & Family Planning:**

**Must know:**

1. Definition of demography and family welfare programme.
2. Stages of the demographic cycle and their impact on the population.
3. Definition, calculation and interpretation of demographic indices like birth rate, death rate, growth rate, Fertility rates.
4. Reasons for rapid population growth in India.
5. Need for population control measures and the National Population Policy.
6. Identify and describe the different family planning methods and their advantages and shortcomings.
7. Demonstrate skills in motivating a couple for selecting an appropriate family planning method.

**Desirable to know:**

1. Organizational, technical and operational aspects of the National Family Welfare Programme and participate in the implementation of Programme.
2. Give guidance for MTP and infertility services.
3. Recent advances in contraception.

**IX. Health Planning and Management:**

**Must know:**

1. Explain the terms: public health, public health administration, regionalization, comprehensive medical care, delivery of health care, planning management, evaluation.
2. Components of health care delivery:
  - i) Describe the salient features of the National Health Policy concerning:

- (a) Provision of medical care;(b) primary health care and Health for All; (c) health manpower development; (d) planned development of health care facilities; (e) encouragement of indigenous systems of medicine.
- II Explain the process of health planning in India by demonstrating awareness of:
- the health systems and health infrastructure at centre, state and district levels.
  - the inter-relationship between community development block and primary health centre.
  - the organization, functions and staffing pattern of community health centers, primary health centers, rural health centre and sub-centre.
  - the job descriptions of health supervisor (male and female); health workers; village health guide; anganwadi workers traditional birth attendants.
  - the activities of the health team at the primary health centre.

**Desirable to know:**

1. Familiarity with management techniques: Define and explain principles of management; explain the three broad functions of management (planning, implementation and evaluation) and how they relate to each other.
2. The components of health care delivery: appreciate the need for International Health Regulations and Disease Surveillance.  
be aware of the constitutional provisions for health in India.  
enumerate the three major divisions of responsibilities and functions (concerning health) of the union and the state governments.  
explain the process of health planning in India by demonstrating awareness of recommendations of different health committees such as Bhore, Mudaliar, etc.  
appreciate the role of national, international voluntary agencies in health care delivery.
3. Explain the terms: cost-effectiveness, cost-benefit.

**X. Nutrition:**

**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 selecting and using appropriate; methods such as: anthropometry, clinical, dietary, laboratory techniques.
3. Compare recommended allowances of individual and families with actual intake
4. Plan and recommend a suitable diet for individuals and families bearing in mind local availability of foods, economic status, etc.
5. Common nutritional disorders: PEM, Vit. A Deficiency, anemia, iodine deficiency disease, fluorosis, food toxin diseases and their control and management.
6. National Programmes in nutrition.

**XI. Medical Sociology:**

**Must know:**

1. Conduction of clinic-social evaluation of the individual in relation to social, economic and cultural aspects; educational residential background; attitude to health, disease and health services; the individual's family and community.
2. Assessment of barriers to good health, recovery from sickness and to leading a socially and economically productive life.
3. Development of a good doctor-patient relationship.
4. Identification of social factors related to health and disease in the context of urban and rural societies.
5. Impact of urbanization of health and disease.

**XII. School Health**

**Must know:**

1. Objectives of the School Health Programme.

2. Activities of the Programmes like:
  - a) Carrying out periodic medical examination of the school children and the teachers.
  - b) Immunization of children
  - c) Health education.
  - d) Mid-day meals.

**Desirable to know:**

1. Obtaining participation of the teachers in the school health programme including maintenance of records; defining healthful practices; early detection of abnormalities.

**XIII. Occupational Health:**

**Must know:**

1. Relate the history of symptoms with the specific occupation including agriculture.
2. Employees State Insurance Scheme

**Desirable to know:**

1. Identification of the physical, chemical and biological hazards to which workers are exposed to while working in a specific occupational environment.
2. Diagnostic criteria of various occupational diseases.
3. To suggest preventive measures against these diseases including accident prevention.
4. Various legislations in relation to occupational health.

**XIV. Health Education (Behavioral Change Communication - BCC):**

**Must know:**

1. Communicate effectively with the individuals, family and the community using tools and techniques of information, education, communication.
  - a) Appreciate barriers to effective communication.
  - b) Describe the principles and methods and evaluation of health education.
  - c) List various methods of health education with their advantages and disadvantages.
  - d) Select and use appropriate media (simple audio-visual aids) for effective health education.
2. Use every opportunity for health education of the individual, family and the community

**XV. Urban Health:**

**Must know:**

1. Common health problems (medical, social, environmental, economic, psychological) of urban slum dwellers.
2. Organisation of health services for slum dwellers.
3. Organisation of health services in urban areas.

**SKILLS**

**Part I: GENERAL SKILLS:**

The student should be able to:

1. Elicit the clinico-social history to describe the agent, host and environmental factors that determine and influence health.
2. Recognize and assist in management of common health problems of the community.
3. Apply elementary principles of epidemiology in carrying out simple epidemiological studies in the community.

4. Work as a team members in rendering health care.
5. Carry out health education effectively for the community.

## **Part II: SKILLS IN RELATION TO SPECIFIC TOPICS:**

### **1. Communication**

The student should be able to communicate effectively with family members at home, patients at clinics or at homes; individuals, family or a group for health education, peers at scientific forums.

### **2. Team activity**

Work as a member of the health team; in planning and carrying out field work like school health.

### **3. Environmental sanitation**

Collect water samples for microbiological evaluation; chlorination of water; estimate the chlorine demand of water; estimate the residual chlorine of water. Insecticides - their proper storage and use in control of vectors.

### **4. Communicable and non- communicable diseases (including social problems)**

- a) Eliciting clinico- social history and examining the patient for diagnosis and treatment.
- b) Collection of appropriate material for microbiological, pathological or biochemical tests.
- c) Fixing and staining and examining smears - peripheral blood smear for malaria and filariasis;  
sputum for AFB; slit skin smears for leprosy; Hb estimation; urine and stool examination.
- d) Assessing the severity and/ or classifying dehydration in diarrhea, upper respiratory tract infection, dog bite, leprosy.
- e) Adequate and appropriate treatment and follow-up of leprosy, malaria, filariasis, rabies, upper respiratory tract infection, diarrhea and dehydration.
- f) Advice on the prevention and prophylaxis of common diseases - vaccine preventable diseases, tetanus, malaria, filariasis, rabies, cholera, typhoid, intestinal parasites.
- g) Use of proper screening methods in early diagnosis of common diseases.
- h) Take necessary steps in disease outbreak/ epidemics/ natural disasters - investigation of epidemic, food poisoning; notification; organizing medical care following disasters.

### **5. Maternal and Child Health**

- a) Antenatal - examination of the mother; application of the risk approach in antenatal care.
- b) Intranatal - conduction a normal delivery; early recognition of danger in intranatal period;  
referral of cases requiring special care.
- c) Postnatal - assessment of the mother and newborn; advice on appropriate family planning method; promotion of breast feeding; advice on weaning.
- d) Assessment of growth and development of the child - use of the 'Road to Health' card; recording important anthropometric assessments of the child; giving immunization to the child; identifying high risk infants.

### **6. Statistics**

- a) Take proper sample.
- b) Apply appropriate tests of significance to make a correct inference.
- c) Simple analysis and presentation of data.

### **7. Nutrition**

- a) Conducting a diet survey.

- b) Community survey and clinical diagnosis of nutritional deficiencies; vitamin A deficiency, iodine deficiency, malnutrition.
- c) Making recommendations regarding diet.

**8. Occupational Health**

- a) Inspection of work sites.
- b) Recommendation in improving work sites.
- c) Medical examination of workers.

**9. Health Care of the Community**

- a) Ensuring community participation in health care.
- b) Arranging intersectoral coordination where necessary.
- c) Working in liaison with other agencies involved in health care in various National Health Programmes.

**10. Health Management**

- a) Be an effective team leader.
- b) Guide and train workers.
- c) Supervision of workers and Programmes.

**11. Family Planning:** Advice on appropriate methods.

**12. Managerial:** Organise antenatal and under - five clinic.

**AREAS FOR INTEGRATED TEACHING**

Sl. no	Area	Collaborating Departments
1.	Growth and development in children < 5 years	Anatomy and Paediatrics
2.	Acute diarrhoeal diseases	Physiology and Paediatrics
3.	Disaster preparedness	Anesthesiology
4.	Maternal and child health and Family Planning	Obstetrics & Gynecology and Paediatrics
5.	Surveillance of vaccine preventable Diseases	Dept. of Health, Govt. of Pondicherry

**45 hours for the environmental studies in UG Curriculum have to be incorporated by the Community Medicine Department in their teaching schedule.**

# **OPHTHALMOLOGY**

# OPHTHALMOLOGY

## Introduction

Anatomy of the eye – including visual pathway, Extraocular muscles

Physiology – Aqueous humour formation, tear film, fields

Pharmacology – Ophthalmic preparations, modes of administration, Antibiotics, antivirals, antifungals, antiglaucoma drugs, mydriatics and cycloplegics, ocular toxicity of systemic, ocular medication.

Elementary Optics: Strums' conoid, donders eye

Diseases of the eye

## **CONJUCTIVA**

### **Must know**

Acute Conjunctivitis, Trachoma, Allergic conjunctivitis, Pinguecula, Pterygium, Xerosis/bitot spots.

### **Desirable to know**

Cheonic conjunctivitis, Dry eye, Membranous conjunctivitis, Inclusion conjunctivitis.

## **CORNEA**

### **Must know**

Corneal inflammations: Corneal Ulcers – bacterial, fungal, viral  
Vitamin A Deficiency and keratomalacia  
Exposure keratitis, Neuroparalytic keratitis  
Corneal blindness, Eye banking, eye donation,  
keratoplasty Arcus senilis

### **Desirable:**

Deep/Interstitial keratitis, Degenerations and dystrophies, Overview of Keratorefractive surgery.

## **SCLERA**

### **Must know:**

Scleritis, episcleritis.

## **UVEAL TRACT**

### **Must know:**

Iridocyclitis, Panophthalmitis, Endophthalmitis

### **Desirable to know:**

Systemic associations of uveitis, Choroiditis, Coloboma iris

## **LENS**

### **Must know:**

Age related cataract and its management, Congenital Cataract, Awareness of amblyopia, Diabetic Cataract, Cataract Surgery

### **Desirable to know:**

Other forms of cataract: complicated cataract, Metabolic, traumatic, toxic, posterior capsular opacification

## **VITREOUS**

### **Must know:**

Vitreous hemorrhage – causes

### **Desirable to know:**

Synchisis syntillans, Asteroid hyalosis

## **GLAUCOMAS**

### **Must know:**

Angle Closure glaucoma, Open angle glaucoma, Steroid glaucoma

### **Desirable to know:**

Secondary glaucomas, Congenital glaucoma

## **RETINA**

### **Must know:**

Fundus changes in Diabetes, Hypertension, Pregnancy induced hypertension, Hematological disorders, Myopia.

: Photocoagulation

: Retinal Vascular diseases – Central retinal occlusion, Central retinal vein occlusion

### **Desirable to know:**

Retinopathy of prematurity, Retinitis pigmentosa, retinoblastoma.

## **OPTIC NERVE**

### **Must know:**

Papilledema, Optic neuritis, Optic atrophy.

## **SQUINT**

### **Must know:**

Awareness of amblyopia, Types of squint (Paralytic, Non paralytic)

## **ORBIT**

### **Must know:**

Common causes of proptosis, Orbital cellulites, Cavernous sinus thrombosis

## **LACRIMAL SYSTEM**

### **Must know:**

Dacryocystitis – Congenital, Acute, Chronic. Dry eye

## **LIDS**

### **Must know:**

Inflammations, ectropion entropion, trichiasis, ptosis, lagophthalmos, symblepharon

## **REFRACTIVE ERRORS**

### **Must know:**

Myopia, hypermetropia, Astigmatism, Presbyopia aphakia/pseudophakia, Anisometropia

## **INJURIES:**

### **Must know:**

Chemical injuries and first aid treatment, Open globe injuries, closed globe injuries.

### **Desirable to know:**

Siderosis bulbi, Chalcosis, medico legal aspects

## **OPHTHALMIC SURGERY**

**Must observe** cataract surgery, enucleation, trabeculectomy, pterygium surgery

### **Desirable to watch:**

Keratoplasty.

## **COMMUNITY OPHTHALMOLOGY**

### **Must Know**

Definition and types of blindness.

: Causes of blindness

: Promotion of eye donation

: NPCB, Vision 2020, Eye camps

## **MISCELLANEOUS**

### **Must Know**

Symptomatic disturbances of vision

Overview of Recent Advances in Ophthalmology

### **Desirable to know:**

Lasers in Ophthalmology.

# **OTO-RHINO- LARYNGOLOGY (E.N.T.)**

## **OTO-RHINO-LARYNGOLOGY (E.N.T.)**

### **Must know:**

1. Anatomy of External, Middle and Inner Ear.
2. Physiology of hearing and equilibrium.
3. Anatomy and Physiology of Nose and Para nasal Sinuses.
4. Anatomy of Oral Cavity Oropharynx.
5. Anatomy of Larynx and Physiology of Phonation.
6. Anatomy of Oesophagus.
7. Anatomy of Neck.

### **EAR DISEASES**

#### **EXTERNAL EAR**

##### **Must know:**

Wax, Perichondritis, Otitis Externa, Furuncle, Otomycosis, Foreign bodies, Otagia

##### **Desirable to know:**

Malignant Otitis externa, Pre auricular Sinus.

#### **MIDDLE EAR**

##### **Must know:**

Acute Otitis media, chronic otitis media – safe and unsafe, Otitis media with effusion complications of CSOM, Facial palsy, Otosclerosis, Myringoplasty, Conductive deafness.

##### **Desirable to know:**

Tympanoplasty

#### **DISEASES OF INNER EAR**

##### **Must know:**

Menieres disease, Sensorineural deafness, Deaf child, Hearing aid, Vertigo, Tinnitus and Ototoxicity.

##### **Desirable to know:**

Rehabilitation of the hearing impaired, Acoustic neuroma. Cochlear implant.

### **NOSE AND PARANASAL SINUSES**

#### **DISEASES OF THE NOSE AND PARANASAL SINUSES:**

##### **Must know:**

Vestibulitis, Deviated nasal septum, Septal hematoma, Septal abscess, Nasal polyposis, Epistaxis, Atrophic Rhinitis, Nasopharyngeal angiofibroma, Acute and Chronic sinusitis, complications of Sinusitis, Foreign bodies in the nose, CSF Rhinorrhoea, Allergic Rhinitis and Rhinosporidiosis.

##### **Desirable to know:**

Fracture nasal bones, maxilla and Wegener's granuloma.

#### **DISEASES OF ORAL CAVITY & OROPHARYNX**

Tonsillitis Acute and Chronic, Quinsy, Leukoplakia, erythroplakia, Malignancy of tongue, tongue tie, Submucous fibrosis. Adenoid, Acute chronic Pharyngitis and Retropharyngeal abscess.

**Desirable to know:**

Malignancy of nasopharynx and Para Pharyngeal abscess.

**DISEASES OF LARYNX AND TRACHEA**

**Must know:**

Stridor, Voice and Speech disorders, foreign bodies in air passages, Malignancy of Larynx, Laryngotracheal trauma, Acute and Chronic inflammations of larynx. Laryngeal paralysis. Puberphonia and Hysterical aphonia.

**Desirable to know:**

Congenital lesions of larynx, voice rehabilitation and Laryngeal stenosis.

**DISEASES OF OESOPHAGUS:**

**Must know:**

Dysphagia, Foreign bodies of food passages.

**Desirable to know:**

Disorders of Oesophagus  
Hiatus hernia & pharyngeal pouch

**SURGERIES IN E N T**

**Must observe:**

Tonsillectomy  
Adenoidectomy  
Tracheostomy  
Antral wash  
Caldwell Luc Surgery  
Anterior Nasal packing  
Direct Laryngoscopy  
Oesophagoscopy  
Miringoplasty  
Mastoid surgery – Cortical & Modified Radical  
F E S S

**COMMUNITY PROGRAMMES:**

1. Prevention of Deafness.
2. Detection of Congenital and Childhood deafness.
3. Hearing Rehabilitation.
4. Prevention & identification of malignancy of Larynx, Tongue.

**X-RAYS**

1. X-Ray Soft tissue neck lateral view.
2. X-Ray PNS water's view.
3. X-Ray mastoids Law's view.
4. X-Ray Nasopharynx Lateral view.

**INSTRUMENTS**

1. Eves tonsillar Snare.
2. Boyle Davis mouth gag.
3. Tracheostomy tubes  
Jackson & Fuller's
4. St. Clarir Thompson's Adenoid curette with / without cage.
5. Tilley lichwitz trochar and cannula.
6. Luc's forceps.

7. Ballenger's Swivel knife.
8. Bronchoscope
9. Oesophagoscope.
10. Laryngoscope.
11. Tracheal dilator
12. Mollisons self retaining mastoid retractor
13. Pillar retractor and dissector

# **MEDICINE**

## CLINICAL SUBJECTS OF PHASE II & PHASE III

The teaching and training in clinical subjects will commence at the beginning of Phase II and continue throughout

The clinical subjects will be taught to prepare the MBBS graduates to understand and manage clinical problems at the level of a practitioner. Exposure to subject matter will be limited to orientation and knowledge required of a general doctor. Maximum attention to the diagnosis and management of the most common and important conditions encountered in general practice should be emphasised in all clinical subject areas. Instructions in clinical subjects should be given both in out patient and in-patient during clinical posting.

Each of the clinical departments shall provide integrated teaching calling on pre-clinical, para-clinical and other clinical departments to join in exposing the students to the full range of disciplines relevant to each clinical area of study. Problem approach will be emphasised based on basic social sciences and a continuation of clinical and laboratory syllabi to optimally understand and manage each clinical condition.

The course shall comprise of:

### **(1) MEDICINE & ITS ALLIED SPECIALITIES;**

#### **(A) MEDICINE:**

##### **Objectives:**

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

1. Elicit clinical history, perform thorough physical examination, elicit physical signs, interpret findings, develop differential diagnoses and request relevant laboratory investigations.
2. Diagnose common clinical disorders with special reference to infectious diseases, nutritional disorders, life style diseases, tropical and environmental diseases.
3. Plan relevant diagnostic and investigative procedures and be able to interpret them.
4. Outline the principles of management and prevention of common health problems affecting the community.
5. Plan and write prescription for comprehensive treatment using the principles of rational drug therapy
6. Provide first level care for common medical conditions and emergencies and recognize the timing and level of referral, if required.
7. Perform essential bedside procedures like venepuncture, SC and IM injections, biological fluid examinations.
8. Assist common bedside procedures like pleural aspiration, bone marrow aspiration and biopsy, lumbar puncture etc.
9. Resuscitate a patient efficiently by providing Basic Life Support in emergencies.
10. Develop an interest in the care for all types of patients.
11. Evaluate each patient as a person in society and not merely a collection of organ systems or symptoms and signs.
12. Discern the hopes and fears of patients, which underlie the symptom complexes and know how to handle these emotions, both in himself / herself and others.
13. Demonstrate skills in documentation of case details including epidemiological data.
14. Respect patients' rights and privileges including patients' right to information and right to seek a second opinion.
15. Demonstrate empathy and humane approach towards patients and their families and respect their sensibilities.
16. Demonstrate communication skills in interviewing patients, providing explanations

to patients and families about the management and prognosis, providing counseling and giving health education messages o patients, families and communities.

17. Have an open attitude to the developments in Medicine so as to be aware of the need to keep abreast of new knowledge.
18. Learn and adopt new ideas and new situations where resources may be limited.
19. Comprehend, accept and manage the uncertainties in scientific knowledge and medical practice.
20. Understand the ethical and legal implications of his/her medical decisions.

### Course content

	<b>Topics</b>	<b>Must know</b>	<b>Desirable to know</b>
1.	<b>Clinical Methods in the Practice of Medicine Clinical approach to patients:</b>		
	The art of medicine, doctor-patient relationship, communication skills, doctor's responsibilities	Yes	
	<b>Clinical approach to disease and care of patients:</b>		
	Clinical diagnostic reasoning i.e. diagnostic possibilities based on interpretation of history, physical findings and laboratory investigations	Yes	
	<b>Principles of rational management:</b>		
	keeping in mind the best evidence in favor of or against different remedial measures (EBM)	Yes	
2	<b>Common Symptoms of Disease</b>		
	Pain: pathophysiology, clinical types, assessment and management	Yes	
	Fever: clinical assessment and management	Yes	
	Cough, chest pain, dyspnoea, hemoptysis	Yes	
	Edema, anasarca, ascites	Yes	
	Pallor, jaundice	Yes	
	Bleeding	Yes	
	Anorexia, nausea and vomiting	Yes	
	Constipation and diarrhea	Yes	
	Hematemesis, malena and hematochezia	Yes	
	Common urinary symptoms- dysuria, pyuria, anuria, oliguria, polyuria, nocturia, enuresis	Yes	
	Body pains and joint pains	Yes	
	Headache, seizures, fainting, syncope, dizziness, vertigo	Yes	
	Disturbances of consciousness and coma	Yes	
	Weight loss and weight gain	Yes	
	Clinical genetics – common types, clinical presentation, investigation and prevention of genetic diseases and genetic counseling	Yes	
	Medial disorders and pregnancy	Yes	
3	<b>Nutrition and Nutritional Disorders</b>		
	Nutritional assessment & needs	Yes	
	Protein energy malnutrition	Yes	
	Obesity	Yes	
	Vitamin deficiency & excess	Yes	
	Mineral deficiency and excess	Yes	
	Diet therapy	Yes	
4	<b>Fluid, Electrolyte and Acid-base Imbalance</b>		
	Fluid and electrolyte balance; acidosis and alkalosis in particular relevance to diarrhea, vomiting, dehydration, uremia and diabetic ketoacidosis	Yes	
5	<b>Poisonings, Stings and Bites</b>		
	General approach to the poisoned patient	Yes	

	Poisoning by specific pharmaceutical agents- organophosphorus compounds, methyl alcohol, narcotics, aluminium phosphide, sedatives / hypnotics, other poisonings common locally	Yes	
	Drugs of misuse	Yes	
	Snake bite and Envenomation	Yes	
	Other bites and stings – scorpion, spider		Yes
6	<b>Specific Environmental and Occupation Hazards</b>		
	Heatstroke and hypothermia	Yes	
	Chemicals and pesticides	Yes	
	Drowning and near drowning	Yes	
	Electrical injuries	Yes	
	Radiation injury	Yes	
	Heavy metal poisoning	Yes	
7	<b>Immune Response and Infections</b>	Yes	
	Approach to infectious diseases – diagnostic and therapeutic principles	Yes	
	Immune defense mechanisms	Yes	
	Laboratory diagnosis of infections	Yes	
	Principles of immunization and vaccine use	Yes	
	Immunodeficiency disorders – acquired	Yes	
	Immunodeficiency disorders – congenital		Yes
	Clinical syndromes – diagnostic and therapeutic approach <ul style="list-style-type: none"> <li>• The febrile patient</li> <li>• Fever and rash</li> <li>• Fever of unknown origin</li> <li>• Infective endocarditis</li> <li>• Intra-abdominal infections and abscesses</li> <li>• Acute infectious diarrhoeal diseases and food poisoning</li> <li>• Sexually transmitted diseases – overview &amp; clinical approach</li> <li>• Infections of skin, muscle &amp; soft tissues</li> <li>• Osteomyelitis</li> <li>• Hospital acquired infections</li> <li>• Infections in immuno-compromised hosts</li> </ul>	Yes	
8	<b>Specific Infections – Epidemiology, clinical features, laboratory diagnosis, rational use of antimicrobial therapy against the following and their prevention:</b>		
	<b>Protozoal infections</b>		
	Amoebiasis, Giardiasis, Malaria, Leishmaniasis Trichomoniasis	Yes	
	Toxoplasmosis, Trypanosomiasis	Yes	
	<b>Bacterial infections :</b>		
	Common gram positive infections	Yes	
	Common gram-negative infections	Yes	
	Enteric fevers	Yes	
	Tetanus	Yes	
	Pertussis and diphtheria		Yes
	Legionella infections		Yes
	Botulism		Yes
	Gas gangrene, other clostridia infections		Yes
	Cholera	Yes	
	Shigellosis and bacillary dysentery		Yes
	Brucellosis		Yes
	Plague		Yes
	Leptospirosis	Yes	
	Donovanosis (Granuloma inguinale)		Yes
	Helicobacter Pylori		Yes
	Infections due to pseudomonas & other gram- negative bacteria	Yes	

	Anaerobic infections	Yes	
	<b>Mycobacterial diseases</b>		
	Tuberculosis	Yes	
	Leprosy	Yes	
	<b>Viral infections</b>		
	Common exanthemata e.g. Measles, mumps, rubella, varicella	Yes	
	Herpes simplex and herpes zoster	Yes	
	Influenza and other common viral respiratory infections	Yes	
	Human immunodeficiency virus (HIV)	Yes	
	Viral gastroenteritis	Yes	
	Dengue fever	Yes	
	Rabies	Yes	
	Viral encephalitis		Yes
	Infectious mononucleosis		Yes
	Rickettsia, Mycoplasma & Chlamydial diseases		Yes
	Infections in immunocompromised host	Yes	
	<b>Common fungal infections</b> e.g. Candidiasis, Aspergillosis, Histoplasmosis, Cryptococcosis, Mucormycosis, Pneumocystis carinii.	Yes	
	Common worm infestations e.g. hookworm, roundworm, thread worm	Yes	
9	<b>Cardiovascular system</b>		
	Clinical examination of the cardiovascular system	Yes	
	Functional anatomy, physiology and investigations	Yes	
	<b>Major manifestations of cardiovascular disease</b> Chest pain, breathlessness, palpitation, Acute circulatory failure (cardiogenic shock) Presyncope and syncope, Cardiac arrest and sudden cardiac death, Abnormal heart sounds and murmurs.	Yes	
	ECG, x ray chest with reference to common CVS diseases	Yes	
	Acute and chronic congestive cardiac failure	Yes	
	Rheumatic fever and rheumatic heart disease	Yes	
	Valvular heart disease		
	Infective endocarditis	Yes	
	Coronary artery disease	Yes	
	Common congenital heart disease in the adults: ASD, VSD, PDA, TOF and coarctation of aorta	Yes	
	Cor pulmonale	Yes	
	Hypertension and hypertensive heart disease	Yes	
	Common cardiac arrhythmias	Yes	
	Deep vein thrombosis	Yes	
	Atherosclerosis and peripheral vascular disease		Yes
	Pericardial disease: pericardial effusion and cardiac tamponade	Yes	
	Aortic aneurysm		Yes
	Myocarditis and cardiomyopathy		Yes
10	<b>Respiratory system</b>		
	Clinical examination of the respiratory system	Yes	
	Respiratory physiology and diagnostic investigations – x ray chest, sputum examination, pulmonary function tests	Yes	
	Bronchoscopy		Yes
	<b>Major manifestations of lung disease</b>		
	Cough, dyspnoea, chest pain, haemoptysis, the solitary radiographic pulmonary lesion, Acute and chronic respiratory failure	Yes	
	Upper respiratory infections	Yes	
	Pneumonias	Yes	
	Bronchial asthma	Yes	
	Chronic obstructive pulmonary disease	Yes	
	Pulmonary tuberculosis: different presentations	Yes	

	Suppurative lung diseases: bronchiectasis, lung abscess	Yes	
	Pleural diseases – effusion, empyema, pneumothorax	Yes	
	Interstitial and infiltrative lung diseases	Yes	
	Common occupational lung diseases	Yes	
	Tumors of the bronchus and lung	Yes	
	Pulmonary vascular diseases <ul style="list-style-type: none"> <li>• Pulmonary hypertension</li> <li>• Pulmonary thromboembolism</li> </ul>	Yes	
	Acute respiratory distress syndrome	Yes	
	Obstructive sleep apnoea		Yes
	Diseases of the nasopharynx, larynx and trachea		Yes
	Diseases of the mediastinum, diaphragm and chest wall		Yes
11	<b>Renal and genito-urinary system</b>		
	Renal physiology and common renal function tests: urine examination, renal function tests, common imaging methods	Yes	
	Major manifestations of renal and urinary tract disease : Dysuria, pyuria, urethral symptoms, disorders of urine volume, hematuria, proteinuria, oedema, incontinence, obstruction of the urinary tract.	Yes	
	Acute renal failure	Yes	
	Chronic renal failure	Yes	
	Urinary tract infections and pyelonephritis	Yes	
	Congenital abnormalities of the kidneys and urinary system		Yes
	Glomerulonephritides and nephrotic syndrome	Yes	
	Tubulo-interstitial diseases		Yes
	Renal involvement in systemic disorders	Yes	
	Drugs and the kidney	Yes	
	Renal vascular diseases		Yes
	Urinary tract calculi and nephrocalcinosis	Yes	
	Tumors of the kidney and genitourinary tract		Yes
	<b>Renal replacement therapy: basics</b>		Yes
12	<b>Gastrointestinal tract</b>		
	Clinical examination of the abdomen	Yes	
	Basic investigations: stool examination, role of imaging, endoscopy and tests of functions.	Yes	
	<b>Major manifestations of gastrointestinal disease</b> Abdominal pain (acute and chronic), dysphagia, dyspepsia, vomiting, constipation, diarrhea, abdominal lump, weight loss, gastrointestinal bleeding-upper and lower, approach to the patient with gastrointestinal disease	Yes	
	Diseases of the mouth and salivary glands – oral ulcers, candidiasis, Parotitis.	Yes	
	Diseases of the oesophagus – GERD, other motility disorders, oesophagitis, carcinoma oesophagus.	Yes	
	Diseases of the stomach and duodenum-gastritis, peptic ulcer disease, tumors of stomach.	Yes	
	<b>Disease of the small intestine</b> Acute gastroenteritis & food poisoning , acute, sub-acute and chronic intestinal obstruction, intestinal tuberculosis	Yes	
	Inflammatory bowel disease Malabsorption syndrome Tumors of small intestine	Yes	Yes
	<b>Disorders of the colon and rectum</b> Bacillary dysentery, amoebic colitis ,ulcerative colitis Tumors of the colon & rectumIrritable bowel disease	Yes	
	Abdominal tuberculosis :peritoneal,nodal, gastrointestinal	Yes	
	Ischaemic gut injury		Yes
	Anorectal disorders	Yes	
	Diseases of the peritoneal cavity :acute and chronic peritonitis,	Yes	

	ascites		
13	<b>Disease of pancreas</b>		
	Acute and chronic pancreatitis	Yes	
	Tumors of pancreas		Yes
14	<b>Hepatobiliary tract disease</b>		
	Clinical examination of the abdomen for liver and biliary disease	Yes	
	Functional anatomy, physiology , liver function tests, basics of role of imaging of the hepatobiliary disease	Yes	
	<b>Major manifestations of liver disease</b> <ul style="list-style-type: none"> <li>• 'Asymptomatic' abnormal liver function tests</li> <li>• Jaundice</li> <li>• Acute (fulminant) hepatic failure</li> <li>• Portal hypertension and ascites</li> <li>• Hepatic (porto-systemic encephalopathy)</li> </ul>	Yes	
	<b>Hepatorenal failure</b>		Yes
	Liver abscess- amoebic & pyogenic	Yes	
	Acute and chronic hepatitis –viral and toxic	Yes	
	Alcoholic liver disease	Yes	
	Cirrhosis of liver and chronic liver disease	Yes	
	Fatty liver and non alcoholic steatohepatitis		Yes
	Infiltrative diseases of liver		Yes
	Acute and chronic 'cholecystitis', cholelithiasis	Yes	
	Tumors of gall bladder and bile ducts		Yes
15	<b>Endocrine and Metabolic disorders</b>		
	Diabetes mellitus: aetiopathogenesis, diagnosis, management, recognition of acute and chronic complications, and immediate management of acute complications, special problems in management.	Yes	
	Hypo and hyperthyroidism – major manifestations, recognition, interpretation of thyroid function tests	Yes	
	Iodine deficiency disorders	Yes	
	Cushing's syndrome and Addison's disease - recognition	Yes	
	Pituitary disorders: Acromegaly and Sheehan's syndromes		Yes
	Calcium and phosphorus metabolism: parathyroid and metabolic bone Disease.	Yes	
	Hypogonadism		Yes
	Hypopituitarism and hyperpituitarism		Yes
	Hypothalamic disorders		Yes
	Hypoparathyroidism and hyperparathyroidism		Yes
16	<b>Hematological disorders</b>		
	Definition, prevalence, etiological factor, pathophysiology, pathology, recognition, investigations and principles of treatment of: <ul style="list-style-type: none"> <li>• Anemias: iron deficiency, megaloblastic and common haemolytic anemias (thalassemia, sickle cell and acquired hemolytic)</li> <li>• Common bleeding disorders (thombocytopenia and hemophilia)</li> <li>• Agranulocytosis and aplastic anemia</li> </ul>	Yes	
	<b>Leukemias:</b> Recognition, diagnosis, differential diagnosis and broad principles of management	Yes	
	<b>Lymphomas:</b> Recognition , diagnosis , differential diagnosis and broad principles of management	Yes	
	<b>Blood group and transfusion:</b> Major blood group systems and histo compatibility complex, concepts of transfusion and component therapy; indications for transfusion therapy, precautions to be taken during blood transfusion, hazards of	Yes	

	transfusion and safe handling of blood and blood products.		
	Disorders of coagulation and venous thrombosis	Yes	
	Bone marrow transplantation		Yes
17	<b>Disorders of the Immune System, Connective Tissue and Joints</b>		
	Introduction to the immune system and autoimmunity	Yes	
	Primary immune deficiency diseases		Yes
	HIV, AIDS and related disorders	Yes	
	Recognition of major manifestations of musculoskeletal disease: Joint pain, bone pain, muscle pain and weakness, regional periarticular pain, back and neck pain.	Yes	
	Approach to articular and musculoskeletal disorders	Yes	
	Inflammatory joint disease	Yes	
	Infectious arthritis	Yes	
	Inflammatory muscle disease		Yes
	Osteoarthritis	Yes	
	Systemic connective tissue diseases – systemic lupus erythematosus, rheumatoid arthritis, progressive systemic sclerosis	Yes	
	Vasculitides		Yes
	Ankylosing spondylitis, reactive arthritis and undifferentiated spondyloarthropathy		Yes
	Sarcoidosis	Yes	
	Amyloidosis	Yes	
	Musculoskeletal manifestations of disease in other systems	Yes	
	Diseases of bone		Yes
18	<b>Neurological Diseases</b>		
	Clinical examination of nervous system	Yes	
	Functional anatomy, physiology and investigations : EEG, basics of brain and spinal cord imaging	Yes	
	Major manifestations of nervous system disease: Headache and facial pain, raised intracranial tension, faintness, dizziness, syncope & vertigo, sleep disorders, disorders of movement, ataxia, sensory disturbances (numbness, tingling and sensory loss), acute confusional states coma and brain death, aphasia and other focal cerebral disorders, speech, swallowing and brain-stem disturbance, visual disturbances, sphincter disturbances.	Yes	
	Migraine and cluster headaches	Yes	
	Seizures and epilepsy	Yes	
	Cerebrovascular disease	Yes	
	Dementias including Alzheimer's disease	Yes	
	Acute and chronic meningitis	Yes	
	Viral encephalitis		Yes
	Diseases of cranial nerves		Yes
	Intracranial tumours		Yes
	Diseases of spinal cord – transverse myelitis and cord compression	Yes	
	Multiple sclerosis and other demyelinating diseases		Yes
	Parkinson's disease and other extrapyramidal disorders		Yes
	Cerebellar disorders	Yes	
	Motor neuron disease		Yes
	Peripheral neuropathy	Yes	
	Neurological manifestations of system diseases	Yes	
	Nutritional and metabolic diseases of the nervous system	Yes	
	Myasthenia gravis and other diseases of neuromuscular junction		Yes
	Diseases of muscle		Yes
	Recognition of brain death	Yes	
19	<b>Clinical Pharmacology and Therapeutics</b>		

	Principles of drug therapy	Yes	
	Adverse drug reactions	Yes	
	Drug interactions	Yes	
	Monitoring drug therapy	Yes	
	Rational prescription writing	Yes	
	Concept of essential drugs	Yes	
20	<b>Critical Care Medicine</b>		
	Physiology of the critically ill patient	Yes	
	Recognition of major manifestations of critical illness: circulatory failure: shock, respiratory failure, renal failure, coma, sepsis, disseminated intravascular coagulation.	Yes	
	General principles of critical care management	Yes	
	Scoring systems of critical care		Yes
	Outcome and costs of intensive care		Yes
	Ethical issues related to critical care	Yes	
21	<b>Pain Management and Palliative Care</b>		
	General principles of pain	Yes	
	Assessment and treatment of pain	Yes	
	Palliative care		Yes
22	<b>Geriatrics</b>		
	Principles of Geriatric Medicine	Yes	
	Normal ageing	Yes	
	Clinical assessment of frail elderly	Yes	
	Decisions about investigations and rehabilitation	Yes	
	Major manifestations of diseases in elderly	Yes	
	Special issues for care of elderly	Yes	
23	<b>Medical Ethics</b>		
	Principles of medical ethics- Beneficence, non –maleficence, patient autonomy, equity Different concepts- health ethics, bioethics, public health ethics	Yes	
	Brief introduction to perspectives of medical ethics: Hippocratic Oath, declaration of Helsinki, WHO declaration of Geneva, International code of Medical Ethics (1983), Medical Council of India Code of Ethics.	Yes	
	Ethics of the individual: Confidentiality, physician patient relationship, Patient autonomy, organ donation	Yes	
	Death and dying, and Euthanasia	Yes	
	Ethics of human life: In vitro fertilization, prenatal sex-determination, surrogate motherhood, genetic engineering	Yes	
	Professional ethics: Code of conduct, fee charging and splitting, allocation of resources in health care	Yes	
	Family and society in medical ethics: Family planning , Care of terminally ill/dying patient	Yes	
	Ethical work up of cases: Gathering information, gain confidentiality, shared decision making, informed consent	Yes	
	Research ethics: animal and experimental research, human experimentation, informed consent, drug trials	Yes	
	Practice of universal precautions	Yes	
	Bio medical waste: types, potential risks and their safe management.	Yes	
	PEP Prophylaxis	Yes	
	Hand washing	Yes	
23	<b>Medical Psychiatry</b>	Yes	
	Classification of psychiatric disorders	Yes	
	Aetiological factors in psychiatric disorders	Yes	
	The clinical interview and mental state examination	Yes	
	Major manifestations of psychiatric illness	Yes	
	• Disturbed and aggressive behavior	Yes	

	• Delusions and hallucinations	Yes	
	• Depressive Symptoms	Yes	
	• Anxiety symptoms	Yes	
	• Deliberate self-harm and suicidal ideation	Yes	
	• Alcohol misuse and withdrawal	Yes	
	• Misuse of drugs other than alcohol		Yes
	• Medically unexplained physically symptoms and functional somatic syndromes	Yes	
	• Psychiatric and psychological aspects of chronic and progressive disease	Yes	
	<b>Clinical syndromes</b>		
	• Organic brain syndromes	Yes	
	• Substance abuse-Alcohol-Drugs	Yes	
	• Bipolar disorders	Yes	
	• Depressive disorders	Yes	
	• Schizophrenia	Yes	
	<b>Treatments used in psychiatry</b>		
	• Psychological treatments	Yes	
	• Physical treatments	Yes	
	<b>Neurotic, stress-related and somatoform disorders</b>		
	• Anxiety	Yes	
	• Obsessive compulsive disorders	Yes	
	• Dissociative disorders	Yes	
	Sleep disorders	Yes	
	Legal aspects of psychiatry	Yes	

### Teaching and Learning methods

Lectures, Small group discussions, Seminars, Algorithms, Problem Based Learning, Videography, Integrated teachings and e-modules.

### Skills

Skill labs, Role play, Problem based - paper and real cases, Integrated teaching and Field visits.

## FUNDAMENTALS OF INTERNAL MEDICINE (CARDINAL SYMPTOMS)

### Lectures

1. Introduction to the practice of Medicine (Art of medicine, Doctor-Patient relationship, Responsibilities of a doctor and Evidence Based Medicine)
2. Medical ethics – Code of conduct, Acts of omission and commission, Informed Consent, patient autonomy and confidentiality
3. Alterations in temperature
4. Pain – Pathophysiology, clinical types, assessment and management
5. Chest pain, dyspnea and palpitations
6. Alterations in pulse and blood pressure
7. Cough, hemoptysis and cyanosis
8. Anorexia, nausea, vomiting, abdominal pain and dysphagia
9. Diarrhoea, constipation and GI bleeding
10. Jaundice and hepatomegaly
11. Ascites, edema and anasarca
12. Pallor, clubbing and bleeding
13. Splenomegaly and lymphadenopathy
14. Urinary tract symptoms (Oliguria, anuria, dysuria, pyuria, hematuria, polyuria, nocturia, chyluria and enuresis)
15. Weight loss and weight gain
16. Headache, vertigo and dizziness
17. Seizures, syncope and involuntary movements

18. Motor (including gait) disorders and sensory disturbances, speech disorders.
19. Disturbances of consciousness, brain death and organ donation
20. Arthralgias, arthritis and myalgias
21. Genetics – Basic (modes of inheritance, pedigree, clinical application and counselling)
22. Nutritional assessment and needs
23. Physiology of the critically ill patient and general principles of critical care management.
24. CPR, Sudden Cardiac Death
25. Test

### **Symposia / Modules**

1. Communication skills
2. Ethics
3. Nutrition – Requirement, assessment, mineral deficiency and overdose, prevention and supplementation, diet in disease

## **INFECTIOUS DISEASES AND ENVIRONMENTAL MEDICINE**

### **Lectures**

1. Approach to infectious disease – diagnostic and therapeutic principles; Immune defence mechanisms.
2. Enteric fever and *Salmonella* infections.
3. Clostridial infections – Tetanus, gas gangrene and botulism.
4. Cholera, *Shigella* and other bacterial diarrhoeas (Traveller's diarrhoea), Food poisoning
5. Brucellosis, plague and Anthrax.
6. Malaria
7. Filariasis and Leishmaniasis
8. Amoebiasis and Giardiasis
9. Hydatid disease and Toxoplasmosis
10. Worm infestations (Hookworm, roundworm, tapeworm, pinworm, *Strongyloidiasis*)
11. Hemorrhagic fevers (Dengue, leptospirosis and rickettsial)
12. Chikungunya, Avian influenza and SARS
13. Rabies and other encephalitides (JE, HSV)
14. Exanthematous fevers (Measles, mumps, rubella, varicella and Herpes simplex)
15. Bacteremia, sepsis, SIRS, septic shock.
16. Common fungal infections (*Candidia*, *Aspergillus*, *Mucor* and *Cryptococcus*)
17. HIV – Definitions, Transmission, Epidemiology, Clinical Manifestations, Diagnosis, Management
18. HIV and Opportunistic infections
19. Nosocomial infections
20. Stings and bites (Snake bite, scorpion stings and others)
21. Poisoning – General Principles; OP poisoning, carbamate poisoning, Organochlorine poisoning
22. Plant poisons (Yellow oleander, abrus, *Cleistanthus collinus* and datura)
23. Heat related disorders
24. Drowning and electrical injuries
25. Test

### **Symposia / Modules**

1. Fever with rash
2. FUO
3. Rodenticide, aluminum phosphide, CuSO<sub>4</sub>, drug overdose, methyl alcohol and others (2 symposia)
4. Diarrhoea and dysentery
5. HIV infection (Symposium)

## **DISEASES OF THE GASTROINTESTINAL TRACT AND LIVER DISEASES**

### **Lectures**

1. Introduction to basic investigations of the gastrointestinal tract.
2. Diseases of oral cavity and esophagus (GERD, Barrett's esophagus and Achalasia cardia)
3. Acid peptic disease (*H. pylori*) and non-ulcer dyspepsia
4. Approach to chronic diarrhoea (IBS, IBD and malabsorption)
5. Abdominal tuberculosis - peritoneal, nodal and gastrointestinal
6. Pancreatic function tests, acute and chronic pancreatitis, cystic fibrosis
7. Acute viral hepatitis
8. Chronic hepatitis (viral, autoimmune and granulomatous)
9. Cirrhosis, its complications and treatment
10. Portal hypertension – Causes, classification, complications and management
11. Metabolic liver diseases (Wilson's, hemochromatosis, toxin- and drug- induced)
12. Alcohol related liver disorders and NASH.
13. Parenteral and enteral nutrition, diet therapy.
14. Test

### **Symposia / Modules**

1. Ascites
2. Jaundice
3. Chronic diarrhea

## **NEPHROLOGY**

### **Lectures**

1. Renal physiology and common renal function tests.
2. Urinary tract infections – etiopathogenesis, types, clinical features, diagnosis and treatment.
3. Glomerular disorders – Overview; Acute nephritis: Etiology, types, pathology, Clinical features, diagnosis, treatment and complications.
4. Nephrotic syndrome – Causes, clinical features, diagnosis, complications and treatment.
5. Renal failure – Types, clinical identification, laboratory findings. (Overview)
6. Acute renal failure (ARF) – Etiopathogenesis, clinical features, treatment.
7. Chronic renal failure (CRF) – Etiopathogenesis, clinical features and complications
8. Management of chronic renal failure and its complications.
9. Test

### **Symposia / Modules**

1. Glomerulopathies, tubular disorders.
2. Drugs and the kidney.

## **HEMATOLOGY**

### **Lectures**

1. Approach to anemia, its classification and investigation.
2. Iron deficiency anemia, sideroblastic anemia and anemia of chronic diseases.
3. Megaloblastic anemia and myelodysplastic syndrome.
4. Aplastic anemia, agranulocytosis and stem cell transplantation.
5. Hemolytic anemia.
6. Acute leukemias.
7. Chronic leukemias.
8. Lymphomas.
9. Multiple myeloma, polycythemia rubra vera and myelofibrosis.
10. Approach to bleeding disorders.
11. Platelet disorders.
12. Clotting factor abnormalities.
13. Disseminated Intravascular Coagulation (DIC), thrombotic disorders and vessel wall abnormalities.
14. Blood component therapy and its hazards.
15. Stem cell transplantation.
16. Test.

## **Symposia**

1. Anemia.
2. Bleeding disorders.

## **ENDOCRINOLOGY**

### **Lectures**

1. Introduction to Endocrinology and the HPA axis.
2. Diseases of the pituitary gland – Hypopituitarism, short stature, hyperprolactinemia.
3. Diseases of the pituitary gland –Acromegaly, SIADH, Diabetes insipidus
4. Thyroid disorders – Thyroid hormone; synthesis, metabolism and action. Hypothyroidism – Causes, clinical features, diagnosis and treatment (including emergencies), Hashimoto's thyroiditis.
5. Thyroid disorders - Hyperthyroidism – Causes, clinical features, diagnosis and treatment (including emergencies), Simple Goiter, nodular goiter
6. Disorders of the parathyroid glands (hypo- and hyper- parathyroidism; Ca and PO4 metabolism)
7. Diabetes mellitus – Etiopathogenesis, classification, clinical manifestations and diagnosis.
8. Diabetes mellitus - Management
9. Diabetes mellitus – Acute and chronic complications including coma in diabetic patients
10. Disorders of the adrenal glands – Cushing's syndrome, Addison's disease
11. Disorders of the adrenal glands – Conn's syndrome , pheochromocytoma.
12. Sexual dysfunction – Hypogonadism (hypogonadotrophic, hypergonadotrophic), impotence
13. Dyslipidemia
14. Test

### **Symposia / Modules**

1. Interpretation of thyroid and adrenal function tests.
2. Diabetic emergencies / endocrine emergencies.

## **IMMUNOLOGY, GENETICS AND GERIATRICS**

### **IMMUNOLOGY**

#### **Lectures**

1. Overview of the immune system; Primary immune deficiency disorders.
2. Major Histocompatibility Complex and disease associations.
3. Hypersensitivity reactions.
4. Classification of autoimmune rheumatological disorders; Rheumatoid arthritis.
5. Systemic autoimmune diseases: Systemic lupus erythematosus, progressive Systemic sclerosis, Sjogren's syndrome, mixed connective tissue disease and Overlap syndromes.
6. Seronegative spondyloarthritides and crystal arthritides.
7. Vasculitis – Classification, clinical features, diagnosis and treatment.
8. Metabolic bone disease – Osteomalacia, osteoporosis, Paget's disease.
9. Miscellaneous disorders – sarcoidosis, polymyositis, dermatomyositis and amyloidosis.

### **GENETICS**

#### **Lectures**

1. Introduction to genetics: Basics, gene mutations and chromosomal disorders.
2. Common genetic disorders: Patterns of inheritance, pedigree charting, clinical applications of genetics and gene therapy.

### **GERIATRICS**

## Lectures

1. Biology of aging, age-related changes and their consequences, principles of Geriatric medicine, clinical assessment of the elderly and the frail elderly.
2. Common geriatric problems – Falls, incontinence, insomnia, depression, constipation, delirium, memory impairment: Special issues in care of the elderly.

## **NEUROLOGY**

### Lectures

1. Functional anatomy (anatomy of long tracts and lobar functions), laboratory investigations.
2. Acute bacterial meningitis and viral / aseptic meningitis, cerebral abscess.
3. Chronic meningitis – overview, TB meningitis, cryptococcal meningitis.
4. Cerebrovascular accidents.
5. Seizure disorders
6. Extrapyrmidal system disorders – Parkinsonism and other disorders.
7. Dementia – overview, Alzheimers's, HIV dementia and alcohol related dementia.
8. Coma – approach, elevated intracranial pressure; hypoxic ischemic encephalopathy, metabolic encephalopathy and Wernicke's encephalopathy.
9. Motor neuron disease and ataxic disorders (Friedrich's and others).
10. Demyelinating disorders – Multiple sclerosis and Acute demyelinating encephalomyelitis (ADEM).
11. Movement disorders, Bell's palsy, Trigeminal neuralgia, other cranial neuropathies.
12. Peripheral nerve disorders – Introduction, classification, approach.
13. Guillain Barre Syndrome, Diabetic neuropathy, Chronic Inflammatory Demyelinating Polyneuropathy (CIDP), HIV neuropathy, Alcoholic neuropathy.
14. Diseases of the spinal cord – compressive and non-compressive myelopathy, HIV myelopathy, transverse myelitis and subacute combined degeneration (SACD)
15. Muscle disorders – Overview. Myasthenia gravis
16. Primary and metastatic tumours of the Central Nervous System, pseudotumour cerebri.
17. Test

### **Symposium**

1. COMA
2. Neurological emergencies – (Status epilepticus, others)
- 3.

## **CARDIOLOGY**

### Lectures

1. Rheumatic fever – etiopathogenesis, clinical features, diagnosis and treatment.
2. Valvular diseases of the heart – clinical detection, complications and their Management (MS, MR, AS, AR).
3. Congenital heart disease – ASD, VSD, PDA, TOF, CoA: clinical detection, investigations and treatment.
4. Infective endocarditis – etiopathogenesis, clinical features, diagnosis and treatment.
5. Systemic hypertension – Classification; Essential hypertension Clinical presentations, JNC Classification, investigations, complications and treatment.
6. Systemic hypertension – Secondary: Causes, diagnosis, investigations and treatment.
7. Coronary artery disease – Risk factors, angina pectoris (types, diagnosis and treatment).
8. Coronary artery disease – Acute myocardial infarction.
9. Myocardial disease – Myocarditis and cardiomyopathies.

10. Heart failure – etiopathogenesis, types, clinical features and criteria for diagnosis.
11. Heart failure – investigations and treatment.
12. Pericardial diseases – Acute pericarditis, constrictive pericarditis, pericardial effusion.
13. Vascular diseases – Aortoarteritis, atherosclerosis, peripheral vascular Disease, Aortic Aneurysm and aortic dissection.
14. Arrhythmias – Atrial fibrillation (AF), Ventricular tachycardia (VT), Ventricular Fibrillation (VF), Supra ventricular tachycardia (SVT) and conduction defects.
15. Primary pulmonary hypertension – etiopathogenesis, clinical features, diagnosis and treatment. Cor pulmonale.
16. Test

Note: Lectures 3; (5 and 6); (10 and 11); and 14 are over a 1.5 hour duration.

### **Symposia / Modules**

1. Heart failure.
2. Hypertension.

## **RESPIRATORY SYSTEM**

### **Lectures**

1. Pneumonia – Typical, atypical, Ventilator Associated and Hospital Aquired.
2. Bronchial asthma and Tropical Pulmonary Eosinophilia
3. Chronic obstructive pulmonary disease (Chronic bronchitis and emphysema)
4. Suppurative lung disease (Bronchiectasis, lung abscess and empyema)
5. Pulmonary tuberculosis – Introduction and epidemiology
6. Pulmonary tuberculosis – Primary and post-primary
7. Pulmonary tuberculosis – Diagnosis and treatment (RNTCP/DOTS) – Lecture 1
8. Pulmonary tuberculosis – Diagnosis and treatment (RNTCP/DOTS) – Lecture 2
9. ExtraPulmonary tuberculosis
10. Interstitial lung disease and Occupational lung diseases (Pneumoconioses)
11. Pleural diseases – Pleural effusion and pneumothorax
12. Lung neoplasms and Sleep Apnea
13. Test

### **Symposia / Modules**

- a) Pulmonary Function Tests, sputum examination and chest radiograph interpretation
- b) Laboratory investigations in respiratory disease
- c) Respiratory emergencies – Acute respiratory failure, chronic respiratory failure, status asthmaticus.

# DERMATOLOGY

## DERMATOLOGY

### Objectives

At the end of the course, the learners shall be able to:

1. Demonstrate good knowledge of common skin diseases, clinical manifestations, bedside investigations with special emphasis on clinical diagnosis.
2. Demonstrate comprehensive knowledge of various modes of topical therapy.
3. Describe the mode of action of commonly used dermatological drugs, their doses, side effects toxicity, indications and contraindications and interactions

### Knowledge

Subject	Must Know	Desirable to know
<b>Skin Infections:</b>		
a) bacterial - including Leprosy and STD	Yes	
b) Viral - including Retroviral diseases	Yes	
c) Fungal	Yes	
<b>Infestations</b>		
a) Scabies	Yes	
b) Pediculosis	Yes	
<b>Nutritional Disorders</b>		
a) Pellagra	Yes	
b) Riboflavin deficiency	Yes	
c) Vitamin A deficiency	Yes	
<b>Allergies :</b>		
a) Drug induced – such as acute urticaria, angioedema, drug rash. FDE, Erythema Multiforme, Maculopapular rash, SJ Syndrome	Yes	
b) Environmental – contact dermatitis	Yes	
c) Constitutional – atopic dermatitis, eczema and seborrhoeic dermatitis	Yes	
<b>Dermatological Emergencies: (Diagnosis and Referrals)</b>		
-Toxic Epidermal Necrolysis	Yes	
- Pemphigus vulgaris and its variants		Yes
- Erythroderma		Yes
-Staphylococcal Scalded Skin Syndrome		Yes
Other common skin diseases – Acne Vulgaris, Lichen Planus, psoriasis, Vitiligo, Melasma, Herpes Zoster.	Yes	

### Examination Skills

Skills	Perform independently	Perform under Supervision	Assist the expert	Observe
Good and complete skin examination including hairs and nails	Yes			
Good and complete examination of the genitalia, and oral mucosa	Yes			
<b>Leprosy</b>				
1) Must be able to demonstrate anaesthesia in patches and extremities	Yes			
2) Demonstration thickened nerves	Yes			
3) Classify and manage Hansen's disease and differentially diagnose a hypopigmented patch.	Yes			
4) Clinically identify Type I and Type II Reactions in Leprosy and manage acute reactions	Yes			
5) Prevent deformities in Leprosy, through	Yes			

counseling etc				
6) Care of deformities in limbs and ulcer care	Yes			
<b>STD syndromes</b>				
1) Syndromic management	Yes			
2) HIV counseling	Yes			
3) Contact tracing	Yes			
4) Treatment of contacts	Yes			
Skills for various compresses.	Yes			
Incision and drainage.		Yes		
Molluscum contagiosum and Warts removal techniques		Yes		
Management of allergies		Yes		
Management of Dermatological Emergencies.			Yes	
Perform Bedside diagnostic tests: Tzanck smear Tissue Smear Gram staining		Yes		
Slit smear for AFB			Yes	
Dark Ground Microscopy				Yes
Skin Biopsies				Yes
<b>LASERs Handling</b>				Yes
PUVA Therapy including Narrow Band UVB therapy				Yes
Chemical peels				Yes
Patch Testing				Yes
Minor Dermatological surgical procedures				Yes

#### **Assessment**

Formative at the end of capsule course and clinical postings

Summative at the end of the Course

#### **Tools:**

##### **Theory**

Problem solving MCQs,  
Structured Long questions  
Problem solving long questions  
Short answer questions  
Practical  
Short cases  
OSCE

#### **Summative examination to be included along with Medicine**

#### **Teaching learning methods:**

Structured interactive sessions

Small group discussions

Self-learning tools like

1. Assignments
2. Problem based learning
3. Written case scenarios
4. Simulated patient management problems
5. Tutorials, workshops
6. One to one teaching in ward

#### **Learning resource materials**

Textbooks, Internet, CDs, Videos, Skill laboratories etc.

#### **Recommended Text Books**

Review of Dermatology by Vijay K Garg, A M Kochhar, K Sardana  
Roxburg's Common Skin Diseases

# **PSYCHIATRY AND BEHAVIOURAL SCIENCES**

## PSYCHIATRY AND BEHAVIOURAL SCIENCES

### BEHAVIOURAL SCIENCES

#### Learning Objectives

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

1. Understand the nature and development of different aspects of normal human behaviour like learning, memory, motivation, emotion, personality and intelligence.
7. Recognise differences between normal and abnormal behaviour
8. Understand how psychological and social factors influence human behaviour throughout his life cycle, and how they affect his response to health and illness.
9. Conduct psychosocial evaluation of the patient in respect to attributes like socio-economic status; attitude to health and disease and health services.
10. Establish harmonious doctor-patient relationship.
11. Communicate effectively with patient, his family and community.
12. Possess and utilise the knowledge and skills of behavioural sciences / techniques for adoption of health practices.
13. To sensitise the medical student regarding human behaviour normal and abnormal and have the ability to observe and understand the same, a process which is continuous and life long in his profession.

### COURSE CONTENT

	<b>Topics</b>	<b>Must know</b>	<b>Desirable to know</b>
1	Introduction to types of behavioural sciences: sociology, psychology, anthropology relevant to health and disease.	Yes	
2	Family studies : role of family in health and disease	Yes	
3	Illness and health: Mores about health and illness.	Yes	
4	Socio-economic status: Relationship of socio-economic status with health and mental illness.	Yes	
5	Communication skills: interview techniques, methods of communication with patients and their relatives, role of communication in interpersonal relationship.	Yes	
6	Methods of social work: social case work	Yes	
7	Introduction to psychology – Basis of human behaviour, application of psychology to medicine.	Yes	
8	Human development: Infancy to adolescence: Stages of development and individual differences.	Yes	
9	Human development: adulthood to old age – development tasks of adulthood and old age; adjustment problems of old age.	Yes	
10	Personality development : types of personality and pre-morbid personality and its relationship with illness and behaviour	Yes	
11	Death and dying: Reactions of terminally ill patient and family; breaking news of fatal illness /death to the family.	Yes	
12	Learning and conditioning: Nature of learning; performance role of motivation in learning and methods to make learning effective.	Yes	
13	Cognitive process: Sensory process- attention, perception, sensation and thinking; sensory process and psychopathology; problem solving decision making and communication in thinking process; salient features of abnormal thinking.	Yes	
14	Emotion: relationship of emotion to illness.	Yes	
15	Intelligence: Nature of intelligence; role of genetic and environmental	Yes	

	influences in intelligence.		
16	Behavioural medicine: behavioural aspects applied to illness	Yes	
17	Coping and stress: different stressors and their effects.	Yes	
18	Doctor- patient relationship.	Yes	
19	Illness behaviour	Yes	
20	Psychological methods of treatment: counselling	Yes	
21	Attitudes : Nature and development of attitudes		Yes
22	To be aware of the security aspects as per the demands of the situation, region: Security of the person, the citizen; physical trauma; Psychological trauma; 'psychological support and first aid-psychological support during disasters.	Yes	
<b>BRAIN AND BEHAVIOR</b>			
The following items to be covered by the multidisciplinary team in the dept of psychiatry During the first and second terms -			
23	Introduction to types of behavioural sciences :Aspects of health economics and management sciences		Yes
24	Family studies: Types of families: structure and functioning; social Problems		Yes
25	Illness and health: Beliefs, customs, norms.		Yes
26	Socio-economic status: Measurement of socio-economic status.		Yes
27	Communication skills: Communication medias.		Yes
28	Methods of social work: social group work and community organisation.		Yes
29	Introduction to psychology – Role of nature vs. nurture in shaping Human behaviour		Yes
30	Human development: Infancy to adolescence: Behavioural expectancies and problems		Yes
31	Human development: adulthood to old age – adjustment in old age to old age diseases.		Yes
32	Learning and conditioning: Learning of adaptive and maladaptive behaviours; Various learning methods like association, cognitive, verbal, motor and social.		Yes
33	Cognitive process: Methods of improving memory; forgetting and its determinants; thinking process- concept formation; role of language		Yes
34	Emotion: Development of emotive behaviour and its physiological basis		Yes
35	Intelligence: Assessment of intelligence in clinical setting; growth of intelligence from birth to old age.		Yes
36	Behavioural medicine: Methods of behavioural treatment for psychosomatic diseases.		Yes
37	Coping and stress: Methods of adaptive and maladaptive coping and stress management.		Yes
38	Illness behaviour: Sick role; role of socio- cultural background in illness behaviour.		Yes
39	Attitudes: theories and methods to change attitudes; measurement of attitudes		Yes
40	Optimal Communication with one another in team and with patients and their families, regarding security of the citizen, as per the demands of the region and situation.		Yes
41	Social security: Social assistance and social insurance; social security schemes.		
42	To be aware of the disasters man-made or natural and the preparedness to disaster & management of disasters in team-work paradigm.		
43	Mock-drill participation in disaster, in team work paradigm, behavioural aspects.		

## BEHAVIOURAL SCIENCES –SKILLS

(To be acquired after integrated teaching in preclinical years-phase I  
To be of use to clinical psychiatry during the clinical exposure)

Skills	Perform independently	Perform under Supervision	Assist the expert	Observe
1. Understanding Normal and abnormal behaviour, recognising abnormal behaviour		Yes		
2. Unconscious, Subconscious, Conscious mind ; Id, Ego Superego(Psychoanalytic Approaches)		Yes		
3. Behavioural Analysis		Yes		
4. Behavioural changes in Anxiety; Normal Anxiety and Generalised Anxiety Disorder	Yes			
5. Detection of unhappiness, hopelessness, helplessness, worthlessness.	Yes			
6. Meaning of Bio-psycho-social in Causation and in Interventional Approaches	Yes			

## PSYCHIATRY

### Learning Objectives

Able to student to deliver mental health services at the primary care level:

1. Able to identify signs and symptoms of common psychiatric illnesses
2. Able to identify developmental delays including Cognitive delays
3. Aware of common psychopharmacological interventions in Psychiatry
4. Able to apply basic counselling skills and have comfort with discussing common psychological issues.
5. Able to understand the nature and development of normal human behaviour.
6. Able to appreciate the interplay between Psychological and Physical factors in medical presentations.
7. Aware of statutory and educational provisions with regard to psychiatric illnesses and disability.
8. Able to develop helpful and humane attitude towards psychological, psychiatric and behavioural difficulties.
9. And overall, able to deliver mental health services at the primary care level.

## PSYCHIATRY & DRUG /ALCOHOL DE-ADDICTION -

### COURSE CONTENT

Topics	Must Know	Desirable to know
1. Substance Abuse Ask about alcohol use, identify problem drinking, educate and advise, refer appropriately.	Yes	
2. Depression and Anxiety disorders Ask about Depression and Anxiety, Diagnose depression, assess suicide risk, educate and advise, prescribe rationally and discuss referral	Yes	
3. Unexplained Physical complaints Identify Physical symptom without Medical cause, Elicit stress and coping related Information, Educate, Reassure and refer appropriately.	Yes	
4. Cognitive Delays Identify developmental delay , Basic education and advise, Discuss referral	Yes	
5. Sleep Educate regarding Sleep Hygiene, Prescribe rationally, Look for other psychiatric Possibilities	Yes	
6. Mental functions : primary and higher Elicit signs and symptoms of delirium Identify Early Cognitive decline Educate family, Plan	Yes	

referral.		
7. Agitated/Violent patient Emergency management keeping forensic and transportation needs in mind	Yes	
8. Psychoses - Identify, provide immediate care and refer. Educate regarding Continued care in discussion with the psychiatrist.	Yes	
9. Concept of mental hygiene and Mental Health promotional issues related to Death and Dying Breaking Bad news, Eliciting reactions and support	Yes	
10. Signs and symptoms of Alcoholism, Its Medical and Psychosocial impact, treatments available.	Yes	
11. Signs and symptoms of common mental illnesses- Depression, anxiety, somatoform disorders including conversion disorders and psychoses, dementia. Common antidepressants and tranquilisers.	Yes	
12. Basic Counselling Principles	Yes	
13. Child Development and Common developmental disorders	Yes	
14. Interplay of Psychological and Physical aspects in Medical presentations	Yes	
15. Common causes of delirium, behavioural management and safe sedation methods.	Yes	
16. Forensic aspects of violence, attempted suicide and suicide.	Yes	
17. Prevalent Social and Psychological concepts around death and dying		Yes
18. WHO Primary care classification of mental disorders		Yes
19. Psychosocial barriers to Help-Seeking for mental illnesses		Yes
20. Educational and Statutory provisions regarding psychiatric illnesses and disability.		Yes
21. Principles of Psycho-education		Yes
22. Basic psychotherapeutic skills		Yes
23. Mass hysteria, PTSD		Yes
24. Chronic Organic Brain Syndrome(Dementia)		Yes
25. Issues related to Death and Dying Breaking Bad news, Eliciting reactions and support		Yes

### PSYCHIATRY & DRUG / ALCOHOL DE-ADDICTION Skills

Skills	Perform independently	Perform under Supervision	Assist the expert	Observe
Psychiatric history taking	Yes			
Mental status examination (primary mental functions)	Yes			
Mental status examination ( higher mental functions)	Yes			
Diagnosis of common straight forward Psychiatric disorders	Yes			
Dealing with PTSD		Yes		
Dealing with Mass Hysteria			Yes	
Mental Hygiene	Yes			
Sleep Hygiene	Yes			
Developmental delay assessment		Yes		

Physical Methods of Treatment ( E.g. ECT – Electro Convulsive Therapy)				Yes
Abreaction				Yes
Brief Psychotherapy	Yes			
Counselling	Yes			
Suspect clinically and refer to the speciality (Psychiatrist) allied speciality (like, neurologist)	Yes			
Behavioural and psychological analysis of Self Destructive Behaviour	Yes			
Child Psychiatric history taking			Yes	
Child and Adolescent Mental status examination (Primary and higher mental functions)			Yes	
Geriatric History taking			Yes	
Geriatric Mental status examination (Primary and higher mental functions)		Yes		
Initial and primary care for the children and adolescents and then refer to the psychiatrist/ child & Adolescent psychiatrist/ Geriatric Psychiatrist	Yes			
Terminal care			Yes	
Exercising empathy , compassion and establishing rapport and maintaining rapport , which is a must for all psychiatric interventions (need not necessarily in a long term psycho-therapeutic contract)	Yes			
Psychotherapeutic and behaviour modification approaches for treating neurotic disorders			Yes	

**IMPARTING OF KNOWLEDGE / SKILLS:  
(BEHAVIOURAL SCIENCES)**

Teaching / learning methods

Small Group discussions

Seminars

Written Case scenario discussions

Bedside teaching

Problem based learning

Community Observations

There will be flexibility with regard to the choice of the method of teaching/learning.

All the above except the following specifically mentioned items will be covered by the multidisciplinary team in the psychiatry dept. in concert with the community medicine, in integrated teaching framework wherever felt necessary.

The items which are community based will be covered by the Community Medicine team in the first and second terms, as part of the foundation course –in the form of integrated lectures.

The items which are clinical based will be included during the clinical psychiatry training.

The training of the following clinical items which are skills based will be done in concert with other clinical departments and community medicine department:

## **INTEGRATED LEARNING MODULES INVOLVING PSYCHIATRY AND BEHAVIORAL SCIENCES**

Teaching / learning methods  
Structured Interactive Sessions (SIS)  
Group discussions  
Seminars  
Case discussions  
Bedside teaching  
Problem based learning  
Community Observations  
Didactic Lectures

The following will have to be taught as Integrated modules in association with the other departments mentioned against each. The first Four are included in the Major Integrated teaching Module list that was separately circulated. The rest are to be taken up by the Department of psychiatry as part of its training between III and VII terms.

### **Clinical Psychiatry training will need the following -**

1. 12 full days of clinical postings
2. 3 half day seminars and One whole day workshop as detailed under integrated modules.
3. 1 half day workshop during Paediatric postings.
4. 2 half day workshops during Medical postings
5. 10 hours of lectures which is a significant reduction from the present situation?

### **ASSESSMENT**

Formative assessment after each posting in psychiatry in the form of MCQs and short answer questions and OSCE for practical evaluation  
Summative assessment at the end of ninth semester to be included as part of General Medicine.

### **ASSESSMENT TOOLS:**

Theory  
Structured long question  
Short answer questions  
Structured MCQs  
Practical  
OSCEs  
Short case  
Viva

### **REFERENCES**

#### **1. ESSENTIAL**

1. Verghese. A and Abraham. A (1987) Introduction to Psychiatry; Chennai, Christian Literature Society.
2. Rao. A.V, Kuruvilla.K (1997) Psychiatry; New Delhi, B.I Churchill Livingstone.
3. Abuja .N (2002) Short text book of psychiatry, 5th Ed., New Delhi, Jaypee Medical Publishers.
4. Swash .M (2002) Hutchison's Clinical Methods, 21<sup>st</sup> Ed. London, Saunders Publication.
5. Boon.N.A, Colledge.N.R, and Walker.B.R (Editors) Davidson's Principles of Medicine-20th Edn. Oxford, ELBS with Churchill Livingstone and Elsevier.

#### **2. FOR FURTHER READING**

6. Namboodiri.V.M.D & John.C.J (1984) A Guide to Clinical Psychiatry; Kolenchery,

M.M.M. Hospital.

7. Kumar .K.A (1992) Facets of Substance Abuse – An Update; Trivandrum, Trivandrum Medical College.
8. Nair.M.K.C (Author), Pejaver .R.K (Editor) Child Development 2000 and Beyond; Bangalore, Prism Books Pvt. Ltd.
9. Kakar.S (1997) Culture & Psyche –Selected Essays; Delhi, Oxford University Press.

# **TUBERCULOSIS AND RESPIRATORY DISEASES**

## **TUBERCULOSIS AND RESPIRATORY DISEASES**

(l) 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 especially National Tuberculosis control programme.

(i) OBJECTIVES:

(a) Knowledge

At the end of the course of Tuberculosis and Chest-diseases, the student shall be able to :

- (1) demonstrate sound 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.

(b) 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-ray and respiratory function test;
- (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 pneumothoracic drainage/aspiration.

c. **INTEGRATION:**

The broad goal of effective teaching can be obtained through integration with departments of Medicine, Surgery, Microbiology, Pathology, Pharmacology and Preventive & Social Medicine.

## **TOPICS FOR THEORY PAPER AND ALLOCATION OF MARKS**

### **Paper I - General medicine (systemic medicine)**

Cardiology -	9 marks
Neurology –	9 marks
Respiratory & TB –	9 marks

Gastroenterology & Liver diseases – 9 marks  
Nephrology & Fluid and electrolyte– 9 marks  
Cardinal symptoms – 9 marks  
Critical care – 6 marks

**Paper – II**

**General Medicine including Dermatology, Psychiatry and Tropical Medicine**

Tropical and Environmental Medicine 9 marks  
Infectious Diseases 9 marks  
Endocrinology & Diabetes 9 marks  
Hematology 9 marks  
Geriatrics / Genetics 3 marks  
Nutrition 3 marks  
Immunology & Musculoskeletal 6 marks  
Dermatology, STD leprosy 6 marks  
Psychiatry 6 marks

# PAEDIATRICS

## PAEDIATRICS

### OBJECTIVES

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

1. Diagnose and appropriately treat common pediatric and neonatal illnesses.
2. Describe the common pediatric disorders and emergencies in terms of epidemiology, etiopathogenesis, clinical manifestations, diagnosis, rational therapy and rehabilitation;
3. Identify pediatric and neonatal illnesses and problems that require secondary and tertiary care and refer them appropriately.
4. Advise and interpret relevant investigations.
5. Counsel and guide patient's parents and relatives regarding the illness, the appropriate care, the possible complications and the prognosis.
6. Provide emergency cardiopulmonary resuscitation to newborns and children.
7. Describe preventive strategies for common infectious disorders, malnutrition, genetic and metabolic disorders, poisonings, accidents and child abuse;
8. Participate in the National Health Programmes effectively.
9. Diagnose and effectively treat acute pediatric and neonatal emergencies.
10. Discharge medico-legal and ethical responsibilities.
11. Perform routine investigative and therapeutic procedures, as applicable to children including neonates.

TOPIC	Must know	Desirable to know
<b>Vital Statistics</b>	Yes	
1. Definition and overview of Pediatrics with special reference to age-related disorders. Population structure, pattern of morbidity and mortality in children.	Yes	
2. Maternal, Perinatal, neonatal, infant and preschool mortality rates.	Yes	
3. Definition, causes, present status and measures for attainment of goals.	Yes	
4. Current National programs such as ICDS, RCH, Vitamin A prophylaxis, IDA, IDD, AFP	Yes	
5. UIP, Pulse polio, ARI, Diarrhea Control Program, etc.	Yes	
6. Other National programs and Health related Millenium Development Goals		Yes
<b>Growth and Development</b>	Yes	
7. Normal growth from conception to maturity.	Yes	
8. Anthropometry: measurement and interpretation of weight, length/height, head circumference, mid-arm circumference. Use of weighing machines, infantometer	Yes	
9. Interpretation of Growth Charts: Road to Health card and percentile growth curves	Yes	
10. Psychological and behavioral problems	Yes	
11. Approach to a child with developmental disabilities	Yes	
12. Abnormal growth patterns-failure to thrive, short stature	Yes	
13. Growth patterns of different organ systems such as lymphoid, brain and sex organs	Yes	
14. Normal pattern of teeth eruption.	Yes	
15. Principles of normal development	Yes	
16. Important milestones in infancy and early childhood in the areas of gross motor, fine motor, language and personal-social development. 3-4 milestones in each of the developmental fields, age of normal appearance and the	Yes	

upper age of normal.		
17. Preventable causes and assessment of developmental retardation	Yes	
18. Measurement and interpretation of sitting height, US:LS ratio and arm span.		Yes
19. Sexual maturity rating	Yes	
20. Age-independent anthropometric measurement-principles and application.		Yes
<b>Nutrition</b>	Yes	
21. Normal requirements of protein, carbohydrates, fat, minerals and vitamins for newborn, children, adolescents, and pregnant and lactating mother. Common food sources.		
22. Breastfeeding—physiology of lactation, composition of breast milk, colostrum, initiation and technique of feeding. Exclusive breastfeeding - Definition and benefits. Characteristics and advantages of breast milk. Hazards and demerits of prelacteal feed, top milk and bottle feeding. Feeding of LBW babies. Problems in breastfeeding, BFHI, IMS act.	Yes	
23. Complementary feeding, National Guidelines on Infant and Child Feeding (IYCF).	Yes	
24. Assessment of nutritional status of a child based on history and physical examination	Yes	
25. Protein energy malnutrition - Definition, classification according to IAP/ Wellcome Trust/WHO, acute versus chronic malnutrition. Clinical features of marasmus and kwashiorkor. Causes and management of PEM including that of complications. Planning a diet for PEM.	Yes	
26. Vitamins-Recognition of vitamin deficiencies (A, D, K, C, B-Complex). Etiopatho-genesis, clinical features, biochemical and radiological findings, differential diagnosis and management of nutritional rickets and scurvy. Hypervitaminosis A and D.	Yes	
27. Characteristics of transitional and mature milk (foremilk and hind milk). Prevention and management of lactation failure and feeding problems.	Yes	
28. Definition, causes and management of obesity		Yes
<b>Immunization</b>		
29. National Immunization Programme	Yes	
30. Principles of Immunization. Vaccine preservation and cold-chain	Yes	
31. Types, contents, efficacy storage, dose, site, route, contra-indications and adverse reactions of vaccines — BCG, DPT, OPV, Measles, MMR, Hepatitis B and Typhoid: Rationale and methodology of Pulse Polio Immunization	Yes	
32. Investigation and reporting of vaccine preventable diseases. AFP (Acute Flaccid Paralysis) surveillance.	Yes	
33. Special vaccines like H. influenzae b, Pneumococcal, Hepatitis A, Chicken pox, Meningococcal, Rabies		Yes
<b>Infectious Diseases</b>	Yes	
34. Epidemiology, basic pathology, natural history, symptoms, signs, complications, investigations, differential diagnosis, management and prevention of common bacterial, viral and parasitic infections in the region, with special reference to vaccine-preventable diseases: Tuberculosis, poliomyelitis, diphtheria, whooping cough, tetanus including neonatal tetanus, measles, mumps, rubella, typhoid, viral hepatitis, cholera, chickenpox, giardiasis, amebiasis, intestinal helminthiasis, malaria, dengue fever,		

AIDS.		
35. Rational management of fever, PUO	Yes	
36. Kala-azar, leprosy, chlamydia infection		Yes
<b>Hematology</b>		
37. Causes of anemia in childhood. Classification based on etiology and morphology	Yes	
38. Epidemiology, recognition, diagnosis, management and prevention of nutritional anemia-iron deficiency, megaloblastic	Yes	
39. Clinical approach to a child with anemia with/without lymphadenopathy and/or hepato-splenomegaly	Yes	
40. Epidemiology, clinical features, investigations and management of thalassemia	Yes	
41. Approach to a bleeding child	Yes	
42. Diagnosis of acute lymphoblastic leukemia and principles of treatment	Yes	
43. Clinical features and management of hemophilia, ITP, and aplastic anemia	Yes	
44. Diagnosis and principles of management of lymphomas	Yes	
45. Types, clinical features and management of acute hemolytic anemia		Yes
<b>Respiratory system</b>		
46. Clinical approach to a child with cyanosis, respiratory distress, stridor, wheezing. Significance of recession, retraction.	Yes	
47. Etiopathogenesis, clinical features, complications, investigations, differential diagnosis and management of acute upper respiratory infections, pneumonia	Yes	
48. With emphasis on bronchopneumonia, bronchio-litis, bronchitis. Acute and chronic otitis media.	Yes	
49. Etiopathogenesis, clinical features, diagnosis, classification and management of bronchial asthma. Treatment of acute severe asthma.	Yes	
50. Pulmonary tuberculosis- infection versus disease, difference between primary and post-primary tuberculosis. Etiopatho-genesis, diagnostic	Yes	
51. Criteria in children versus adults. Diagnostic aids - technique and interpretation of Mantoux test and BCG test. Radiological patterns, chemoprophylaxis and treatment including the DOTS schedule.	Yes	
52. Diagnosis and management of foreign body aspiration.	Yes	
53. Pathogenesis, clinical features and management of pneumothorax, pleural effusion and empyema.	Yes	
54. Multidrug resistant tuberculosis, bronchiectasis, cystic fibrosis.		Yes
<b>Gastrointestinal tract</b>		
55. Clinical approach to a child with jaundice, vomiting, abdominal pain, bleeding, hepatosplenomegaly.	Yes	
56. Acute diarrhea disease - Etiopathogenesis, clinical differentiation of watery and invasive diarrhea, complications of diarrheal illness. Assessment of Dehydration, treatment at home and in hospital. Fluid and electrolyte management. Oral rehydration, composition of ORS.	Yes	
57. Clinical features and management of acute viral hepatitis, causes and diagnosis of chronic liver disease; neonatal cholestasis.	Yes	
58. Features and management of liver failure.	Yes	
59. Common causes of constipation	Yes	

60. Gastroesophageal reflux, GI bleeding, portal hypertension.	Yes	
61. Persistent diarrhea, Reye's syndrome, Celiac disease, malabsorption syndrome.		Yes
62. Drug induced hepatitis.		Yes
63. Abdominal tuberculosis, Wilson's disease	Yes	
<b>Central Nervous System</b>		
64. Clinical approach to a child with coma, convulsions, mental retardation	Yes	
65. Clinical diagnosis, investigations and treatment of acute pyogenic meningitis, encephalitis and tubercular meningitis. Neurocysticercosis	Yes	
66. Seizure disorders - Causes and types of convulsions at different ages. Diagnosis, categorization and management of epilepsy (broad outline). Febrile convulsions - definition, types, management.	Yes	
67. Causes, diagnosis and management of cerebral palsy	Yes	
68. Acute flaccid paralysis - Differentiation between Polio and Gullain-Barre syndrome	Yes	
69. Microcephaly, hydrocephalus, rheumatic chorea	Yes	
70. Intracranial space occupying lesions, infantile hemiplegia		Yes
71. Neuroblastoma		Yes
<b>Cardiovascular system</b>		
72. Clinical features, diagnosis, investigation, treatment and prevention of acute rheumatic fever. Common forms of rheumatic heart disease in childhood. Differentiation between rheumatic and rheumatoid arthritis	Yes	
73. Recognition of congenital acyanotic and cyanotic heart disease. Hemodynamics, clinical features and management of VSD, PDA, ASD and Fallot's tetralogy	Yes	
74. Recognition and management of congestive cardiac failure and cyanotic spells in infants and children	Yes	
75. Diagnosis and management of bacterial endocarditis, pericardial effusion, myocarditis		Yes
76. Hypertension in children-recognition, etiology, referral		Yes
<b>Genitourinary system</b>		
77. Approach to a child with proteinuria/hematuria	Yes	
78. Etiopathogenesis, clinical features, diagnosis, complications and management of acute post-streptococcal glomerulonephritis and nephrotic syndrome	Yes	
79. Etiology, clinical features, diagnosis and management of urinary tract infection - related problems	Yes	
80. Etiology, diagnosis and principles of management of acute renal failure	Yes	
81. Hemolytic-uremic syndrome	Yes	
82. Renal and bladder stones		
83. Causes and diagnosis of obstructive uropathy in children		Yes
84. Diagnosis and principles of management of chronic renal failure		Yes
<b>Endocrinology</b>		
85. Etiology, clinical features and diagnosis of diabetes and hypothyroidism, and goiter in children	Yes	
86. Delayed and precocious puberty		Yes
87. Short stature	Yes	
88. Ambiguous genitalia		Yes
<b>Neonatology</b>		
89. Definition - live birth, neonatal period, classification according to weight and gestation, mortality rates	Yes	
90. Delivery room management including neonatal resuscitation and temperature control	Yes	

91. Etiology, clinical features, principles of management and prevention of birth asphyxia	Yes	
92. Birth injuries - causes and their recognition	Yes	
93. Care of the normal newborn in the first week of life. Normal variations and clinical signs in the neonate	Yes	
94. Breastfeeding - physiology and its clinical management	Yes	
95. Identification of congenital anomalies at birth with special reference to anorectal anomalies, tracheo-esophageal fistula, diaphragmatic hernia, neural tube defects	Yes	
96. Neonatal jaundice: causes, diagnosis and principles of management	Yes	
97. Neonatal infection - etiology, diagnosis, principles of management. Superficial infections, sepsis	Yes	
98. Low birth weight babies - causes of prematurity and small-for-date baby, clinical features and differentiation. Principles of feeding and temperature regulation. Problems of low birth weight babies.	Yes	
99. Identification of high risk/sick newborn (i.e., detection of abnormal signs - cyanosis, jaundice, respiratory distress, bleeding, seizures, refusal to feed, abdominal distension, failure to pass meconium and urine	Yes	
100. Transportation of a sick neonate	Yes	
101. Recognition and management of specific neonatal problems-hypoglycemia, hypo-calcemia, anemia, seizures, necrotizing enterocolitis, hemorrhage		Yes
102. Common intra-uterine infections		Yes
<b>Pediatric Emergencies</b>		
103. Status epilepticus	Yes	
104. Status asthmaticus / Acute severe asthma	Yes	
105. Shock and anaphylaxis	Yes	
106. Burns	Yes	
107. Hypertensive emergencies	Yes	
108. Gastrointestinal bleeding	Yes	
109. Comatose child	Yes	
110. Congestive cardiac failure	Yes	
111. Common poisonings and snakebite	Yes	
112. Acute renal failure	Yes	
113. Diabetic ketoacidosis	Yes	
114. Pneumothorax	Yes	
115. Acute laryngotracheobronchitis	Yes	
<b>Fluid-Electrolyte</b>		
116. Principles of fluid and electrolyte therapy in children	Yes	
117. Pathophysiology of acid-base imbalance and principle of management	Yes	
<b>Genetics</b>		
118. Principles of inheritance and diagnosis of genetic disorders, Down's syndrome	Yes	
<b>Behavioral Problems</b>		
119. Breath holding spells, nocturnal enuresis, temper tantrums, pica, refusal to feed	Yes	
120. Learning disabilities, Autism		Yes
<b>Pediatric Surgical Problems</b>		
121. Diagnosis and timing of surgery of cleft lip/palate, hypospadias, undescended testis, tracheo-esophageal fistula, hydrocephalus, CTEV, umbilical and inguinal hernia, anorectal malformations, hypertrophic pyloric stenosis	Yes	
<b>Therapeutics</b>		
122. Pediatric doses, drug combinations, drug interactions,		Yes

age specific choice of antibiotics, etc		
<b>Adolescent Medicine</b> 123. Changes during adolescence, factors affecting adolescent health	Yes	
<b>IMNCI</b> 124. Management of a Young child below 2 months	Yes	
125. Management of a child between 2 mo-5 yr of age	Yes	

### Other programmes pertaining to maternal and child health

#### SKILLS

Skills	Perform independently	Perform under Supervision	Assist the expert	Observe
1. Prepare ORS	Yes			
2. IMNCI Case Management	Yes			
3. Nasogastric tube insertion	Yes			
4. Infant young child feeding counseling	Yes			
5. Anthropometry	Yes			
6. Injections (IM, IV, S/C, I/D)	Yes			
7. Vaccine administration	Yes			
8. Pleural tap		Yes		
9. Ascitic tap		Yes		
10. Blood transfusion and monitoring	Yes			
11. Lumbar puncture		Yes		
12. IV cannula insertion and Blood sampling	Yes			
13. Bone marrow aspiration				Yes
14. Liver biopsy				Yes
15. Kidney biopsy				Yes
16. Peritoneal dialysis		Yes		
17. Neonatal resuscitation			Yes	
18. Intraosseous infusion	Yes			
19. Exchange transfusion				Yes

#### Teaching and Learning Methods

Lectures, Small group discussions, Seminars, Tutorials, Quiz, Debates, Algorithms, Problem Based Learning, Videography, Integrated teachings and e-modules. One week modular teaching is recommended for IMNCI.

#### Proposed Text Books for Pediatrics

1. Ghai Textbook of Pediatrics, CBS Publishers
2. Meharban Singh: Clinical Pediatrics
3. Clinical Methods Hutchisons
5. IAP textbook of Pediatrics
6. Suraj Gupte's Textbook of Pediatrics
7. Meharban Singh Pediatric Emergencies

#### Reference text book

Nelson: Textbook of Pediatrics

#### E – MODULES

The following topics/subjects are available in electronic format and have been specifically prepared for undergraduate students. These can be uploaded on the web to facilitate free access to all students. The details are as follows:

1. Module on teaching of “Infant and young Child feeding (IYCF)”

- Developed by BPNI (Breastfeeding Promotion Network of India) with aid from UNICEF and Experts from Indian Academy of Pediatrics, National Neonatology Forum, Community health, Obstetrics, and Medical Education.
- Available from BPNI, Delhi, India
- Contact person: Professor S. Aneja, Department of Pediatrics, Kalawati Saran Children Hospital and Lady Hardinge Medical College, New Delhi.
- Current status: Ready within a month time.

2. Interactive CD Rom on Breastfeeding

3. Module on teaching of “Prevention and Control of Injuries”

- Developed by WHO, SEARO for teaching undergraduates students of the region with the help of an international core group comprising of experts from the fields of Surgery, Public Health, Medical Education, Legal medicine, Pediatrics, Injury specialists, Trauma Medicine, Psychiatry etc.
- Available from WHO, SEARO, Division of Non-Communicable Diseases, Delhi, India
- Contact person: Professor B. K. Jain, Professor and Head, Department of Surgery, University College of Medical Sciences and GTB Hospital, Delhi 110 095.
- Current status: Ready, Pilot project activated at GTB Hospital, Delhi

4. Module on teaching of “Integrated Management of Neonatal and Childhood Illnesses (IMNCI)”

- Developed by WHO, India with Ministry of Health, Govt. of India for teaching undergraduates students of the country with the help of an international core group comprising of experts from the fields of Public Health, Medical Education, Epidemiologists etc.
- Available from WHO, India. Division of Child Health.
- Contact person: Dr. Harish Kumar, WHO Consultant, IMNCI, Nirman Bhavan, Delhi.
- Current status: Ready, Pilot project completed in 4 medical colleges (Ludhiana, Bangalore, Bhopal, and).

**In Addition, the following E-modules are also proposed**

Neonatal resuscitation  
Essential Newborn Care  
Growth and Development  
Childhood disabilities  
Nutritional Disorders  
Bronchial asthma  
Immunization  
Adolescent medicine

**Integration**

The training in Pediatrics should be integrated with other disciplines, including Anatomy, Physiology, Medicine, Surgery, Community Medicine, Obstetrics, and Physical Medicine and Rehabilitation, to prepare the student to deliver preventive, promotive, curative and rehabilitative services for care of children both in the community and at hospital as part of a team.

Plan for Theory Internal Assessment:

Total of four (n) Periodic tests to be conducted, and the average of (n-1) tests to be taken as internal assessment (theory)

Total of three (n) Clinical tests to be conducted and the average of (n-1) test marks along with the Records marks to be taken as Internal Assessment Clinical Examination Marks.

# **GENERAL SURGERY**

(2) **SURGERY & ITS ALLIED SPECIALITIES**  
**GENERAL SURGERY**

**Objectives**

At the end of the course, the learners shall be able to:

1. Diagnose and appropriately manage common surgical ailments in a given situation.
2. Identify situations calling for urgent or early surgical intervention and refer at the optimum time to the appropriate centers.
3. Provide adequate preoperative, post-operative and follow-up care of surgical patients.
4. Counsel and guide patients and relatives regarding need, implications and problems of surgery in the individual patient
5. Provide emergency resuscitative measures in acute surgical situations including trauma. Should be well versed with BLS & ITLS.
6. Organise and conduct relief measures in situations of mass casualties.
7. Effectively participate in the National Health Programmes especially the Family Welfare Programme.
8. Discharge effectively medico-legal and ethical responsibilities
9. Perform simple surgical procedures.

**KNOWLEDGE**

**System Based**

<b>Subject</b>	<b>Must Know</b>	<b>Desirable to know</b>	<b>Nice to Know</b>
Wound healing	Yes		
Asepsis, antisepsis, sterilization and universal precautions	Yes		
Surgical knots, sutures, drains, bandages and splints.	Yes		
Surgical infections, causes of infections, prevention common micro organisms causing infections	Yes		
Tetanus, gas gangrene treatment & prevention	Yes		
Chronic specific infections Tuberculosis , Filariasis	Yes		
Boils, cellulitis, abscess, necrotising fasciitis.	Yes		
Principles of Antibiotic therapy in Surgery	Yes		
Hospital acquired infections	Yes		
AIDS and Hepatitis.prevention and precautions	Yes		
Fluid and electrolyte balance.	Yes		
Shock, etiology, pathophysiology and management	Yes		
Blood transfusion indication and hazards	Yes		
Common preoperative preparation and postoperative complication	Yes		
Surgical aspects of diabetes mellitus, Diabetic Foot	Yes		
Bites and stings	Yes		
Mechanisms and management of missile, blast and gunshot injuries		Yes	
Organ transplantation: Basic Principles		Yes	
Nutritional support to surgical patients		Yes	
Common skin and subcutaneous conditions	Yes		
Sinus and fistulae, pressure sores	Yes		
Acute arterial occlusion, diagnosis and initiate	Yes		

management.			
Types of gangrene, Burgers disease and atherosclerosis	Yes		
Investigations in case of arterial obstruction, amputation, vascular injuries basic principles and management		Yes	
Venous disorders: Varicose veins	Yes		
Diagnosis, principles of therapy, prevention, of Deep Venous Thrombosis.	Yes		
Investigations in case of arterial obstruction, amputation, vascular injuries basic principles and management		Yes	
Lymphatics: Diagnosis and principles of management of lymphatic malformations, lymphangitis and lymphedema	Yes		
Medical and Surgical management of Lymphatic Filariasis.	Yes		
Burns: causes, prevention and management	Yes		
Wounds of scalp and their management	Yes		
Recognition , diagnosis , monitoring and principles of management of patients with Head injury, Glasgow coma scale	Yes		
Recognition of acute cerebral compression, indication for referrals.	Yes		
Cleft lip and palate principles of diagnosis and management	Yes		
Leukoplakia, retention cysts, ulcers of tongue.	Yes		
Oral malignancies, recognition , prevention and principles of management	Yes		
Salivary gland Neoplasms	Yes		
Branchial cyst, cystic hygroma		Yes	
Cervical lymphadenitis nonspecific and tuberculous,. Metastatic lymph nodes and lymphomas.	Yes		
Diagnosis and principles of management of Thyroid swellings	Yes		
Thyroglossal cyst and fistula	Yes		
Thyroiditis		Yes	
Thyrotoxicosis	Yes		
Thyroid neoplasms		Yes	
Management of solitary thyroid nodule	Yes		
Thoracic outlet syndrome		Yes	
Management of nipple discharge	Yes		
Breast abscess	Yes		
Clinical breast examination, breast self examination	Yes		
Screening and investigation of breast lump	Yes		
Cancer breast diagnosis, staging and principles of management	Yes		
Recognition and treatment of pneumothorax, haemothorax	Yes		
Pulmonary embolism: prevention/recognition and treatment	Yes		
Flail chest, stove in chest.	Yes		
Postoperative pulmonary complication.	Yes		
Empyema thoracis	Yes		
Recognition of oesophgeal atresia and principles of management		Yes	
Congenital diaphragmatic Hernia, Principles of		Yes	

management			
Neoplasms of the lung		Yes	
Cancer oesophagus: principles of management		Yes	
Gastro esophageal reflux, Hiatus Hernia Principles of management	Yes		
Achalasia Cardia principles of management	Yes		
Congenital hypertrophic pyloric stenosis	Yes		
Aetiopathogenesis, diagnosis and management of; peptic ulcer	Yes		
Cancer stomach		Yes	
Signs and tests of liver function	Yes		
Amoebic liver abscess	Yes		
Hydatid cyst	Yes		
Portal hypertension		Yes	
Obstructive jaundice	Yes		
Neoplasms of liver		Yes	
Rupture spleen		Yes	
Indications for splenectomy		Yes	
Clinical features, diagnosis, complications and principles of management of cholelithiasis and cholecystitis	Yes		
Carcinoma gall bladder		Yes	
Choledochal cyst		Yes	
Acute pancreatitis	Yes		
Chronic pancreatitis		Yes	
Carcinoma pancreas		Yes	
Peritonitis: causes, recognition, diagnosis, complications and principles of management	Yes		
Tuberculous peritonitis	Yes		
Abdominal pain types and causes	Yes		
Intestinal amoebiasis	Yes		
Tuberculosis of intestine	Yes		
Ulcerative colitis		Yes	
Carcinoma colon		Yes	
Intestinal obstruction	Yes		
Principles of management of Neonatal Intestinal obstruction	Yes		
Appendix: Diagnosis and management of acute appendicitis	Yes		
Appendicular lump and abscess	Yes		
Clinical features of the rectal diseases	Yes		
Rectum: Carcinoma rectum	Yes		
Principles of management of colostomy	Yes		
Anal Canal: Surgical anatomy, features and management of fissures, fistula in ano	Yes		
Perianal and ischiorectal abscess	Yes		
Haemorrhoids	Yes		
Anorectal Anomalies		Yes	
Hirschprung's disease, Principles of management		Yes	
Clinical features, diagnosis, complication and principles of management of inguinal hernia	Yes		
Umbilical, femoral hernia and epigastric hernia	Yes		
Abdominal wall defects in children		Yes	
Premalignant conditions of large bowel	Yes		
Carcinoma rectum		Yes	
Prolapse of rectum		Yes	
Anal carcinoma	Yes		
Urinary symptoms and investigations of urinary	Yes		

tract			
Diagnosis and principles of management of urolithiasis	Yes		
Hydronephrosis		Yes	
Pyonephrosis, perinephric abscess		Yes	
Renal tuberculosis	Yes		
Renal tumors		Yes	
Lower Urinary tract symptoms or prostatism	Yes		
Neonatal urinary obstruction		Yes	
Benign prostatic hyperplasia; diagnosis and management.	Yes		
Carcinoma prostate		Yes	
Genital tuberculosis in male	Yes		
Phimosis and paraphimosis	Yes		
Carcinoma penis		Yes	
Diagnosis and principles of treatment of undescended testis	Yes		
Torsion testis	Yes		
Hydrocele, haematocele and pyocele	Yes		
Varicocele.		Yes	
Acute and chronic epididymo-orchitis	Yes		
Testicular tumours.		Yes	
Principles of management of Urethral injuries	Yes		

### Symptoms based

(Preferably learnt during IX semester) Approach to the patient with

Subject	Must Know	Desirable to know	Nice to Know
Ulcers in oral cavity	Yes		
Solitary nodule of the thyroid	Yes		
Lymph nodes swellings in the neck	Yes		
Suspected breast lump	Yes		
Acute abdominal pain	Yes		
Dysphagia	Yes		
Chronic abdominal pain	Yes		
Epigastric mass	Yes		
Right hypochondrium mass	Yes		
Right iliac fossa mass	Yes		
Renal mass	Yes		
Inguino-scrotal swelling	Yes		
Scrotal swelling	Yes		
Gastric outlet obstruction	Yes		
Upper gastrointestinal bleeding	Yes		
Lower gastrointestinal bleeding	Yes		
Anorectal symptoms	Yes		
Acute intestinal obstruction	Yes		
Obstructive jaundice	Yes		
Acute retention of Urine	Yes		
Bladder outlet obstruction	Yes		
Haematuria	Yes		
Peripheral vascular disease	Yes		
Varicose veins	Yes		
New born with developmental anomalies	Yes		

**Skill Based Objectives**

<b>Skills</b>	<b>Perform independently</b>	<b>Perform under Supervision</b>	<b>Assist the expert</b>	<b>Observe</b>
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 in adults and children	Yes			
Arrive at a logical working diagnosis after clinical examination	Yes			
Order appropriate investigations keeping in mind their relevance (need based) and cost effectiveness.	Yes			
Write a complete case record with all necessary details.	Yes			
Write a proper discharge summary with all relevant information	Yes			
Obtain informed consent for any examination/procedure	Yes			
At the end of the learners should be able to perform:	Yes			
Start IV lines and monitor infusions	Yes			
Start and monitor blood transfusion.	Yes			
Venous cut-down	Yes			
Manage a C.V.P. line	Yes			
Conduct CPR (Cardiopulmonary resuscitation)	Yes			
Basic life support /ITLS	Yes			
Endotracheal intubation	Yes			
Pass nasogastric tube	Yes			
Perform digital rectal examination and proctoscopy	Yes			
Urethral catheterisation	Yes			
Dressing of the wounds	Yes			
Suturing of the simple wounds	Yes			
Remove small subcutaneous swellings		Yes		
Various types of biopsies		Yes		
Relieve pneumothorax		Yes		
Infiltration, surface and digital Nerve blocks		Yes		
Incise and drain superficial abscesses		Yes		
Manage Lacerated wounds		Yes		
Control external hemorrhage		Yes		
Vasectomy			Yes	
Circumcision			Yes	
Surgery for hydrocele			Yes	
Surgery for hernia			Yes	
Injection/banding of piles			Yes	
Management of shock			Yes	
1. Assessment and management of burns			Yes	
All the operations performed by surgeons during surgical posting during general surgical postings				Yes

**Skill**

Skills to be learnt initially on the models and later on performed under supervision before performing independently, provision of surgical skills laboratories in the Medical Colleges will facilitate this process

Teaching learning methods:

Structured interactive sessions

Small group discussions

Self learning tools like

(a) Assignments

(b) Problem based learning

(c) Written case scenarios

(d) Simulated patient management problems,

in addition to routine classroom and bedside teaching

Learning resource materials: Text books, Internet, CDs, Videos, Skill laboratories etc.

### **Suggested text Books**

Bailey and love Short practice of Surgery

A manual of clinical Surgery by S Das

Hamilton Bailey's demonstration of clinical signs

Pye's Surgical Handicraft

### **Suggested topics for e-learning:**

All the topics included in symptom based learning

1. Ulcers in oral cavity
2. Solitary nodule of the thyroid
3. Lymph node in the neck
4. Suspected breast lump
5. Acute abdominal pain
6. Dysphagia
7. Chronic abdominal pain
8. Epigastric mass
9. Right hypochondrium mass
10. Right iliac fossa mass
11. Renal mass
12. Inguino-scrotal swelling
13. Scrotal swelling
14. Gastric outlet obstruction
15. Upper gastrointestinal bleeding
16. Lower gastrointestinal bleeding
17. Anorectal symptoms
18. Acute intestinal obstruction
19. Obstructive jaundice
20. Acute retention of Urine
21. Bladder outlet obstruction
22. Haematuria
23. Peripheral vascular disease
24. Varicose veins
25. New born with developmental anomalies

**ORTHOPEDICS**  
**ANAESTHESIOLOGY**  
**RADIODIAGNOSIS**  
**& IMAGING**  
  
**RADIOTHERAPY**

## ORTHOPEDICS:

### a. **KNOWLEDGE:**

The student should be able to:

1. explain the principles of recognition of bone injuries and dislocation.
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 as seen in this country.
5. explain etiogenesis, manifestations, diagnosis of neoplasm affecting bones.

### b. **SKILLS**

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

1. Detect sprains and deliver first aid measures for common fractures and sprains and manage uncomplicated fractures of clavicle, Colles's, forearm, phalanges etc.
2. Techniques of splinting, plaster, immobilization etc.
3. Management of common bone infections, learn indications for sequestration, amputations and corrective measures for bone deformities.
4. Aspects of rehabilitation for Polio, Cerebral Palsy and Amputation.

### c. **APPLICATION:**

Be able to perform certain orthopedic skills, provide sound advice of skeletal and related conditions at primary or secondary health care level.

### d. **INTEGRATION:**

Integration with anatomy, surgery, pathology, radiology and Forensic Medicine be done.

## ANAESTHESIOLOGY

The purpose of anesthesia training for medical students is not to make anesthesiologists out of all medical students, but to give students knowledge of basic concepts used in anesthesia and to teach them skills of airway management and vascular access that may be useful to them in other areas of medical practice.

The physician should have a good knowledge of what the anesthetic will do to the patient, even though the physician does not administer it him or herself.

The student, therefore, should observe and study the physiological changes which take place in the anesthetized patient. When these changes are of sufficient magnitude, they become complications or toxic effects. The student should learn what these are, how they are caused, and how they may present and be treated. Emphasis should be laid on good preoperative preparation. Students should learn basic techniques of maintaining a clear airway and giving assisted or artificial ventilation. They should also learn how to position the patient's head, how to hold the chin and how to insert an airway. Medical students should learn enough about an anesthetic machine.

In addition to these technical accomplishments, the student may have the opportunity to administer either general or spinal anesthesia under the direct and constant supervision of a member of the staff.

## OBJECTIVES

### Knowledge

The students, at the end of their posting should be able to:

1. Introduce principles of acute medicine as it is practiced in managing the anesthetized patient in the operating room and in managing the patient in the recovery unit.
2. Discuss and demonstrate principles of applied physiology and applied pharmacology. Simulation on Human patient Simulator (HPS) is ideal to teach many aspects of applied physiology and pharmacology.
3. Review principles of and teach skills in resuscitation (cardiopulmonary, cerebral, fluid and others).
4. Teach care of the unconscious patient, including airway and ventilation management.
5. Teach management of blood ,fluid, electrolyte balance , and metabolic disturbances in the surgical patient, with specific emphasis on those derangements which are encountered in the anesthetized patient.
6. Review management of acute and chronic pain problems.
7. Introduce concepts of drug interactions, especially as they apply to patients receiving anesthesia.
8. Demonstrate the evaluation of patients relative to surgical and anesthetic risk. Teach appropriate preoperative preparation of patients subjected to surgery and anesthesia.
9. Introduce the various techniques of anesthesiology.
10. Pharmacology of muscle relaxant, application and monitoring
11. Pharmacology: Basic / Applied of local anaesthetics : Various types of blocks advantages / Problems with each. Descriptive for some main blocks. Local infiltration , Brachial Plexus, Caudal etc.

### **Skills**

Maintenance of Clear airway  
 Bag Mask Ventilation  
 Starting A Venous Access  
 CPR — Basic and advanced  
 Giving a simple infiltration block, Some nerve block  
 Performing A lumbar puncture

### **Teaching Learning Methodology**

Teaching and learning in anesthesiology should be guided through a series of posting in which the emphasis is laid on practical hands –on experience.

Human patient simulator (HPS) be purchased for better skill development and to reduce the danger to the patients during the learning curve of student. To allow repeat practice according to ability of the student to reach the level of competence needed.

### **Posting Schedule**

Two Weeks in 7th semester  
 To achieve the objectives The students will be posted to

Preanesthetic Clinic: 1

1. Preoperative evaluation & optimization.
2. Operating theatre: Anaesthetic Machine /monitoring, Anaesthetic Techniques
3. Recovery Room: Recovery criteria : Management of complications.
4. Intensive Care Unit: Management of respiratory failure Various types of ventilatory Assistance devices Monitoring Devices and application. Management of patient in Coma.
5. Pain Clinic: Evaluation of patient / non invasive / invasive management.

Emergency On Call

The Intern will be posted to same areas as above and will be asked to follow a case from preoperative preparation to full recovery to get an idea of comprehensive Care.

#### TEXT BOOK RECOMMENDED

1. "The book of Anaesthesia" edited by Alan R. Aitkenhead, David J. Rowbotham, Graham Smith published by Churchill Livingstone.
2. "Fundamentals of Anaesthesia" edited by Colin Pinnock, Ted Lin, Tim Smith Published by Greenwich Medical Media Ltd.

#### Reference Books

1. Fundamental Principles and practice of Anaesthesia, Ed. Petter Hurtton, Cooper Butterworth, Published by Martin Dunitz, 2002.
2. Principles and Practice of Anaesthesiology Edited David E. Longnecker Published by Mosby St. Louis.

### RADIODIAGNOSIS & IMAGING

#### i) **GOAL:**

The broad goal of teaching the undergraduate medical students in the field of Radio-diagnosis should be aimed at making the students realise the basic need of various radio-diagnostic tools in medical practice. They should be aware of the techniques required to be undertaken in different situations for the diagnosis of various ailments as well as during prognostic estimations.

#### ii) **OBJECTIVES**

##### a. **KNOWLEDGE:**

The student should be able to:

1. understand basics of X-ray production, its uses and hazards.
2. appreciate and diagnose changes in bones - like fractures, infections, tumours and metabolic bone diseases.
3. identify and diagnose various radiological changes in disease conditions of chest and mediastinum, skeletal system, G.I. Tract, Hepatobiliary system and G.U. system.
4. learn about various imaging techniques, including isotopes C.T., Ultrasound, M.R.I. and D.S.A.

##### b. **SKILL**

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

1. use basic protective techniques during various imaging procedures.
2. Interpret common X-ray, radio-diagnostic techniques in various community situations.
3. advise appropriate diagnostic procedures in specialized circumstances to appropriate specialists.

### RADIOTHERAPY

#### i) **GOAL:**

The broad goal of teaching the undergraduate medical students in the field of Radiotherapy is to make the students understand the magnitude of the ever-increasing cancer problem in the country. The students must be made aware about steps required for the prevention and possible cure of this dreaded condition.

#### ii) **OBJECTIVES**

##### a. **KNOWLEDGE:**

The students should be able to:

1. identify symptoms and signs of various cancers and their steps of investigations and management.

2. explain the effect of radiation therapy on human beings and the basic principles involved in it.
3. know about radio-active isotopes and their physical properties
4. be aware of the advances made in radiotherapy in cancer management and knowledge of various radio therapeutic equipment while treating a patient.

b. **SKILL:**

At the completion of the training programme, the student should be able to:

1. take a detailed clinical history of the case suspected of having a malignant disease.
2. assist various specialists in administration of anticancer drugs and in application and use of various radiotherapeutic equipment, while treating a patient.

# **OBSTETRICS AND GYNAECOLOGY**

## OBSTETRICS AND GYNAECOLOGY

### Departmental Objectives:

At the end of training in Obstetrics and Gynaecology, the student will be able to:

1. Appreciate the socio-cultural, economic and demographic factors that influence the practice of Obstetrics & Gynaecology.
2. Appreciate the principles of reproductive anatomy and physiology.
3. Understand the preconceptual, antenatal, intranatal and postnatal factors that affect the mother and foetus.
4. Recognise the changes and adaptation that occur in the mother during pregnancy, labour and puerperium.
5. Impart antenatal care, detect deviations from normal pregnancy and refer risk cases appropriately.
6. Know the management of normal labour, be aware of the factors that deviate labour from its normal course and refer such cases appropriately.
7. Institute primary treatment in Obstetric and Gynaecological emergencies.
8. Resuscitate and take adequate care of the new born.
9. Assist couples with infertility and those requiring contraception.
10. Know the normal menstrual cycle, aetiopathology and management of menstrual abnormalities.
11. Know about the benign and malignant tumours of the genital tract and appreciate the need for screening and prevention.
12. Recognise the importance of infections and other diseases of the genital tract.
13. Know about the displacements of genital tract and injuries.
14. Understand the implications of medico-legal and ethical issues concerning the speciality.
15. Acquire communication, decision making and managerial skills.
16. Acquire skills to perform – Obstetrical & Gynaecological examinations and certain minor investigations and therapeutic operative procedures.

### COURSE CONTENT

#### OBSTETRICS:

##### 1. Anatomy of female reproductive tract

###### Must know:

Anatomy of internal and external reproductive organs including their relationship to other pelvic organs.

Applied anatomy as related to Obstetrics and Gynaecology.

##### 2. Physiology of conception:

###### Must know:

Gametogenesis, Ovulation, menstruation, fertilisation and implantation

Spermatogenesis. Normal semen parameters

##### 3. Development of fetus and Placenta

###### Must know:

Basic embryology. Development and structure and functions of placenta.

Fetal development and growth at various gestational ages.

Teratogenic agents and drugs to be avoided / contraindicated in early pregnancy

##### 4. Diagnosis of Pregnancy

###### Must know:

Clinical symptoms and signs of early pregnancy

Dating in early pregnancy including USG dating

Various tests to diagnose pregnancy

###### Desirable to know:

Congenital anomalies that can be diagnosed in early pregnancy

##### 5. Maternal Changes during Pregnancy

###### Must know:

The physiological changes in Blood, Cardiovascular, Respiratory, urinary tract and gastrointestinal tract

## **6. Antenatal care**

### Must Know;

Objectives of antenatal care, clinical diagnosis of pregnancy and differential diagnosis, Monitoring of fetal growth by Gravido-gram, Relevant and basic investigations like Hb for screening anaemia and blood group and Rh typing Nutritional requirements, Drug prescription, Immunisation during pregnancy. Diagnosis of malpresentation, antenatal fetal surveillance. Pelvic assessment

### Desirable to know:

Diagnosis and management of fetal congenital anomalies  
PNDT Act

## **7. Complications of Early pregnancy**

### Must know

Various types of abortions, definitions, causes, investigations and their management.

Diagnosis of Ectopic pregnancy and management

### Desirable to know

Modern management of ectopic pregnancy

## **8. Hyperemesis Gravidarum**

### Must know:

Aetiopathogenesis, investigations and management

### Desirable to know

Unusual complications of hyperemesis and management

## **9. Antepartum haemorrhage**

### Must know

Classification, clinical features, differential diagnosis, investigation including USG features, management and complications

### Desirable to know

Management of Complications like DIC

## **10. Malpresentations and malpositions and CPD**

### Must know

Causes, clinical findings, definitive diagnosis of malpresentations and malpositions and mechanism of labour in such cases

Causes of contracted pelvis and diagnosis and management

Diagnosis of CPD and Trial of labour

Definition of Obstructed labour and rupture uterus, causes, clinical features and management. Prevention of rupture uterus

### Desirable to know

Various types of Pelvis

## **11. Multiple pregnancy**

### Must know

Causes, diagnosis, differential diagnosis, complications in pregnancy and labour and management

### Desirable to know

Mechanism of twin to twin transfusion and management

Management of single fetal demise

## **12. Hydramnios and oligohydramnios**

### Must know

Causes, diagnosis, investigations and management

### Desirable to know

Recent trends in management

## **13. Hypertensive disorders of Pregnancy**

### Must know

Classification, diagnosis, investigations and management of Gestational hypertension, pre-eclampsia, and Eclampsia and complications

Predictive tests&Prevention of pre-eclampsia and Eclampsia

### Desirable to know:

Management of complications of Hypertensive disorders and chronic hypertension and renal disease

Differential diagnosis of convulsions in a pregnant woman

**14. Anaemia during pregnancy**

Must know

Causes, classification of various types of anaemias and their diagnosis, Nutritional anaemias and their management. Prevention of anaemia

Desirable to know

Management of Non-nutritional anaemias in pregnancy

**15. Diabetes mellitus and pregnancy**

Must know

Classification, Diagnosis, Screening for GDM and management of Diabetes during pregnancy and labour

Management of neonate of diabetic mother

Desirable to know

Complications of diabetes and their management

**16. Heart disease and pregnancy**

Must know

Classification, evaluation, complications during pregnancy and labour

Contraception

Desirable to know

Surgical management during pregnancy

**17. Intrauterine- Growth restriction and Intra uterine death**

Must know

Causes, diagnosis and management

Desirable to know

Recent advances in management

**18. Infections during pregnancy**

Must know

UTI, Malaria, Syphilis, Tuberculosis, Hepatitis, HIV and TORCH infections during pregnancy and their management

**19. Preterm labour and Post-dated pregnancy**

Must know

Causes, diagnosis and principles of management of preterm labour and delivery

Evaluation and management of Post-dated pregnancy

Neonatal problems of Preterm and post-term babies

Prevention of Preterm labour, Various Tocolytics

**20. Rh Negative Pregnancy**

Must know

Diagnosis, evaluation and management

Prevention of Rh Isoimmunisation

Management of Haemolytic disease of New born

Desirable to know

In-utero management of Rh iso-immunised fetus

**21. Normal labour**

Must know

Physiology, mechanism and conduct of normal labour

Monitoring in various stages and abnormal labour or dysfunctional labour

Diagnosis and management of fetal distress

Pain relief during labour

Active management of third stage of labour and complications of IIIrd stage

**22. Postpartum haemorrhage**

Must know

Definition, types, Diagnosis and management of PPH.

Retained placenta, Manual removal of placenta

Desirable to know

Management of Inversion of uterus

**23. Induction/Augmentation of labour**

Must know

Pre-requisites for induction

Various methods of cervical ripening

Successful induction and failed induction

Complications and contra-indications for induction  
Various methods /drugs for augmentation of labour

#### **24. Operative Obstetrics**

##### Must know

Indications, technique & complications of episiotomy  
Indications, technique and complications of Caesarean section,  
Forceps and vacuum deliveries  
Assisted breech delivery and Breech extraction  
Methods of Tubectomy complications and failure rates  
Cervical cerclage

##### Desirable to know

Destructive operations in Obstetrics

#### **25. Post-caesarean pregnancy**

##### Must know

Evaluation of a case of post-caesarean pregnancy and management  
Monitoring of a case of post-caesarean in labour and complications of VBAC  
Indications for repeat Caesarean section and complications of Caesarean at repeat CS

#### **26. Puerperium**

##### Must know

Course of Normal Puerperium and complications of Puerperium like Puerperal sepsis and its diagnosis and management and prevention  
Breastfeeding and common problems like lactational failure  
Care of neonate and infant and Immunisation schedule

#### **27. Contraception**

##### Must know

Cafeteria approach, various methods of contraception, advantages and side-effects, and failure rates, Selection of patients and counselling  
IUCD Insertion and removal. Emergency contraception

##### Desirable to know

Implants

#### **28. Medical termination of Pregnancy**

##### Must know

MTP Act, Indications, Contraindications, Various methods of First trimester and Second trimester termination and their complications  
Concurrent contraception

##### Desirable to know

Management of complications of various methods of MTP

#### **29. Perinatal and Maternal mortality in INDIA**

##### Must know

Definition of PNMR & MMR. causes and prevention of Perinatal and maternal mortality

##### Desirable to know

PNMR & MMR in our Institute and Puducherry

### **GYNAECOLOGY**

#### **1. Vaginal discharge**

##### Must know

Physiological and pathological causes of vaginal discharge  
Clinical characteristics, Investigations for diagnosis, predisposing conditions and management

#### **2 .Amenorrhoea**

##### Must know

Classification of Primary and Secondary amenorrhoea , investigations and principles of management

##### Desirable to know

Details of management.

#### **3. Abnormal uterine bleeding**

##### Must know

Normal menstrual pattern and physiology of menstrual cycle  
Various bleeding patterns like menorrhagia, metrorrhagia and polymenorrhoea  
- Causes, investigations, diagnosis of AUB  
Definition, Etiology and classification of DUB and its management  
Desirable to know  
Transvaginal sonography and sonosalpingography

#### **4. Infertility**

##### Must know

Definition of Infertility and sterility  
Causes and investigation of a couple with infertility; semen analysis  
Causes of anovulation and induction of ovulation, Tests for ovulation & tubal patency, Management of tubal factors of infertility including re-canalisation, Counseling for ART

##### Desirable to know

ART and their success

#### **5. Pelvic organ prolapse**

##### Must know

Classification. causes, diagnosis. investigations and management in relation to age and parity.

Preventive aspects of pelvic organ prolapse

##### Desirable to know

##### Nulliparous prolapse

#### **6. Urinary Incontinence**

##### Must know

Classification and differential diagnosis  
Investigations and management of Stress urinary incontinence

##### Desirable to know

Surgical therapy of Stress urinary incontinence

#### **7. Benign tumours of Internal reproductive organs**

##### Must know

Causes. Investigations, complications and management of fibroid uterus, Ovarian cysts, Endometriosis

##### Desirable to know

Conservative surgery and recent advances in management

#### **8. Uterine anomalies**

##### Must know

Classification and diagnosis and reproductive outcome and indications for surgical management

##### Desirable to know

Surgical procedures for specific anomalies

#### **9. Pelvic Inflammatory disease**

##### Must know

Definition, causes, sequelae and management of PID

Sexually transmitted infections and their prevention

Genital tuberculosis diagnosis and management (in detail)

Prevention of PID

#### **10. Genital tract injuries and Genital fistulae**

##### Must know

Post-coital injuries, and operative injuries especially to urinary tract

Causes, clinical features and diagnosis of genital fistulae and their management

##### Desirable to know

Operative techniques and complications

#### **11 Pre-malignant lesions and Malignancies of genital tract**

##### Must know

Etiology and Pathology, Classification, diagnosis of pre-malignant and malignant lesions of vulva, vagina. Cervix, uterus and ovary

Screening for carcinoma cervix

Clinical and Surgicopathological Staging and principles of management of cervical, endometrial cancer and ovarian cancer

##### Desirable to know

Screening for Breast and endometrial and ovarian malignancies  
Chemotherapy and Radiotherapy of Carcinoma cervix including adverse effects  
Chemotherapy of Ovarian cancer

### **11. Problems of Adolescence and menopause**

#### Must know

Menopausal symptoms and management of menopause, HRT  
Causes and investigations of post-menopausal bleeding

#### Desirable to know

Precocious puberty causes and investigation  
Management of Precocious puberty

### **12. Operative Gynaecology**

#### Must know

Indications, technique and complications of Dilatation and Curettage and Fractional curettage, Vaginal hysterectomy, Ward Mayo's operation, Manchester repair, Abdominal Hysterectomy, Ovariectomy. Tubal recanalisation and diagnostic laparoscopy

Staging laparotomy for endometrial and ovarian malignancy

Diagnosis and principles of management of post-operative complications

#### Desirable to know

Indications and techniques of Colposcopy, Hysteroscopy and operative laparoscopy

Detailed management of various post-operative complications

## **SKILLS**

### **1. Communication skills**

#### Must acquire

History taking skills- Present and past Obstetric history

History of Medical and Surgical disorders if any

Family history and treatment history

Counseling for contraception, Breast feeding

#### Desirable to acquire

### **2. Clinical skills**

#### Must acquire

A. General Physical examination and Systemic Examination

B. Obstetric examination

\*Speculum and vaginal examination

\*Diagnosis of early pregnancy

\*Measurement of symphysis fundal height

\* Plotting Gravidogram to monitor fetal growth

\* Obstetric palpation to know the lie, Presentation and position of fetus

\* Pelvic assessment to know grossly contracted pelvis

C. Diagnosis and Monitoring Labour

\* Appreciate Normal Uterine contractions by palpation

\*Fetal heart normality

\*Cervical dilatation

\*Station of presenting part

\*Plotting a Partogram and recognition of deviations from normal

Catherisation of bladder during labour

Technique of ARM

Conduct of normal labour including active management of III stage

Technique of Episiotomy and its suturing

Recognition of Perineal tears and suturing

Exploration of Genital tract for injuries after delivery

Care of Normal New-born and resuscitation of asphyxiated New-born

#### Desirable to acquire

Techniques of Assisted breech delivery and breech extraction

Vacuum application and extraction

Out-let forceps application

Repair of cervical tears

Vaginal packing

D. Gynaecological examination

Must acquire

Inspection and recognition of various parts of external genitalia

Recognition of perineal body and anus

Per speculum examination and recognition of Unhealthy cervix and growth on cervix

Technique of Pap smear collection

Bimanual pelvic examination to know the size and position of uterus and presence and absence of adnexal mass

Identification of cystocele, rectocele and enterocele and descent of cervix

Technique of rectal examination

Technique of cervix biopsy

Technique of Schiller's test and acetic acid test

Technique of IUCD insertion and removal

Desirable to acquire:

1. Culdocentesis
2. Instrumental evacuation for incomplete abortion
3. Blood transfusion
4. Adult resuscitation

**Managerial skills**

Must know

Transport of patient with convulsions, and Shock

How to co-ordinate with team members

Desirable to know

Organisation of antenatal clinics and arrangement for cervical cancer screening at camps

**Recommended Books**

**Latest editions of the following books are recommended**

**Obstetrics:**

1. Manual of Obstetrics, Edited by Daftary SN, and Daftary GS Published by Elsevier, New Delhi, India.
2. Text book of Obstetrics D.C.Dutta, Edited by Hiralal Konar, Published by New Central Book Agency, Kolkata.

**Gynaecology:**

1. Howkins & Bourne Shaw's Text book of Gynaecology edited by Padubidri VG and Daftary SN Published by Elsevier
2. Text book of Gynaecology - D.C.Dutta. Edited by Hiralal Konar, published by New central Book Agency, kolkata
3. Mudaliar and Menon's Clinical Obstetrics Edited by Gopalan Sarala and Jain Vanita Published by Orient Longman, Chennai, INDIA.

**Clinical books:**

1. Gynaecology Illustrated, Edited by Hart DM and Norman J, Illustrated by Callander R and Ramsden IPublished by Churchill LivingStone.
2. Clinical methods in Obstetrics and Gynaecology – A Problem based approach. . Edited by Oumachigui A, .Raghavan S and Habeebullah S published by Orient Longman, 2<sup>nd</sup> Edition
3. Shaw's Text book of Operative Gynaecology Revised by Hudson CN and Setchell ME Published by Reed Elsevier India Pvt., Ltd.
4. Practical Gynaecology and Obstetrics edited by Parulekar SV Published by Vora medical Publications.

# **EXAMINATION REGULATIONS**

## **DISTRIBUTION OF MARKS**

## **EXAMINATION REGULATIONS**

### **Essentialities for qualifying to appear in professional examinations.**

The performance in essential components of training are to be assessed, based on:

(1)           **ATTENDANCE**

75% of attendance in a subject for appearing in the examination is compulsory inclusive of attendance in non lecture teaching. i. e. seminars, group discussions, tutorials, demonstrations, practicals, Hospital (Tertiary, Secondary, Primary) postings and bed side clinics, etc.

For appearing at the University Examination, student should have 75% attendance in each subject even if shortage seen in one subject, he/she will be detained for the entire examination. Students cannot appear separately to the individual subjects during the first appearance at the Professional examination.

(2)           **Internal Assessment:**

(i)           It shall be based on day to day assessment (see note), evaluation of student assignment, preparation for seminar, clinical case presentation etc.:

(ii)          Regular periodical examinations shall be conducted throughout the course. The questions of number of examinations is left to the institution:

(iii)         Day to day records should be given importance during internal assessment:

(iv)         Weightage for the internal assessment shall be as given in the working sheet.

Student must 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 of that subject.

**Note:** Internal assessment shall relate to different ways in which students participation in learning participation in learning process during semesters in evaluated. Some examples are as follows:

(i)           Preparation of subject for students seminar.

(ii)          Preparation of a clinical case for discussion.

(iii)         Clinical case study/problem solving exercise.

(iv)         Participation in Project for health care in the community (planning stage to evaluation).

(v)         Proficiency in carrying out a practical or a skill in small research project.

(3)           **UNIVERSITY EXAMINATIONS:**

Theory (Nature of questions will be short answer type / objective type and marks for each part indicated separately. Question papers should preferably be of short structure / objective type.

Practicals / Clinicals (will be conducted in the laboratories or hospital wards. The objective will be to assess proficiency in skills, conduct of experiment, interpretation of data and logical conclusion. Clinical cases should preferably include common diseases and not esoteric syndromes or rare disorders. Emphasis should be on candidate's capability in eliciting physical signs and their interpretation. **Clinical cases / practicals shall take into account common diseases which the student is likely to come in contact in practice. Rare cases / obscure syndromes, long cases of neurology shall not be put for final examination.**

**Scrutiny of theory question papers received from Paper Setters:**

- In order to ensure uniformity and minimum standards acceptable for evaluation, a Vetting Committee be constituted by the Vice-Chancellor for various subjects in the Pre, Para-Clinical, Part I and Part II Clinical phases of MBBS Examination.

**Criteria for passing the examination**

- Candidate has to pass separately in theory + Viva and Practical / Clinical by getting a minimum of 50% marks in the combined Internal Assessment and University Examination. It is further subject to the condition that candidate should obtain a minimum of 40% marks in University theory examination and minimum of 50% marks in University Practical / Clinical examination.
- The marks of the record submitted to be added to the practical internal assessment.
- **Two notified tests per Semester and the Send-up test is compulsory.** This is to be uniformly followed in all the subjects up to the end of the course. The computation of the internal assessment is based on N-1 principle followed hitherto previously, where N is number of notified tests.
- To make **uniform standardized 100 marks of 3 hours duration with two sections for each theory paper** of the various subjects. The total marks in Theory paper will be inclusive of Internal Assessment (20%) computed through various notified tests.

**Minimum marks for declaration of pass**

	University	Internal Assessment	University + Int. Assessment aggregate + Viva
Theory (Minimum)	40%	35%	50%
Practical / Clinical (Minimum)	50%	35%	50%

- \*Viva marks should be added to the theory marks and not to the Practical/Clinical marks

**Grace Mark in case of failure in ONE out of all subjects for the particular semester**

A passing board is constituted for finalizing the results of each phase. The Heads of the Departments or the members, the board allots grace marks maximum 5 for one subject. **The grace mark of 5 will be added for one subject only after the marks obtained in the University examination are scaled down to 100%** in the particular subject – Theory. The grace mark of 5 is applicable to all the University examinations of MBBS conducted semester-wise. No Grace marks will be added for Practicals. This will not be applicable when the candidate takes up a single subject in the University Examination.

Theory papers will be prepared by the examiners as prescribed. Nature of questions will be short answer type/objective type and marks for each part indicated separately.

Practicals/clinicals will be conducted in the laboratories or hospital wards. Objective will be assess proficiency in skills, conduct of experiment, interpretation of data and logical conclusion. Clinical cases should preferably include common diseases not esoteric syndromes or rare disorders. Emphasis should be on candidate's capability in eliciting physical signs and their interpretation.

Viva/oral includes evaluation of management approach and handling of emergencies. Candidate's skill in interpretation of common investigative data, x-rays, identification of specimens, ECG, etc. also is to be evaluated.

The examinations are to be designed with a view to ascertain whether the candidate has acquired the necessary for knowledge, minimum skills alongwith clear concepts of the fundamentals which are necessary for him to carry out his professional day to day work competently. Evaluation will be carried out on an objective basis.

Question papers should preferably be of short structure/objective type.

Clinical cases/practicals shall take into account common diseases which the student is likely to come in contact in practice. Rare cases/obscure syndromes, long cases of neurology shall not be put for final examination.

During evaluation (both Internal and External) it shall be ascertained if the candidate has acquired the skills as detailed in Appendix-B.

There shall be one main examination in a year and a supplementary to be held not later than 6 months after the publication of its results. Universities Examinations shall be held as under:-

**First Professional:-**

In the second Semester of Phase 1 training, in the subjects of Anatomy, Physiology and Bio-Chemistry.

**Second Professional:-**

In the Fifth Semester of Phase II training, in the subjects of Pathology, Microbiology, Pharmacy and Forensic Medicine.

**Third Professional :-**

Part 1- in the Seventh Semester of Phase III, in the subjects of Ophthalmology, Oto-rhyno-laryngology and Community Medicine.

**Third Professional :-**

Part II-(Final Professional) – At the end of Phase III training in the subjects of Medicine, Surgery, Obstetrics & Gynecology and Pediatrics.

**Note :** Results of all university examinations shall be declared before the start of teaching for next semester.

(4) **DISTRIBUTION OF MARKS TO VARIOUS DISCIPLINES:**  
(A) **FIRST PROFESSIONAL EXAMINATION: (Pre-clinical Subjects):-**

(a)	<b><u>Anatomy:</u></b>	
	Theory -Two papers of 80 marks each -	160 marks.
	Oral (Viva)	20 marks
	Practical	100 marks
	Internal Assessment	
	(Theory-40; Practical-30 includes 5 marks for Record)	70 marks
	Total	350 marks
(b)	<b><u>Physiology including Biophysics</u></b>	
	Theory -Two papers of 80 marks each -	160 marks.
	Oral (Viva)	20 marks
	Practical	100 marks
	Internal Assessment	
	(Theory-40; Practical-30 includes 5 marks for Record)	70 marks
	Total	350 marks
(c)	<b><u>Biochemistry:</u></b>	
	Theory -Two papers of 80 marks each -	160 marks.
	Oral (Viva)	20 marks
	Practical	100 marks
	Internal Assessment	
	(Theory-40; Practical-30 includes 5 marks for Record)	70 marks
	Total	350 marks

**Pass: In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in Practicals. In addition, the candidate should also obtain minimum of 40% in University Theory Examination.**

**Working sheet for the First Professional examination**

Sl. No.	Description	Anatomy	Physiology	Biochemistry
1	No of Theory Papers	2	2	2
2	Marks for each Theory Paper	80	80	80
3	Total marks for Theory Paper	160	160	160
4	Minimum marks for Theory Paper	64	64	64
5	Practical marks	100	100	100
6	Oral	20	20	20
7	Passing minimum for Practical/	50	50	50
8	Internal Assessment	Theory 40, Practical 25 & Record 5	Theory 40, Practical 25 & Record 5	Theory 40, Practical 25 & Record 5
	Total Marks	Part A = 220 Part B = 130	Part A = 220 Part B = 130	Part A = 220 Part B = 130
	Total marks – Part A (Univ. Theory + Int. Assess. Theory + Oral) Part B (Univ. Pract. + Int. Asses. Practical) The candidate has to pass individually in Part A and Part B. Passing minimum is 50% aggregate in each part. In addition the candidate has to obtain in University Theory Examination - 40% minimum and in University Practical Examination - 50% minimum If the candidate fails in one part, he has to appear for both the Parts of the concerned subject.			

**(A) SECOND PROFESSIONAL EXAMINATION;  
(Para-clinical subjects):**

- (a) **Pathology :**  
 Theory-Two papers of 80 marks each - 160 marks.  
 Oral(Viva) 20 marks  
 Practical 100 marks  
 Internal Assessment  
 (Theory-40; Practical-30 includes 5 marks for Record) 70 marks  
 Total 350 marks
- (b) **Microbiology :**  
 Theory-Two papers of 80 marks each - 160 marks.  
 Oral(Viva) 20 marks  
 Practical 100 marks  
 Internal Assessment  
 (Theory-40; Practical-30 includes 5 marks for Record) 70 marks  
 Total 350 marks
- (c) **Pharmacology**  
 Theory-Two papers of 80 marks each - 160 marks.  
 Oral(Viva) 20 marks  
 Practical 100 marks  
 Internal Assessment  
 (Theory-40; Practical-30 includes 5 marks for Record) 70 marks  
 Total 350 marks
- (d) **Forensic Medicine**  
 Theory-one paper 80 marks  
 Oral (Viva) 20 marks  
 Practical/Clinicals 50 marks  
 Internal assessment  
 (Theory-20; Practical-30 includes 5 marks for record) 50 marks  
 Total 200 marks

**Pass:** In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in Practicals. In addition, the candidate should also obtain minimum of 40% in University Theory Examination.

Sl. No.	Description	Pathology	Microbiology	Pharmacology	Forensic Medicine
1	No of Theory Papers	2	2	2	1
2	Marks for each Theory Paper	80	80	80	80
3	Total marks for Theory Paper	160	160	160	80
4	Minimum marks for Theory Paper	64	64	64	32
5	Practical marks	100	100	100	50
6	Oral	20	20	20	20
7	Passing minimum for Practical/	50	50	50	25
8	Internal Assessment	Theory 40, Practical 25 & Record 5	Theory 40, Practical 25 & Record 5	Theory 40, Practical 25 & Record 5	Theory 20, Practical 25 & Record 5
	Total Marks	Part A = 220 Part B = 130	Part A = 220 Part B = 130	Part A = 220 Part B = 130	Part A = 120 Part B = 80
	Total marks – Part A (Univ. Theory + Int. Assess. Theory + Oral) Part B (Univ. Pract. + Int. Asses. Practical) The candidate has to pass individually in Part A and Part B. Passing minimum is 50% aggregate in each part. In addition the candidate has to obtain in University Theory Examination - 40% minimum and in University Practical Examination - 50% minimum If the candidate fails in one part, he has to appear for both the Parts of the concerned subject.				

**Working sheet for the Second Professional examination**

**(d) THIRD PROFESSIONAL**

**(i) PART 1 (Clinical subjects)**

Part 1: To be conducted during end period of seventh semester

**(a) Ophthalmology:**

Theory-one paper	80 marks
Oral (Viva)	20 marks
Practical/Clinicals	50 marks
Internal assessment (Theory-20; Practical-30 includes 5 marks for record)	50 marks
<b>Total</b>	<b>200 marks</b>

**(b) Oto-Rhino-Laryngology :**

Theory-one paper	80 marks
Oral (Viva)	20 marks
Practical/Clinicals	50 marks
Internal assessment (Theory-20; Practical-30 includes 5 marks for record)	50 marks
<b>Total</b>	<b>200 marks</b>

**(c) Community Medicine including Humanities:**

Theory-Two papers of 80 marks each -	160 marks.
Oral(Viva)	20 marks

Practical	100 marks
Internal Assessment	
(Theory-40; Practical-30 includes 5 marks for Record)	70 marks
Total	350 marks

**Pass:** In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in Practicals. In addition, the candidate should also obtain minimum of 40% in University Theory Examination.

**Working sheet for the Third Professional Part I examination**

Sl. No.	Description	Ophthalmology	Oto-rhinolaryngology	Community Medicine including Humanities
1	No of Theory Papers	1	1	2
2	Marks for each Theory Paper	80	80	80
3	Total marks for Theory Paper	80	80	160
4	Minimum marks for Theory Paper	32	32	64
5	Practical/Clinical marks	50	50	100
6	No of Long cases and marks	Nil	Nil	Clinico-social case discussion 60 marks Stat. / Epidem. Exercises – 20 marks
7	No of short cases and marks	2 x 20 = 40 Spotters 2x5=10	2 x 20 = 40 Spotters 2x5=10	Spotters – 20 marks
8	Oral	20	20	20
9	Passing minimum for Practical / Clinical	25	25	50
10	Internal Assessment	Theory 20, Practical 25 & Record 5	Theory 20, Practical 25 & Record 5	Theory 40, Practical 25 & Record 5
	Total Marks	Part A = 120 Part B = 80	Part A = 120 Part B = 80	Part A = 220 Part B = 130
	Total marks – Part A (Univ. Theory + Int. Assess. Theory + Oral) Part B (Univ. Pract. + Int. Asses. Practical) The candidate has to pass individually in Part A and Part B. Passing minimum is 50% aggregate in each part. In addition the candidate has to obtain in University Theory Examination - 40% minimum and in University Practical Examination - 50% minimum If the candidate fails in one part, he has to appear for both the Parts of the concerned subject			

## **PART-II**

(a) **Medicine:**

Paper I- General Medicine	
Paper II - General Medicine (including Psychiatry, Dermatology and S.T.D.) (Shall contain one question on basic sciences and allied subjects)	
Theory -Two papers of 80 marks each -	160 marks.
Oral (Viva)	20 marks
Practical	100 marks
Internal Assessment	
(Theory-40; Practical-30 includes 5 marks for Record)	70 marks
Total	350 marks

(b) **Surgery:**

Paper 1-General Surgery (Section 1) Orthopaedics (Section 2)	
Paper II -General Surgery including Anaesthesiology, Dental diseases and Radiology. (shall contain one question on basic sciences and allied subjects)	
Theory -Two papers of 80 marks each -	160 marks.
Oral (Viva)	20 marks
Practical	100 marks
Internal Assessment	
(Theory-40; Practical-30 includes 5 marks for Record)	70 marks
Total	350 marks

***Paper 1 of Surgery shall have one section in Orthopaedics. The questions on Orthopaedic Surgery be set and assessed by examiners who are teachers in the Orthopaedic surgery.***

(c) **Obstetrics and Gynaecology**

Paper I- Obstetrics including social obstetrics.	
Paper II – Gynaecology, Family Welfare and Demography (Shall contain one question on basic sciences and allied subjects)	
Theory -Two papers of 80 marks each -	160 marks.
Oral (Viva)	20 marks
Practical	100 marks
Internal Assessment	
(Theory-40; Practical-30 includes 5 marks for Record)	70 marks
Total	350 marks

(d) **Pediatrics : (Including Neonatology)**

Theory-one paper	80 marks
Oral (Viva)	20 marks
Practical / Clinicals	50 marks
Internal assessment	
(Theory-20; Practical-30 includes 5 marks for record)	50 marks
Total	200 marks

**Pass: In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in Practicals. In addition, the candidate should also obtain minimum of 40% in University Theory Examination.**

### Working sheet for the Third Professional Part II examination

Sl. No.	Description	Medicine	Surgery	Obst & Gynae	Paediatrics *
1	No of Theory Papers	2	2	2	1
2	Marks for each Theory Paper	80	80	80	80
3	Total marks for Theory Paper	160	160	160	80
4	Minimum marks for Theory Paper	64	64	64	32
5	Practical/Clinical marks	100	100	100	50
6	No of Long cases and marks	1 40 marks	1 40 marks	Obst – 1 40 marks Gynae – 1 40 marks	Nil
7	No of short cases and marks	3x20 = 60 marks	3x20 = 60 marks	Nil	2 x 20 = 40 spotters 2 x 5 = 10
8	Oral	20	20	20	20
9	Passing minimum for Practical/	50	50	50	25
10	Internal Assessment	Theory 40, Practical 25 & Record 5	Theory 40, Practical 25 & Record 5	Theory 40, Practical 25 & Record 5	Theory 20, Practical 25 & Record 5
	Total Marks	Part A = 220 Part B = 130	Part A = 220 Part B = 130	Part A = 220 Part B = 130	Part A = 120 Part B = 80
	Total marks – Part A (Univ. Theory + Int. Assess. Theory + Oral) Part B (Univ. Pract. + Int. Asses. Practical) The candidate has to pass individually in Part A and Part B. Passing minimum is 50% aggregate in each part. In addition the candidate has to obtain in University Theory Examination - 40% minimum and in University Practical Examination - 50% minimum If the candidate fails in one part, he has to appear for both the Parts of the concerned subject				

### GRACE MARK

#### **Grace Mark in case of failure in ONE out of all subjects for the particular semester**

A passing board is constituted for finalizing the results of each phase. The Heads of the Departments or the members, the board allots grace marks maximum 5 for one subject. **The grace mark of 5 will be added for one subject only after the marks obtained in the University examination are scaled down to 100%** in the particular subject – Theory. The grace mark of 5 is applicable to all the University examinations of MBBS conducted semester-wise. **No Grace marks will be added for Practicals.**

Grace Mark will not be applicable when the candidate takes up the University Examination in a compartmental manner.

#### **APPOINTMENT OF EXAMINERS:**

- (1) No person shall be appointed as an examiner in any of the subjects of the Professional examination leading to and including the final Professional examinations for the award of the MBBS degree unless he has taken atleast five years previously, a doctorate degree of a recognized university or an equivalent qualification in the particular subject as per recommendation of the Council on teachers' eligibility qualifications and has had at least five years of total teaching experience in the subject concerned in a college affiliated to a recognized university at a faculty position.
- (2) There shall be at least four examiners for 100 students, out of whom not less than 50% must be external examiners. Of the four examiners, the senior most internal examiner will act as the Chairman and co-ordinator of the whole examination programme so that uniformity in the matter of assessment of candidates is maintained. Where candidates appearing are more than 100, one additional examiner, for every additional 50 or part thereof candidates appearing, be appointed.
- (3) Non medical scientists engaged in the teaching of medical students as whole time teachers, may be appointed examiners in their concerned subjects provided they possess requisite doctorate qualifications and five year teaching experience of medical students after obtaining their postgraduate qualifications. Provided further that the 50% of the examiners (Internal & External) are from the medical qualification stream.
- (4) External examiners shall not be from the same university and preferably be from outside the state.
- (5) The internal examiner in a subject shall not accept external examinership for a college from which external examiner is appointed in his subject.
- (6) A university having more than one college shall have separate sets of examiners for each college, with internal examiners from the concerned college.
- (7) External examiners shall rotate at an interval of 2 years.
- (8) There shall be a Chairman of the Board of paper-setters who shall be an internal examiner and shall moderate the questions.
- (9) Except Head of the department of subject concerned in a college/institution, all other with the rank of reader or equivalent and above with requisite qualifications and experience shall be appointed internal examiners by rotation in their subjects; provided that where there are no posts of readers, then an Assistant Professor of 5 years standing as Assistant Professor may be considered for appointment as examiner..

# **INTERNSHIP**

## CHAPTER - V

### INTERNSHIP

(1) **General**

Internship is a phase of training wherein a graduate is expected to conduct actual practice of medical and health care and acquire skills under supervision so that he/she may become capable of functioning independently.

(2) **Specific Objectives**

At the end of the internship training, the student shall be able to:

- i) diagnose clinical common disease conditions encountered in practice and make timely decision for referral to higher level;
- ii) use discreetly the essential drugs, infusions, blood or its substitutes and laboratory services.
- iii) Manage all type of emergencies-medical, surgical obstetric, neonatal and paediatric, by rendering first level care;
- iv) Demonstrate skills in monitoring of the National Health Programme and schemes, oriented to provide preventive and promotive health care services to the community;
- v) Develop leadership qualities to function effectively as a leader of the health team organised to deliver the health and family welfare service in existing socio-economic, political and cultural environment;
- vi) Render services to chronically sick and disabled (both physical and mental) and to communicate effectively with patient and the community.

- (3) **Time allocation** to each discipline is approximate and shall be guided more specifically by the actual experience obtained. Thus a student serving in a district or taluk hospital emergency room may well accumulate skill in surgery, orthopaedics, medicine, obstetrics and Gynaecology and Paediatrics during even a single night on duty. Responsible authorities from the medical college shall adjust the intern experience to maximize intern's opportunities to practice skills in patient care in rough approximation of the time allocation suggested.

#### (4) INTERNSHIP – TIME DISTRIBUTION

##### Compulsory

Community Medicine	<b>2 months</b>
Medicine including 15 days of Psychiatry	2 months
Surgery including 15 days Anaesthesia	2 months
Obst./Gynae. Including Family Welfare Planning	2 months
Paediatrics	<b>1 month</b>
Orthopaedics including PMR	<b>1 month</b>
E.N.T.	15 days
Ophthalmology	15 days
Casualty	15 days

##### Elective posting (1 x 15 days)

**15 days**

Subjects for Elective posting will be as follows:

- i) Dermatology and Sexually Transmitted Diseases.
- ii) Tuberculosis and Respiratory Diseases
- iii) Radio-diagnosis
- iv) Forensic Medicine
- v) Blood Bank
- vi) Psychiatry

Note: Structure internship with college assessment at the end of the internship.

#### (5) OTHER DETAILS:

- i) All parts of the internship shall be done as far as possible in institutions of India. In case of any difficulties, the matter may be referred to the Medical Council of India to be considered on individual merit.
- ii) Every candidate will be required after passing the final MBBS examination to undergo compulsory rotational internship to the satisfaction of the College authorities and University concerned for a period of 12 months so as to be eligible for the award of the degree of Bachelor of Medicine and Bachelor of Surgery (MBBS) and full registration.
- iii) The University shall issue a provisional MBBS pass certificate on passing the final examination.
- iv) The State Medical Council will grant provisional registration to the candidate on production of the provisional MBBS pass certificate. The provisional registration will be for a period of one year. In the event of the shortage or unsatisfactory work, the period of provisional registration and the compulsory rotating internship may be suitably extended by the appropriate authorities.
- v) The intern shall be entrusted with clinical responsibilities under direct supervision of senior medical officer. They shall not be working independently.
- vi) Interns will not issue a medical certificate or a death certificate or a medicolegal document under their signature.
- vii) In recognition of the importance of hands-on experience, full responsibility for patient care and skill acquisition, internship should be increasingly scheduled to utilize clinical facilities available in District Hospital, Taluka Hospital, Community

Health Centre and Primary Health Centre, in addition to Teaching Hospital. A critical element of internship will be the acquisition of specific experiences and skill as listed in major areas:

Provided that where an intern is posted to District/Sub Divisional Hospital for training, there shall be a committee consisting of representatives of the college/university, the State Government and the District administration, who shall regulate the training of such trainee.

Provided further that for such trainee a certificate of satisfactory completion of training shall be obtained from the relevant administrative authorities which shall be countersigned by the Principal/Dean of College;

- viii) Adjustment to enable a candidate to obtain training in elective clinical subjects may be made.
- ix) Each medical college shall establish links with one entire district extending out-reach activities. Similarly, Re-orientation of Medical Education (ROME) scheme may be suitably modified to assure teaching activities at each level of District health system which will be coordinated by Dean of the medical college;
- x) Out of one year, 6 months shall be devoted to learning tertiary care being rendered in teaching hospital/district hospital suitably staffed with well qualified staff, 3 months of secondary care in a small District or Taluka Hospital/Community Health Centre and 3 months in Primary Health care out of which 2 months should be in Primary Health Programme at the Community level. One month of primary care training may be in the form of preceptorship with a practicing family physician or voluntary agency or other primary health care provider.
- xi) One year's approved service in the Armed Forces Medical Services, after passing the final MBBS examination shall be considered as equivalent to the pre-registration training detailed above; such training shall, as far as possible, be at the Base/General Hospital.

**(6) ASSESSMENT OF INTERNSHIP:**

- i) The intern shall maintain a record of work which is to be verified and certified by the medical officer under whom he works. Apart from scrutiny of the record of work, assessment and evaluation of training shall be undertaken by an objective approach using situation tests in knowledge, skills and attitude during and at the end of the training. Based on the record of work and date of evaluation, the Dean/Principal shall issue certificate of satisfactory completion of training, following which the University shall award the MBBS degree or declare him eligible for it.
- ii) Satisfactory completion shall be determined on the basis of the following:-
  - (1) Proficiency of knowledge required for each case SCORE 0-5
  - (2) The competency in skills expected to manage each case:
    - a) Competency for performance of self performance,
    - b) of having assisted in procedures,
    - c) of having observed. SCORE 0-5
  - (3) Responsibility, punctuality, work up of case, involvement in treatment, follow-up reports. SCORE 0-5
  - (4) Capacity to work in a team (Behaviour with colleagues, nursing staff and relationship with paramedicals). SCORE 0-5
  - (5) Initiative, participation in discussions, research aptitude. SCORE 0-5

poor	Fair/	Below	Average/	Above	Excellent
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		<b>Average/</b>		<b>Average/</b>	
0	1	2	3	4	5

(6) A Score of less than 3 in any of above items will represent unsatisfactory completion of internship.

(7) Full registration shall only be given by the State Medical Council/Medical Council of India on the award of the MBBS degree by the university or its declaration that the candidate is eligible for it.

(8) Some guidelines in the implementation of the training programme are given below.

(9) **INTERNSHIP – DISCIPLINE RELATED:**

**(i) Community Medicine**

Interns shall acquire skills to deal effectively with an individual and the community in the context of primary health care. This is to be achieved by hands on experience in the district hospital and primary health Centre. The details are as under: -

**(I) Community Health Centre/District Hospital/Attachment to General Practitioner:**

- (1) During this period of internship an intern must acquire
  - a) clinical competence for diagnosis of common ailments, use of bed side investigation and primary care techniques;
  - b) gain information on 'Essential drugs' and their usage;
  - c) recognise medical emergencies, resuscitate and institute initial treatment and refer to suitable institution.
- (2) Undergo specific Government of India/Ministry of Health and Family Welfare approved training using Government of India prescribed training manual for Medical Officers in all National Health Programmes (e.g. child survival and safe motherhood-EPI, CDD, ARI, FP, ANC, safe delivery, Tuberculosis, Leprosy and others as recommended by Ministry of Health and Family Welfare:-
  - a) gain full expertise in immunization against infectious disease;
  - b) participate in programmes in prevention and control of locally prevalent endemic diseases including nutritional disorders;
  - c) learn skills first hand in family welfare planning procedures;
  - d) learn the management of National Health Programmes;
- (3) Be capable of conducting a survey and employ its findings as a measure towards arriving at a community diagnosis.
- (4) (a) conduct programmes on health education,  
(b) gain capabilities to use Audiovisual aids,  
(c) acquire capability of utilization of scientific information for promotion of community health
- (5) Be capable of establishing linkages with other agencies as water supply, food distribution and other environmental/social agencies.
- (6) Acquire quality of being professional with dedication, resourcefulness and leadership.
- (7) Acquire managerial skills, delegation of duties to paramedical staff and other health professionals.

**(II) TALUKA HOSPITAL**

Besides clinical skill, in evaluation of patient in the environment and initiation of primary care, an Intern shall:

- (1) effectively participate with other members of the health team with qualities of leadership;
- (2) make a community diagnosis in specific situations such as epidemics and institute relevant control measures for communicable diseases;
- (3) develop capability for analysis of hospital based morbidity and mortality statistics.

- (4) Use essential drugs in the community with the awareness of availability, cost and side effects;
- (5) Provide health education to an individual/community on :
  - a) tuberculosis;
  - b) small family, spacing, use of appropriate contraceptives;
  - c) applied nutrition and care of mothers and children;
  - d) immunization;
  - e) participation in school health programme.

**(III) PRIMARY HEALTH CENTRE**

- (1) Initiate or participate in family composite health care (birth to death), Inventory of events;
- (2) Participation in all of the modules on field practice for community health e.g. safe motherhood, nutrition surveillance and rehabilitation, diarrhea disorders etc.
- (3) Acquire competence in diagnosis and management of common ailments e.g. malaria, tuberculosis, enteric fever, congestive heart failure, hepatitis, meningitis acute renal failure etc.;
- (4) Acquire proficiency for Family Welfare Programmes (ante natal care, normal delivery, contraception care etc.)

**(ii) GENERAL MEDICINE**

- (I) Interns shall acquire following training during their term.
  - (1) acquire competence for clinical diagnosis based on history physical examination and relevant laboratory investigation and institute appropriate line of management;
  - (2) this would include diseases common in tropics (parasitic, bacterial or viral infections, nutritional disorders, including dehydration and electrolyte disturbances) and system illnesses.
- (II) The intern shall have assisted as a care team in intensive care of cardiac, respirator, hepatic, neurological and metabolic emergencies.
- (III) The intern shall be able to conduct the following laboratory investigations:
  - (a) Blood: (Routine haematology smear and blood groups);
  - (b) Urine: (Routine chemical and microscopic);
  - (c) Stool: (for ova/cyst and occult blood);
  - (d) Sputum and throat swab for gram stain or acid fast stain and
  - (e) Cerebro Spinal Fluid (CSF) for smear.
- (IV) Conduct following diagnostic procedures:
  - (a) Urethral catheterisation;
  - Proctoscopy;
  - Ophthalmoscopy/Otoscopy;
  - Indirect laryngoscopy;
  - (b) therapeutic procedures;
  - Insertion of Ryles Tube;
  - Pleural, ascetic tap, Cerebro Spinal Fluid (CSF) tap, installing or air way tube, Oxygen administration etc.
- (V) Biopsy Procedures:
  - Liver, Kidney, Skin, Nerve, Lymph node, and muscle biopsy, Bone marrow aspiration, Biopsy of Malignant lesions on surface, Nasal/nerve/skin smear for leprosy.
- (VI) (a) Familiarity with usage of life saving procedures:
  - including use of aspirator, respirator and defibrillator,
  - (b) Competence in interpretation of different monitoring devices such as cardiac monitor, blood gas analysis etc.
- (VII) Participate as a team member in total health care of an individual including appropriate follow-up and social rehabilitation.
- (VIII) Other competencies as indicated in general objectives.

**(iii) PAEDIATRICS:**

The details of the skills that an intern shall acquire during his/her tenure in the department of Paediatrics are as follows:

The intern shall be able to:

- (1) diagnose and manage common childhood disorders including neonatal disorders and acute emergencies( enquiry from parents of sick children), examining sick child making a record of information;
- (2) carry out activities related to patient care such as laboratory work, investigative procedures and use of special equipments. The details are given as under:-
  - (a) diagnostic techniques: blood (including from femoral vein and umbilical cord), abscess, cerebrospinal fluid, urine, pleura and peritoneum and common tissue biopsy techniques;
  - (b) techniques related to patient care: immunization, perfusion techniques, feeding procedures, tuberculin testing & breast feeding counselling;
  - (c) use of equipment: vital monitoring, temperature monitoring, resuscitation at birth and care of children receiving intensive care;
- (3) screening of newborn babies and those with objective risk factors for any anomalies and steps for prevention in future;
- (4) plan in collaboration with parents and individual, collective surveillance of growth and development of new born babies, infants and children so that he/she is able to:
  - (a) recognise growth abnormalities;
  - (b) recognise anomalies of psychomotor development;
  - (c) detect congenital abnormalities;
- (5) assess nutritional and dietary status of infants and children and organise prevention, detection and follow up of deficiency disorders both at individual and community level such as:
  - (a) protein-energy malnutrition
  - (b) deficiencies of vitamins especially A, B, C and D;
  - (c) Iron deficiency;
- (6) institute early management of common childhood disorders with special reference to Paediatrics dosage and oral rehydration therapy.
- (7) Participate actively in public health programme oriented towards children in the community.

**(iv) GENERAL SURGERY**

An intern is expected to acquire following skills during his/her posting:

- (A) Diagnose with reasonable accuracy all surgical illnesses including emergencies
- (B)
  - (a) resuscitate a critically injured patient and a severe burns patient;
  - (b) control surface bleeding and manage open wound;
- (C)
  - (a) monitor patients of head, spine, chest abdominal and pelvic injury;
  - (b) institute first-line management of acute abdomen;
- (D)
  - (a) perform venesection;
  - (b) perform tracheostomy and endotracheal intubation;
  - (c) catheterise patients with acute retention or perform trocar cystostomy,
  - (d) drain superficial abscesses,
  - (e) suturing of wound,
  - (f) perform circumcision,
  - (g) biopsy of surface tumours,
  - (h) perform vasectomy

**(v) CASUALTY:**

The intern after training in Casualty must be able to:

- (1) identify acute emergencies in various disciplines of medical practice;
- (2) manage acute anaphylactic shock;

- (3) manage peripheral-vascular failure and shock;
- (4) manage acute pulmonary oedema and Left Ventricular failure (LVF);
- (5) undertake emergency management of drowning poisonings and seizures;
- (6) undertake emergency management of bronchial asthma and status asthmaticus;
- (7) undertake emergency management of hyperpyrexia;
- (8) undertake emergency management of comatose patients regarding airways positioning, prevention of aspiration and injuries;
- (9) assess and administer emergency management of burns;
- (10) assess and do emergency management of various trauma victims;
- (11) identify medicolegal cases and learn filling up forms as well as complete other medicolegal formalities in cases of injury, poisoning, sexual offenses, intoxication and other unnatural conditions.

**(vi) OBSTETRICS AND GYNAECOLOGY:**

Technical skills that interns are expected to learn:

- (1) diagnosis of early pregnancy and provision of ante-natal care;
- (2) diagnosis of pathology of pregnancy related to
  - (a) abortions;
  - (b) ectopic pregnancy;
  - (c) tumours complicating pregnancy;
  - (d) acute abdomen in early pregnancy;
  - (e) hyperemesis gravidarum;
- (3) detection of high risk pregnancy cases and suitable advise e.g. PIH, hydramanios, antepartum haemorrhage, multiple pregnancies, abnormal presentations and intra-uterine growth retardation;
- (4) antenatal pelvic assessment and detection of cephalopelvic disproportion;
- (5) induction of labour and amniotomy under supervision;
- (6) management of normal labour, detection of abnormalities, post-partum hemorrhage and repair of perennial tears;
- (7) assist in forceps delivery;
- (8) assist in caesarean section and postoperative care thereof;
- (9) detection and management of abnormalities of lactation;
- (10) perform non-stress test during pregnancy;
- (11) per speculum, per vaginum and per rectal examination for detection of common congenital, inflammatory, neoplastic and traumatic conditions of vulva, vagina, uterus and ovaries;
- (12) medicolegal examination in Gynecology and obstetrics.
- (13) To perform the following procedures:-
  - (a) dilation and curettage and fractional curettage;
  - (b) endometrial biopsy;
  - (c) endometrial aspiration;
  - (d) pap smear collection;
  - (e) Intra Uterine Contraceptive Device (IUCD) insertion;
  - (f) Minilap ligation;
  - (g) Urethral catheterisation;
  - (h) Suture removal in postoperative cases;
  - (i) Cervical punch biopsy;
- (14) to assist in major abdominal and vaginal surgery cases in Obstetrics and Gynaecology.
- (15) to assist in follow-up postoperative cases of obstetrics and gynaecology such as:
  - (a) Colposcopy;
  - (b) Second trimester Medical Termination of Pregnancy (MTP) procedures e.g. Emcredyl Prostaglandin instillations;
- (16) To evaluate and prescribe oral contraceptive.

**(vii) OTO RHINO LARYNGOLOGY (ENT)**

- (1) Interns shall acquire ability for a comprehensive diagnosis of common Ear, Nose and Throat (ENT) diseases including the emergencies and malignant neoplasma of the head and neck;
- (2) he/she shall acquire skills in the use of head mirror, otoscope and indirect laryngoscopy and first line of management of common Ear Nose and Throat (ENT) problems;
- (3) he/she shall be able to carry out minor surgical procedures such as:
  - (a) ear syringing antrum puncture and packing of the nose for epistaxis,
  - (b) nasal douching and packing of the external canal,
  - (c) remove the foreign bodies from the nose and ear
  - (d) observed or assisted in various endoscopic procedures and trachesotomy;
- (4) an item shall have participated as a team member in the community diagnosis e.g. Chronic Suppurative Otitis Media (CSOM) and be aware of national programme on prevention of deafness,
- (5) he/she shall possess knowledge of various ENT rehabilitative programmes.

**(viii) OPHTHALMOLOGY**

An intern shall acquire following skills: -

- (1) he/she shall be able to diagnose and manage common ophthalmological conditions such as:-  
Trauma, Acute conjunctivitis, allergic conjunctivitis, xerosis, entropion, corneal ulcer, iridocyclitis, myopia, hypermetropia, cataract, glaucoma, ocular injury and sudden loss of vision;
- (2) he shall be able to carry out assessment of refractive errors and advise its correction;
- (3) he shall be able to diagnose ocular changes in common systemic disorders;
- (4) he/she shall be able to perform investigative procedures such as:-  
Tonometry, syringing, direct ophthalmoscopy, subjective refraction and fluorescein staining of cornea.
- (5) he/she shall have carried out or assisted the following procedures:
  - a) Subconjunctival injection;
  - b) Ocular bandaging;
  - c) Removal of concretions;
  - d) Epilation and electrolysis;
  - e) Corneal foreign body removal;
  - f) Cauterization of corneal ulcers;
  - g) Chalazion removal;
  - h) Entropion correction;
  - i) Suturing conjunctival tears;
  - j) Lids repair
  - k) Glaucoma surgery (assisted);
  - l) Enucleation of eye in cadaver;
- (6) he/she shall have full knowledge on available methods for rehabilitation of the blind.

**(ix) ORTHOPAEDICS ;**

**GOAL:**

The aim of teaching the undergraduate student in Orthopaedics and Rehabilitation is to impart such knowledge and skills that may enable him to diagnose and treat

common ailments. He shall have ability to diagnose and suspect presence of fracture, dislocation, acute osteomyelitis, acute poliomyelitis and common congenital deformities such as congenital talipes equinovarus (CTEV) and dislocation of hip (CDH).

(A) **THERAPEUTIC-** An intern must know:

- (a) Splinting (plaster slab) for the purpose of emergency splintage, definitive splintage and post operative splintage and application of Thomas splint;
- (b) Manual reduction of common fractures – phalangeal, metacarpal, metatarsal and Colles's fracture;
- (c) Manual reduction of common dislocations – interphalangeal, metacarpophalangeal, elbow and shoulder dislocations;
- (d) Plaster cast application for undisplaced fractures of arm, fore arm, leg and ankle;
- (e) Emergency care of a multiple injury patient;
- (f) Precautions about transport and bed care of spinal cord injury patients.

(B) **Skill that an intern should be able to perform under supervision:**

- (1) Advise about prognosis of poliomyelitis, cerebral palsy, CTEV and CDH;
- (2) Advise about rehabilitation of amputees and mutilating traumatic and leprosy deformities of hand;

(C) An intern must have observed or preferably assisted at the following operations:

- (1) drainage for acute osteomyelitis;
- (2) sequestrectomy in chronic osteomyelitis;
- (3) application of external fixation;
- (4) internal fixation of fractures of long bones.

(x) **DERMATOLOGY AND SEXUALLY TRANSMITTED DISEASES**

An intern must be able to: -

- (1) conduct proper clinical examination; elicit and interpret physical findings, and diagnose common disorders and emergencies.
- (2) perform simple, routine investigative procedures for making bedside diagnosis, specially the examination of scraping for fungus, preparation of slit smears and staining for AFB for leprosy patient and for STD cases;
- (3) take a skin biopsy for diagnostic purpose;
- (4) manage common diseases recognizing the need for referral for specialized care in case of inappropriateness of therapeutic response.

(xi) **PSYCHIATRY**

An Intern must be able to:

- (1) diagnose and manage common psychiatric disorders;
- (2) identify and manage psychological reaction and psychiatric disorders in medical and surgical patients in clinical practice and community setting.

(xii) **TUBERCULOSIS AND RESPIRATORY DISEASES**

An intern after training must be able to: -

- (1) conducting proper clinical examination, elicit and interpret clinical findings and diagnose common respiratory disorders and emergencies;
- (2) perform simple, routine investigative procedures required for making bedside diagnosis, specially sputum collection, examination for etiological organism like AFB, interpretation of chest X-rays and respiratory function tests;
- (3) interpret and manage various blood gases and pH abnormalities in various respiratory diseases;
- (4) manage common diseases recognizing need for referral for specialized care in case of inappropriateness of therapeutic response;
- (5) perform common procedures like laryngoscopy, pleural aspiration, respiratory physiotherapy, laryngeal intubation and pneumo-thoracic drainage aspiration.

(xiii) **ANAESTHESIA**

After the internship in the department of Anesthesiology an intern shall acquire knowledge, skill and attitude to:

- a) perform pre-anaesthetic check up and prescribe pre-anaesthetic medications;
- b) perform venepuncture and set up intravenous drip;
- c) perform laryngoscopy and endotracheal intubation;
- d) perform lumbar puncture, spinal anaesthesia and simple nerve blocks;
- e) conduct simple general anaesthetic procedures under supervision;
- f) monitor patients during anaesthesia and post operative period;
- g) recognise and manage problems associated with emergency anaesthesia;
- h) maintain anaesthetic records;
- i) recognise and treat complication in post operative period;
- j) perform cardio-pulmonary brain resuscitation (C.P.B.R.) correctly, including recognition of cardiac arrest.

**(xiv) RADIO-DIAGNOSIS:**

An intern after training must be able to identify and diagnose:

- (1) all aspects of 'Emergency Room' Radiology like –
  - (a) all acute abdominal conditions;
  - (b) all acute traumatic conditions with emphasis on head injuries;
  - (c) differentiation between Medical and surgical radiological emergencies;
- (2) Basic hazards and precautions in Radio-diagnostic practices.

**(xv) PHYSICAL MEDICINE AND REHABILITATION:**

An intern is expected to acquire the following skills during his/her internship: -

- (1) competence for clinical diagnosis based on details history an assessment of common disabling conditions like poliomyelitis, cerebral palsy, hemiplegia, paraplegia, amputations etc;
- (2) participation as a team member in total rehabilitation including appropriate follow up of common disabling conditions;
- (3) principles and procedures of fabrication and repair of artificial limbs and appliances;
- (4) various therapeutic modalities;
- (5) use of self help devices and splints and mobility aids;
- (6) familiarity with accessibility problems and home making for disabled;
- (7) ability to demonstrate simple exercise therapy in common conditions like prevention of deformity in polio, stump exercise in an amputee etc.;

**(xvi) FORENSIC MEDICINE AND TOXICOLOGY**

The intern is to be posted in the casualty department of the hospital while attached under Forensic Medicine Department with the following objectives:

- (1) to identify medicolegal problem in a hospital and general practice;
- (2) to identify and learn medicolegal responsibilities of a medical man in various hospital situations;
- (3) to be able to diagnose and learn management of basic poisoning conditions in the community;
- (4) to learn how to handle cases of sexual assault;
- (5) to be able to prepare medico-legal reports in various medicolegal situations;
- (6) to learn various medicolegal post-mortem procedures and formalities during its performance by police.

# APPENDICES

## APPENDIX 'A'

Curriculum in 'Family Welfare' for the Bachelor of Medicine and Bachelor of Surgery (MBBS) Course.

The Curriculum may be considered under various pre and para clinical heads and the following details are worked out for each of the disciplines.

### 1. Anatomy

- i) Gross and microscopic anatomy of the male and female generative organs.
- ii) The menstrual cycle.
- iii) Spermatogenesis and Oogenesis
- iv) Fertilization of the ovum.
- v) Tissue and organ changes in the mother in pregnancy.
- vi) Embryology and Organogenesis.
- vii) Principles of Genetics.
- viii) Applied anatomy of mechanical methods of preventing conception.
  - a) in female- chemical contraceptive, pessaries, Intra-Uterine Contraceptive Device (IUCD), tubectomy etc.
  - b) in male – condom, vasectomy etc.

### 2. Physiology

- i) Physiology of reproduction.
- ii) Endocrines and regulations of reproduction in the female
- iii) Endocrines and physiology of reproduction in the male.
- iv) Physiology and Endocrinology of pregnancy, parturition and lactation.
- v) Nutritional needs of mother and child during pregnancy and lactation.
- vi) The safe period-rhythm method of contraceptions.
- vii) Principles of use of oral contraceptive.

### 3. Pharmacology

- i) Mode of action and administration of:
  - a) Chemical contraceptive
  - b) Oral contraceptive
- ii) Contra indication for administration of contraceptives.
- iii) Toxic effects of contraceptives.

### 4. Community Medicine

- i) The need for family welfare Planning.
- ii) Organization of Family Welfare Planning service.
- iii) Health Education in relating to Family Welfare Planning.
- iv) Nutrition.
- v) Psychological needs of the mother, the child and the family.
- vi) Demography and vital Statistics.

### 5. Obstetrics & Gynaecology

- i) Contraceptive methods in male/female.
  - a) Mechanical
    - i) Pessaries, Intra Uterine Contraceptive Device (IUCD), Condoms,
    - ii) Tubectomy and vasectomy
  - (b) Chemical
  - (c) Oral
  - (d) Rhythm Method
- ii) Demonstrations of use of Pessaries, IUCD, Condoms and technique of tubectomy
- iii) Advice on family planning to be imparted to parents.

### 6. Paediatrics

- i) Problems of child health in relation to large family.

- (a) Organization of pediatric services.
- (b) Nutritional problems of mother and child.
- (c) Childhood diseases due to overcrowding.

## **7. Surgery**

Technique of Vasectomy.

### **I. Compulsory Internship**

Placement of a student for in-service training in a family welfare planning clinic for a period of at least one month.

### **II. Examination**

It is necessary that questions on family welfare planning be introduced in the theory, practical and oral examination throughout the MBBS course.

The curriculum content has been indicated subjectwise. However, it would be more advantageous to the student for purpose of integrated learning and for understanding of the subject if family welfare planning instruction with the curriculum content indicated could be divided into two parts.

## **Part-I**

### **Anatomy, Physiology, Biochemistry and Pharmacology**

There shall be close integration in the teaching of these subjects. It is suggested that during the early para-clinical years, two to three weeks may be set apart for instruction in Family Welfare Planning relating to these subjects; so that the student gets an overall understanding of the principles and practice of "Family Planning" within the limited time available for covering all the subjects of the medical course. The method suggested would save time and repetition of essential facts.

### **Part-II**

This includes the later para-clinical and clinical courses. The practical aspects of Family Welfare Planning methods should be emphasized. The program of instruction shall be supervised by the Department of Obstetrics and Gynaecology. The department of Community Medicine Internal Medicine, Psychiatry, Paediatrics and Surgery must be closely associated in imparting instruction relating to the problems arising for want of family welfare planning and the advantages to society and the individual which will be gained by adopting the measures suggested.

### **Seminars:**

The medical colleges shall organise occasional seminars in which staff from all departments and the in-service trainees shall participate.

## APPENDIX-B

### **A comprehensive list of skills recommended as desirable for Bachelor of Medicine and Bachelor of Surgery (MBBS) Graduate:**

#### **I. Clinical Evaluation:**

- (a) To be able to take a proper and detailed history.
- (b) To perform a complete and thorough physical examination and elicit clinical signs.
- (c) To be able to properly use the stethoscope, Blood Pressure, Apparatus Auroscope, Thermometer, Nasal Speculum, Tongue Depressor, Weighing Scales, Vaginal Speculum etc.:
- (d) To be able to perform internal examination-Per Rectum (PR), Per Vaginum (PV) etc.
- (e) To arrive at a proper provisional clinical diagnosis.

#### **II. Bed side Diagnostic Tests:**

- (a) To do and interpret Haemoglobin(HB), Total Count (TC), Erythrocytic Sedimentation Rate (ESR), Blood smear for parasites, Urine examination /albumin /sugar /ketones/microscopic:
- (b) Stool exam for ova and cysts;
- (c) Gram, staining and Siehl-Nielsen staining for AFB;
- (d) To do skin smear for lepra bacilli
- (e) To do and examine a wet film vaginal smear for Trichomonas
- (f) To do a skin scraping and Potassium Hydroxide (KOH) stain for fungus infections;
- (g) To perform and read Montoux Test.

#### **III. Ability to Carry Out Procedures.**

- (a) To conduct CPR (Cardiopulmonary resuscitation) and First aid in newborns, children and adults.
- (b) To give Subcutaneous (SC) /Intramuscular (IM) /Intravenous (IV) injections and start Intravenous (IV) infusions.
- (c) To pass a Nasogastric tube and give gastric leavage.
- (d) To administer oxygen-by mask/catheter
- (e) To administer enema
- (f) To pass a urinary catheter- male and female
- (g) To insert flatus tube
- (h) To do pleural tap, Ascitic tap & lumbar puncture
- (i) Insert intercostal tube to relieve tension pneumothorax
- (j) To control external Haemorrhage.

#### **IV. Anaesthetic Procedure**

- (a) Administer local anaesthesia and nerve block
- (b) Be able to secure airway potency, administer Oxygen by Ambu bag.

#### **V. Surgical Procedures**

- (a) To apply splints, bandages and Plaster of Paris (POP) slabs;
- (b) To do incision and drainage of abscesses;
- (c) To perform the management and suturing of superficial wounds;
- (d) To carry on minor surgical procedures, e.g. excision of small cysts and nodules, circumcision, reduction of paraphimosis, debridement of wounds etc.
- (e) To perform vasectomy;
- (f) To manage anal fissures and give injection for piles.

#### **VI. Mechanical Procedures**

- (a) To perform thorough antenatal examination and identify high risk pregnancies.
- (b) To conduct a normal delivery;
- (c) To apply low forceps and perform and suture episiotomies;
- (d) To insert and remove IUD's and to perform tubectomy

- VII. Paediatrics**
- (a) To assess new borns and recognise abnormalities and I.U. retardation
  - (b) To perform Immunization;
  - (c) To teach infant feeding to mothers;
  - (d) To monitor growth by the use of 'road to health chart' and to recognize development retardation;
  - (e) To assess dehydration and prepare and administer Oral Rehydration Therapy (ORT)
  - (f) To recognize ARI clinically;
- VIII. ENT Procedures:**
- (a) To be able to remove foreign bodies;
  - (b) To perform nasal packing for epistaxis;
  - (c) To perform trachesotomy
- IX. Ophthalmic Procedures:**
- (a) To invert eye-lids;
  - (b) To give Subconjunctival injection;
  - (c) To perform appellation of eye-lashes;
  - (d) To measure the refractive error and advise correctional glasses;
  - (e) To perform nasolacrimal duct syringing for potency
- X. Dental Procedures:**
- To perform dental extraction
- XI. Community Healthy:**
- (a) To be able to supervise and motivate, community and para-professionals for corporate efforts for the health care;
  - (b) To be able to carry on managerial responsibilities, e.g. Management of stores, indenting and stock keeping and accounting
  - (c) Planning and management of health camps;
  - (d) Implementation of national health programmes;
  - (e) To effect proper sanitation measures in the community, e.g. disposal of infected garbage, chlorination of drinking water;
  - (f) To identify and institute and institute control measures for epidemics including its proper data collecting and reporting.
- XII. Forensic Medicine Including Toxicology**
- (a) To be able to carry on proper medicolegal examination and documentation of injury and age reports.
  - (b) To be able to conduct examination for sexual offences and intoxication;
  - (c) To be able to preserve relevant ancillary material for medico legal examination;
  - (d) To be able to identify important post-mortem findings in common un-natural deaths.
- XIII. Management of Emergency**
- (a) To manage acute anaphylactic shock;
  - (b) To manage peripheral vascular failure and shock;
  - (c) To manage acute pulmonary oedema and LVF;
  - (d) Emergency management of drowning, poisoning and seizures
  - (e) Emergency management of bronchial asthma and status asthmaticus;
  - (f) Emergency management of hyperpyrexia;
  - (g) Emergency management of comatose patients regarding airways, positioning prevention of aspiration and injuries
  - (h) Assess and administer emergency management of burns

## APPENDIX-C

### Prescribed Teaching Hours and Suggested Model Time Tables:-

Following minimum teaching hours are prescribed in various disciplines:

**A. Pre-Clinical Subjects :** (Phase I - First and Second Semester)

Anatomy	650 Hrs.
Physiology	480 Hrs.
Biochemistry	240 Hrs.
Community Medicine	60 Hrs.

**B. Para-Clinical Subjects:** (Phase II - 5<sup>th</sup> to 7<sup>th</sup> Semester)

Pathology	300 Hrs.
Pharmacology	300 Hrs.
Microbiology	250 Hrs.
Community Medicine	200 Hrs. (including 8 weeks postings of 3 hrs each)
Forensic Medicine	100 Hrs.

Teaching of para-clinical subjects shall be 4 hrs per day in 3<sup>rd</sup> Hrs Semester and 3Hrs per day in 4<sup>th</sup> and 5<sup>th</sup> Semesters (See attached Time Table)

**C. Clinical Subjects**

1. Clinical postings as per chart attached.
2. Theory lectures, demonstrations and Seminars etc.in addition to clinical postings as under. The clinical lectures to be held from 4<sup>th</sup> Semester onwards (See attached Time Table)

-	Gen-Medicine	300 Hours	Gen. Surgery	300 Hours
-	Paediatrics	100 "	Orthopedics	100 "
-	T.B. and Chest	20 "	Ophthalmology	100 "
-	Psychiatry	20 "	ENT	70 "
-	Skin and STD	30 "	Radiology	20 "
-	Community Medicine	50 "	Dentistry	10 "
-	Anaesthesia	20 "	Obst & Gynae.	300 "

**Note**

This period of training is minimum suggested. Adjustments where required depending on availability of time be made. This period of training does not include university examination period. Extra time available be devoted to other Sub-specialities. During semesters 3 to 9 following clinical postings for each student, of 3 hrs. duration is suggested for various departments after introductory course in Clinical Methods in Medicine and surgery of 2 weeks each for the whole class.

Subjects	3 <sup>rd</sup> Sem- ester weeks	4 <sup>th</sup> Sem- ester weeks	5 <sup>th</sup> Sem- ester weeks	6 <sup>th</sup> Sem- ester weeks	7 <sup>th</sup> Sem- ester weeks	8 <sup>th</sup> Sem- ester weeks	9 <sup>th</sup> Sem- ester weeks	Total
General Medicine	6	-	4	-	4	6	6	26
Paediatrics	-	2	-	2	2	4	-	10
TB and Chest	-	2	-	-	-	-	-	02
Skin and STD	-	2	-	2	-	2	-	06
Psychiatry	-	-	2	-	-	-	-	02
Radiology	-	-	-	-	2	-	-	02
Gen Surgery	6	-	4	-	4	6	6	26
Orthopaedics	-	-	4	4	-	-	2	10
Ophthalmology	-	4	-	4	-	-	2	10
ENT	-	4	-	4	-	-	-	08
Obst. &Gyn. And Family Planning	2	4	4	-	4	4	6	24
Comm. Med.	4	4	-	4	-	-	-	12
Casualty	-	-	-	2	-	-	-	02
Dentistry	-	-	-	-	2	-	-	02
<b>Total</b>	<b>18</b>	<b>22</b>	<b>18</b>	<b>22</b>	<b>18</b>	<b>22</b>	<b>22</b> 175	<b>14</b> <b>2</b>

Clinical methods in Medicine and Surgery for whole class will be for 2 weeks each respectively at the start of 3<sup>rd</sup> semester.

This posting will include training in Radiodiagnosis & Radiotherapy where existent.

This posting includes exposure to Rehabilitation Physiotherapy

This posting includes exposure to laboratory medicine and infectious diseases.

This posting includes exposure to dressing and Anaesthesia

This includes maternity training and Family medicine and the 3<sup>rd</sup> semester posting shall be in Family Welfare Planning.

### **PHASE –II**

#### **Third Semester**

Days/8-9 Time	9-10	10-11	11-12	12-1	1-2	2-3	3-4
Mon	Para Clinical Lectures	Clinical Postings		Para Clinical Lectures		Practicals	
Tues	do	do	do	do	L	Para-Clinical	
Wed	do	do	do	do	U	Do	
Thurs	do	do	do	do	N	Do	
Fri	do	do	do	do	C	Do	
Sat	do	do	do	do	H	Do	

Note: These are suggested time tables. Adjustments where required, depending upon the availability of time and facility, are made.

#### **Fourth and Fifth Semester**

Days/8-9 Time	9-10	10-11	11-12	12-1	1-2	2-3	3-4
Mon	Lectures In Clinical Subjects	Clinical Postings		Lectures in para-clinical subjects		Practicals	
Tues	do	do	do	do	L	Para-Clinical	
Wed	do	do	do	do	U	Do	
Thurs	do	do	do	do	N	Do	
Fri	do	do	do	do	C	Do	
Sat	do	do	do	do	H	Do	

**Sixth, Seventh, Eighth & Ninth Semester**

Days/8-9 Time	9-10	10-11	11-12	12-1	1-2	2-3	3-4
Mon	Lectures In Clinical Subjects	Clinical Postings		Lectures in Demonstration in clinical subjects		Practicals Demonstrations in Clinical Subjects	
Tues	do	do		do	L		
Wed	do	do		do		Do	
Thurs	do	do		do	U	Do	
Fri	do	do		do	N	Do	
Sat	do	do		do	C	Do	
					H		

**Note:** These are suggested time tables. Adjustments where required, depending upon the availability of time and facility, be made.

# **ANNEXURES**

# ANNEXURE

## FIRST PROFESSIONAL MODEL QUESTION PAPERS

### ANATOMY

#### PAPER I

Time: 3 hours

Max. Marks: 80

#### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### SECTION A

General Anatomy, Gross Anatomy-Upper limb, Lower limb, General Histology, General Embryology and Medical Genetics

1. What is the normal neck-shaft angle of femur? Mention the conditions in which it gets deviated and add a note on its arterial supply.  
(2+4+4=10 marks)
2. Explain briefly (3 x 5 = 15 marks)
  - a. Abduction of shoulder joint & Scapulohumeral rhythm
  - b. Mechanism of locking at knee joint
  - c. Fascial spaces of hand
  - d. Placental barrier
  - e. X-chromosome inactivation
3. Write short notes on (3 x 5 = 15 marks)
  - a. Twinning
  - b. Myelinated and unmyelinated axons
  - c. Structure and function of burse
  - d. Erb's point
  - e. Myoepithelial cell

#### SECTION B

Abdomen, Pelvis & Perineum, Systemic Histology, Systemic Embryology

4. What is processes vaginalis of Testes? How does this lead for development of congenital indirect inguinal hernia and hydrocoele?  
(2+4+4=10 marks)
5. Explain Why / How (3 x 5 = 15 marks)
  - a. Formation of esophageal varices occur in condition of portal vein obstruction
  - b. Bare area of liver gets arterial supply through inferior phrenic artery
  - c. Falciform ligament and lesser omentum are regarded as parts of ventral mesogastrium
  - d. Seepage of urine occurs through umbilicus
  - e. Mucosal and submucosal changes occur in small intestine from proximal to distal
6. Write short notes on (3 x 5 = 15 marks)
  - a. Pudendal block
  - b. Congenital meegacolon
  - c. Microscopic structure of macula densa
  - d. Hassall's corpuscles
  - e. Formation of caput medusae

## ANATOMY

### PAPER II

Time: 3 hours

Max. Marks: 80

#### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### **SECTION A**

Thorax, Brain & Spinal cord, Systemic Histology (Thorax & Brain), Systemic Embryology (Thorax & Brain), Post natal growth & Development

1. Describe the relations branches and normal development of arch of Aorta. Mention the arteries that take part in collateral circulation in condition such as Coarctation of Aorta of post ductal type. (2+4+4=10 marks)
2. Explain briefly (3 x 5 = 15 marks)
  - a) Pial components of spinal cord
  - b) Vascular supply of interventricular septum
  - c) Cerebellar cortex
  - d) Telachoroidea of 4<sup>th</sup> ventricle
3. Write short notes on (3 x 5 = 15 marks)
  - a) Broncho pulmonary segments
  - b) Azygos vein
  - c) Milestones of one year
  - d) Alar and basal plate
  - e) Lumbar puncture

#### **SECTION B**

Head & Neck, Systemic Histology and Systemic Embryology

4. Describe the position, relations and fiber composition of sublentiform and retrolentiform parts of Internal capsule. Add a note on its arterial supply. (2+4+4=10 marks)
5. Explain briefly (3x 5 = 15 marks)
  - a) Killian's dehiscence of constrictor muscle of pharynx
  - b) Layers of scalp and applied significance of each
  - c) Auriculo temporal nerve syndrome
  - d) Pre ganglionic and post ganglionic connections of Ciliary and Submandibular ganglion
  - e) Histological components of blood acqeous barrier with a clinical importance.
6. Write short notes on (3 x 5 = 15 marks)
  - a) Microscopic structure taste bud
  - b) Branchial cyst
  - c) Movements of Vocal cords and muscles acting on it
  - d) Neuro vascular relations of thyroid gland
  - e) Medial wall of middle ear cavity

## PHYSIOLOGY

### PAPER I

Time: 3 hours

Max. Marks: 80

#### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### SECTION A

(General Physiology, Blood, Nerve and Muscle, ANS and GI system)

1. Name the clotting factors. With the help of a schematic diagram, explain the mechanism of blood coagulation. (2+8=10 marks)
2. (3 x 5 = 15 marks)
  - a) With the help of a suitable diagram, briefly describe the molecular basis of skeletal muscle contraction.
  - b) Classify lymphocytes. Briefly describe the mechanism of cellular immunity
  - c) With the help of a suitable diagram, describe the mechanism of hydrochloric acid secretion in stomach.
  - d) Classify the processes of transport across cell membrane. Briefly explain the mechanism of action of  $\text{Na}^+ - \text{K}^+$  pump
  - e) List the steps of erythropoiesis. Briefly describe the regulation of erythropoiesis.
3. (3 x 5 = 15 marks)
  - a) A female patient of 40 years age complains of drugging of eye-lid and general weakness and fatigue that aggravates towards evening, but improves after rest or sleep. What could be your provisional diagnosis and what is the nature of dysfunction? Name one investigation (and its finding) to confirm your diagnosis. Give the physiological basis of use of a drug in this condition.
  - b) A newborn baby delivered from an Rh negative mother had severe anemia, jaundice, generalized swelling of the body and some degree of motor deficits. What is the probable condition and what could be the possible cause of the dysfunction? Briefly mention the physiological basis of treatment of the dysfunction. How will you prevent this dysfunction to occur in subsequent pregnancy of the same mother?
  - c) Explain, why is dehydration common and usually fatal (if not treated immediately) in children. Why are sodium and glucose important components of oral rehydration solution?
  - d) List three important features each for regenerative and regenerative changes in a nerve following injury
  - e) A patient with history of chronic gastritis developed severe anemia. What are the possible pathophysiological bases of anemia in this condition and what is the possible physiological basis of management?

## **SECTION B**

### Endocrine Physiology, Physiology of Reproduction and Renal system)

4. Name the hormones secreted from adrenal glands. Describe various functions of cortisol. (2+8=10 marks)
5. (3 x 5 = 15 marks)
- With the help of a schematic diagram, describe the mechanisms of increase in cardiac output by thyroid hormones
  - With the help of a suitable diagram, briefly describe the uterine, ovarian and hormonal changes in different phases of menstrual cycle
  - With the help of suitable diagrams, briefly describe the counter-current mechanisms of acidification of
  - With the help of a suitable diagram, describe the mechanism of glomerular filtration
  - List the hormones that influence calcium metabolism. Briefly describe the function of any one major hormone controlling plasma calcium concentration.
6. (3 x 5 = 15 marks)
- A patient of 40 years age complains of polyphagia, polydipsia and polyuria. What could be your provisional diagnosis and how will you establish your diagnosis? How will you differentiate it from other major cause of polyuria? Give the physiological basis of use of a drug in this condition
  - A patient complains of loss of control on his micturition following recovery from a spinal injury. What could be the nature of bladder dysfunction and what is the cause of this dysfunction? What investigation you would like to perform to confirm the nature of bladder dysfunction
  - What advice you would like to give to a newly married couple not desirous of children for two years? Briefly explain the mechanism of action of this contraceptive method
  - A patient following thyroid surgery developed carpopedal spasm and laryngospasm. What is the possible cause of these dysfunctions and what is the physiological basis of its management?
  - Briefly explain the mechanism and importance of tubuloglomerular feedback.

## PHYSIOLOGY

### PAPER II

Time: 3 hours

Max. Marks: 80

#### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### **SECTION A**

(Cardiovascular System, Respiratory system and Environmental physiology)

1. Define systolic and diastolic pressure and give their normal values.  
Describe the short-term mechanisms of regulation of blood pressure.  
(2+8=10 marks)
  
2. (3 x 5 = 15 marks)
  - a) Draw a labelled diagram of oxyhemoglobin dissociation curve. Briefly, describe the effects of pH, temperature and 2,3-DPG on it
  - b) Define end-diastolic volume and ejection fraction and give their normal values. Describe briefly mechanism of autoregulation of cardiac output
  - c) Describe the mechanism of cardiovascular changes immediately following the moderate to severe isotonic exercise
  - d) Briefly describe the neural regulation of respiration
  - e) Draw a labelled diagram of cardiac muscle action potential. Explain, why cardiac muscle can not be tetanized?
  
3. (3 x 5 = 15 marks)
  - a) A patient complains of dyspnoea at rest, which is aggravated in supine posture. On examination, he was found to have increased JVP and pedal edema. What is your provisional diagnosis and what is clinical name of this dyspnea? Give the physiological mechanisms of edema formation in this condition.
  - b) Give the physiological mechanisms of changes in heart rate, cardiac output and blood pressure on acute exposure to very cold environment?
  - c) A person was exposed to an environment rich in carbon monoxide. What type of hypoxia he is likely to suffer? Briefly explain the physiological basis of management of this type of hypoxia
  - d) Draw a labelled diagram of JVP and give the physiological basis of genesis of each wave of JVP
  - e) With the help of a suitable diagram of timed vital capacity, briefly explain the primary difference between restrictive and obstructive lung disease

#### **SECTION B**

Neurophysiology (CNS), Special senses and Integrative physiology)

4. Draw a schematic labelled diagram of corticospinal tracts. Explain the mechanisms of difference between upper and lower motor neuron paralysis  
(2+8=10 marks)
  
5. (3 x 5 = 15 marks)
  - a) Draw a labelled diagram to depict functional divisions of cerebellum. Briefly, describe functions of cerebellum

- b) With the help of a suitable diagram, explain the effects of lesion at various parts of visual pathway
  - c) Describe the functions of middle ear
  - d) With the help of suitable diagrams, explain the mechanisms of referred pain
  - e) With the help of a suitable diagram, explain the mechanism of synaptic transmission in CNS
6. (3 x 5 = 15 marks)
- a) Following brain injury, a patient developed hypersexuality, hyperphagia and visual agnosia and started exploring objects orally. What is your provisional diagnosis? Name the parts of the brain affected in this dysfunction
  - b) A person developed difficulty in reading news papers after the age of 40 years. What is the probable visual defect and how will you treat this defect?
  - c) Briefly describe the physiological basis of health improvement by practice of slow-breathing type of pranayama
  - d) With the help of a labelled schematic diagram, trace the pathway for fine touch
  - e) A patient complains of incoordination of movement and instability in maintaining posture. On examination, he was found to have intentional tremor and inability to perform rapid alternate movement. Which structure of the central nervous system is most likely involved in this dysfunction? What will be the state of muscle tone in this disease and what is the physiological basis of change of the muscle tone

# BIOCHEMISTRY

## PAPER I

Time: 3 hours

Max. Marks: 80

### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book

Illustrate your answer with suitable diagrams

#### **SECTION A**

Biomolecules – structure function correlations, Cell organization; Enzymes, Bioenergetics and Biological oxidation; Body fluids, Fluid Electrolyte and Acid Base balance and associated disorders.

1. Describe the various types of inhibition of enzyme activity using Lineweaver Burk plot and state how are they distinguished? Name an enzyme inhibitor used as a drug. (6+3+1=10 marks)
2. (3 x 5 = 15 marks)
  - a) What are prostaglandins? State their biochemical functions
  - b) Explain the chemi osmotic theory of oxidative phosphorylation
  - c) Describe the common secondary structures of protein with suitable diagrams
  - d) Mention the enzymatic and non enzymatic parameters to diagnose acute myocardial infarction and state their significance in terms of time duration after infarction
  - e) Explain the role of kidney in acid base balance.
3. (3 x 5 = 15 marks)
  - a) Explain rancidity of fats and state how it can be prevented
  - b) How is the plasma sodium levels regulated?
  - c) Describe the organization of a typical biomembrane with a suitable diagram
  - d) Explain the structural composition and function of heparin
  - e) Explain the concept of Prion disease

#### **SECTION B**

Hepatobiliary, Gastric, Pancreatic function tests; Interpretation of Lab. Data; Digestion and absorption of nutrients, metabolism of carbohydrates and lipids, influence of hormones and associated inborn errors. Integration of intermediary metabolism. Biochemistry and diabetes mellitus

4. Describe the various steps involved in the formation of glucose from lactate. How is the process regulated? (8+2=10 marks)
5. (3 x 5 = 15 marks)
  - a) Explain the biosynthesis and utilization of ketone bodies
  - b) Describe the biosynthesis of acetyl CoA from Pyruvate
  - c) Using biochemical parameters, how are the different types of jaundice distinguished?
  - d) Explain the catabolism of cholesterol in the body
  - e) Explain the molecular defects and clinical features of galactosemias
6. Write short notes on (3 x 5 = 15 marks)
  - a) Explain the role of HDL in prevention of coronary artery disease
  - b) Explain the digestion and absorption of dietary triglycerides
  - c) How are reducing equivalents transported from the cytosol in to mitochondria?
  - d) How is HMP Shunt pathway functionally significant in our system?
  - e) The plasma lipid profile of a patient reveals the following  
Triglycerides: 200 mg/dl; HDL Cholesterol: 40 mg/dl; Total cholesterol: 300 mg/dl. Calculate the plasma LDL cholesterol level.

## BIOCHEMISTRY

### PAPER II

Time: 3 hours

Max. Marks: 80

#### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### **SECTION A**

Vitamins, Minerals and Nutrition; Instrumentation and techniques used in Biochemistry; Thyroid, Adrenocortical and renal function tests; Interpretation of laboratory data; Xenobiotics, environmental hazards and cancer biology

1. Mention good dietary sources, factors affecting gut absorption, transport and storage in the body, functional importance and daily requirement and RDA of iron in the body. (10 marks)
2. (3 x 5 = 15 marks)
  - a) Describe the Wald's visual cycle
  - b) What is dietary fibre? How is it beneficial to a diabetic patient?
  - c) Outline the steps and state the applications of Polymerase Chain Reaction
  - d) Explain the functional importance of folate in the body
  - e) State the principles, types and applications of chromatography
3. (3 x 5 = 15 marks)
  - a) Why is Phenylalanine considered both glucogenic and ketogenic amino acid?
  - b) How is the diagnosis of primary hypothyroidism made based on lab parameters?
  - c) Mention three types of biochemical reactions where pyridoxine is required, with examples.
  - d) Explain the functional role of Vitamin K in the body
  - e) Mention three enzymes which require Zinc as a cofactor

#### **SECTION B**

Metabolism of proteins, amino acids, haemoglobin, Nucleotides, purines and pyrimidines, their regulation and associated inborn errors; Porphyrrias; Human genetics, Molecular biology and Immunology

4. Describe the steps of DNA replication and add a note on telomerase. (10 marks)
5. (3 x 5 = 15 marks)
  - a) Illustrate with suitable examples the various types of DNA repair mechanisms
  - b) Explain the steps of catabolism of Methionine
  - c) Outline the steps and state the applications of PCR
  - d) Explain the sources of ammonia in the liver
  - e) Explain phase II detoxification reactions with examples.
6. (3 x 5 = 15 marks)
  - a) State the principle and application of hybridoma technique
  - b) What is a proto-oncogene?
  - c) How is complementary DNA constructed in the laboratory?
  - d) Explain the molecular basis of sickle cell anemia
  - e) How are dietary fibres beneficial for diabetic patients?

**SECOND PROFESSIONAL MODEL QUESTION PAPERS**

**PATHOLOGY**

**PAPER I**

General Pathology

Time: 3 hours

Max. Marks: 80

ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

**SECTION A**

1. Define inflammation and necrosis. List the causes of cell injury and discuss in detail the cell changes in irreversible cell injury. (15 marks)
2. Write short notes on: (5 x 7 = 35 marks)
  - a) Caseous necrosis
  - b) Hyperplasia
  - c) Dysplasia
  - d) Morphological changes in apoptosis
  - e) Cellular edema

**SECTION B**

3. Discuss the etiopathogenesis and morphology of acute myeloid Leukaemia. How you confirm the diagnosis. (15 marks)
4. Write short notes on: (5 x 7 = 35 marks)
  - a) Bone marrow changes in Haemolytic anaemia
  - b) Peripheral smear findings in Aplastic anaemia
  - c) Leukemoid reaction
  - d) I.T.P.
  - e) G6 PD Deficiency

## **PATHOLOGY**

### **PAPER II**

#### Systemic Pathology

Time: 3 hours

Max. Marks: 80

#### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### **SECTION A**

1. 65 year old male presented with the C/o cough and haemoptysis for 6 months. He also c/o loss of weight and appetite for the same duration.  
(15 marks)
  - a) What is probable diagnosis?
  - b) Discuss how you will diagnose this disease
  - c) Discuss in detail the risk factors, gross and microscopic features of this disease.
  
2. Write short notes on: (5 x 7 = 35 marks)
  - a) Pathogenesis of bronchiectasis
  - b) Microscopic findings in myocardial infarction
  - c) Aschoff nodule
  - d) Gross features of ulcerative colitis
  - e) Ulcers in the small intestine

#### **SECTION B**

3. Discuss in detail the clinical, radiologic, gross and microscopic features of Osteoclastoma.  
(15 marks)
  
4. Write short notes on: (5 x 7 = 35 marks)
  - a) Microscopic findings in Ewings sarcoma
  - b) Peripheral smear findings in Aplastic anaemia
  - c) Leukemoid reaction
  - d) I.T.P.
  - e) G6 PD deficiency

# MICROBIOLOGY

## PAPER I

Time: 3 hours

Max. Marks: 80

### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### **SECTION A**

##### General Microbiology and Immunology

1. Define sterilization and disinfection. List the methods of sterilization by physical methods and discuss in detail the principle of autoclave. Add a note on sterilization control.  
(15 marks)
2. Write short notes on: (5 x 7 = 35 marks)
  - a) Role of capsule in virulence
  - b) Plasmids and drug resistance in bacteria
  - c) Type I hypersensitivity reaction
  - d) Polymerase chain reaction
  - e) Antigen presenting cells

#### **SECTION B**

##### Systematic Bacteriology

3. Discuss the pathogenesis and laboratory diagnosis of enteric fever.  
(15 marks)
4. Write short notes on: (5 x 7 = 35 marks)
  - a) Toxins of *vibrio cholerae*
  - b) Non suppurative sequelae of *Streptococcus pyogenes*
  - c) Inclusion bodies of Chlamydia
  - d) Specific serological tests for syphilis
  - e) Clinical forms of anthrax

# MICROBIOLOGY

## PAPER II

Time: 3 hours

Max. Marks: 80

### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### **SECTION A**

##### Parasitology and Virology

1. List malarial parasites of man. Describe the life cycle of the parasite causing cerebral malaria. Discuss the pathogenesis and laboratory diagnosis of this condition. (15 marks)
2. Write short notes on: (5 x 7 = 35 marks)
  - a) Serodiagnosis of HIV / AIDS
  - b) NNN medium
  - c) Trichomonas vaginalis
  - d) Polio vaccines
  - e) Prevention of hepatitis B

#### **SECTION B**

##### Mycology and Applied Microbiology

3. A 2 year old boy was admitted in the hospital with complaints of fever, irritability and vomiting of 1 day duration. On examination, he had neck stiffness and a positive Kernig's sign could be elicited. An appropriate investigation was carried out to confirm the diagnosis. (2+10+3=15 marks)
  - a) What is the most probable diagnosis?
  - b) Describe the steps taken to diagnose this condition
  - c) What is the treatment in this case?
4. Write short notes on: (5 x 7 = 35 marks)
  - a) Germ tube test
  - b) Sources of hospital infection
  - c) Dimorphic fungi
  - d) Role of KOH in mycology
  - e) Investigation of a cholera outbreak

# PHARMACOLOGY

## PAPER I

Time: 3 hours

Max. Marks: 80

### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### **SECTION A**

##### General Pharmacology and CNS

1. Describe the major mechanisms of action of anti-epileptic drugs. Explain the Pharmacokinetics of phenytoin and state how it affects the dosage adjustment in epilepsy. (8+7= 15 marks)
2. Write short notes on: (5 x 7 = 35 marks)
  - a) Volume of distribution
  - b) Opioid antagonism
  - c) Tricyclic antidepressants
  - d) Competitive antagonism
  - e) Methanol poisoning

#### **SECTION B**

##### Chemotherapy and GIT

3. Classify the drugs used in malaria. Write the pharmacotherapy of malaria caused by Plasmodium vivax. (8+7=15 marks)
4. Write short notes on: (5 x 7 = 35 marks)
  - a) H. Pylori infection
  - b) Surgical prophylaxis with antibiotics
  - c) Hepatic amoebiasis
  - d) HIV protease inhibitors
  - e) Cell cycle specific agents

## PHARMACOLOGY

### PAPER II

Time: 3 hours

Max. Marks: 80

#### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### **SECTION A**

##### Endocrine, Cardiovascular system & Blood

1. Enumerate the drugs used in essential hypertension. Write briefly the mechanism of action, uses, adverse effects and contraindications of angiotensin – Converting enzyme inhibitors. (15 marks)
2. Write short notes on: (5 x 7 = 35 marks)
  - a) Management of chronic heart failure
  - b) Postmenopausal hormonal therapy
  - c) Mechanism of action and uses of loop diuretics
  - d) Low molecular weight heparin
  - e) Uses and adverse effects of stains

#### **SECTION B**

##### Respiratory system, Autonomous Nervous system, Autacoids & their antagonists, therapy of common poisoning & heavy metal antagonists

3. Classify cholinomimetic drugs and explain their clinical uses in detail (15 marks)
4. Write short notes on: (5 x 7 = 35 marks)
  - a) Leukotriene inhibitors
  - b) Second generation H<sub>1</sub> antihistamines
  - c) Pharmacotherapy of status asthmaticus
  - d) Prophylaxis of migraine
  - e) Drug therapy of paracetamol toxicity

**FORENSIC MEDICINE**

**PAPER I**

**FORENSIC MEDICINE & PSYCHIATRY**

Time: 3 hours

Max. Marks: 80

**ANSWER ALL QUESTIONS**

**Each Section to be answered in separate Answer Book**  
**Illustrate your answer with suitable diagrams**

**SECTION A**

1. A 25 years old man was stabbed in the chest with a dagger. The Victim was brought to JIPMER EMS department immediately. Discuss the management of this case with emphasis on its medico legal aspects. How would you issue a wound certificate in this case? (10 marks)

2. Write short notes on: (5 x 6 = 30 marks)

- a) Rigor mortis and its Medico legal importance
- b) Difference between entry and exit wounds in firearm injury
- c) Medical Termination of Pregnancy Act 1971
- d) Civil responsibilities of mentally-ill person
- e) Testamentary capacity and its requirements

**SECTION B**

3. A patient was brought to the Casualty, with altered sensorium, constricted pupils and profuse sweating. The attender gave history of Diarrhea. Name the probable poison producing these features. Discuss its treatment and post-mortem findings. (10 marks)

4. Write short notes on: (5 x 6 = 30 marks)

- a) Penal Erasure
- b) Magistrate's inquest
- c) Plumbism
- d) Treatment of methyl alcohol poisoning
- e) Subpoena

**THIRD PROFESSIONAL PART I MODEL QUESTION PAPERS**

**E.N.T**

**PAPER I**

Time: 3 hours

Max. Marks: 80

ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

**SECTION A**

Nose and Ear

1. 12 year old patient presented with complaints of bilateral torrhoea of 4 years duration. The discharge was copious and mucoid. Discuss the diagnosis and management of the above patient. (5+5=10 marks)
2. Write short notes on: (5 x 6 = 30 marks)
  - a) Rhinosporidiosis
  - b) Little's area of septum
  - c) Ototoxic drugs
  - d) Atrophic Rhinitis
  - e) Nasal Myiasis

**SECTION B**

Larynx and Pharynx

3. Describe the clinical features and complications of a case of Peritonsillar abscess. Outline its management. (5+5=10 marks)
4. Write short notes on: (5 x 6 = 30 marks)
  - a) Vocal cord nodules
  - b) Acute retropharyngeal abscess
  - c) Complications following adenoidectomy
  - d) Laryngocele
  - e) Myringotomy

# OPHTHALMOLOGY

## PAPER I

Time: 3 hours

Max. Marks: 80

### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### **SECTION A**

##### Anterior segment diseases

1. A 50 year old woman complains of progressive painless visual loss in both eyes. Discuss the differential diagnosis. (5+5 = 10 marks)
2. Write short notes on: (5 x 6 = 30 marks)
  - a) Complicated cataract
  - b) Keratomalacia
  - c) Ring Synechia
  - d) Vernal catarrh
  - e) Field defects in open angle glaucoma

#### **SECTION B**

##### Posterior segment & Adnexal diseases

3. Discuss the fundus pictures and treatment of diabetic retinopathy. (5+5 = 10 marks)
4. Write short notes on: (5 x 6 = 30 marks)
  - a) Hypertensive Retinopathy
  - b) Optic atrophy
  - c) Berlins edema
  - d) Entropion
  - e) Rhegmatogenous retinal detachment

## COMMUNITY MEDICINE

### PAPER I

(General Epidemiology, Biostatistics, Sociology, Nutrition, Demography, Environmental Health)

Time: 3 hours

Max. Marks: 80

ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### SECTION A

1. Explain the term "disease control". Describe different activities for disease control, giving examples for each. (3+7=10 marks)
2. Write short notes on: (5 x 6 = 30 marks)
  - a) Chi-square test
  - b) Sex ratio in India
  - c) Audio-visual aids to make lecture more effective
  - d) Primordial prevention
  - e) Odds ratio

#### SECTION B

3. In an Epidemiological study conducted to assess the risk of cancer among smokers, the data were as follows: (3+7=10 marks)

Total population:	74,00,000
Number of smokers:	14,80,000
Deaths among smokers due to lung cancer:	3315
Number of non-smokers:	59,20,000
Deaths among non-smokers due to lung cancer:	592

  - a) What is this type of study? Give reasons
  - b) Calculate the possible indicators of risk
4. Write short notes on: (5 x 6 = 30 marks)
  - a) Sensitivity of a screening test
  - b) Bacteriological quality of drinking water
  - c) Indicators for epidemiological assessment of Iodine Deficiency
  - d) Cultural factors affecting maternal health
  - e) Pulse Polio Immunization

## COMMUNITY MEDICINE

### PAPER II

(Epidemiology of Communicable and Non-communicable diseases, Occupational Health, Maternal and Child Health, Family Welfare, Public Health Administration, Health Education)

Time: 3 hours

Max. Marks: 80

#### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### SECTION A

1. Describe the problem of acute respiratory infections (ARI). List the agent, host and environmental factors for the control of ARI among children aged 2 months to 5 years. (10 marks)
2. Write short notes on: (5 x 6 = 30 marks)
  - a) Management of diarrhea among children with some dehydration
  - b) Prevention of rheumatic fever and rheumatic heart disease
  - c) Sickness benefit under E S I
  - d) Role of health education in school health
  - e) Signs of organic lead poisoning

#### SECTION B

3. What is the importance of perinatal mortality rate (PMR)? In the context of developing countries what are the social & biological causes of PMR? What are the measures to reduce PMR? (2+4+4=10 marks)
4. Write short notes on: (5 x 6 = 30 marks)
  - a) Pearls Index
  - b) Network analysis
  - c) Community Health Centre
  - d) Risk factors for hypertension
  - e) Principles of Primary Health Care

**THIRD PROFESSIONAL PART II MODEL QUESTION PAPERS**

**OBSTETRICS AND GYNAECOLOGY**

**PAPER I**

Obstetrics Including Social Obstetrics

Time: 3 hours

Max. Marks: 80

ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

**SECTION A**

1. Define anaemia in pregnancy. How do you manage a case of severe anaemia at 28 weeks of pregnancy? (2 + 8= 10marks)
2. Write short notes on: (5 x 6 = 30 marks)
  - a) Diagnosis of Ectopic Pregnancy.
  - b) Partogram
  - c) Management of cervical incompetence.
  - d) Prevention of postpartum haemorrhage
  - e) Screening for gestational Diabetes mellitus

**SECTION B**

3. Define obstructed labour. Describe the clinical features and management of a case of obstructed labour. (2 +4+4=10 marks)
4. Write short notes on: (5 x 6= 30 marks)
  - a) Episiotomy
  - b) Follow up of vesicular mole
  - c) Uses of Ultrasound in II trimester
  - d) Prevention of puerperal sepsis
  - e) Outlet forceps

# OBSTETRICS AND GYNAECOLOGY

## PAPER II

### Gynaecology Including Family Welfare & Demography

Time: 3 hours

Max. Marks: 80

### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### **SECTION A**

1. A woman aged 30 years complains of mass descending per vaginum for two years.
  - a) What is the differential diagnosis?
  - b) How do you manage if she had III<sup>o</sup> uterovaginal prolapse? (3+7 = 10 marks)
  
2. Write short notes on: (5 x 6 = 30 marks)
  - a) Medical Management of endometriosis
  - b) Haematocolpos.
  - c) Fractional Curettage.
  - d) Pap smear
  - e) Turner's syndrome

#### **SECTION B**

3. A 35 years old lady complains of mass abdomen of four months duration
  - a) Discuss the differential diagnosis?
  - b) How will you manage a case of carcinoma ovary? (3 + 7 = 10 marks)
  
4. Write short notes on: (5 x 6 = 30 marks)
  - a) Male condom
  - b) Tests for ovulation
  - c) Methods of II trimester medical termination of pregnancy
  - d) Contra indications for use of hormonal contraceptions
  - e) Complications of IUCD

## MEDICINE

### PAPER I

#### Systemic Medicine

Time: 3 hours

Max. Marks: 80

#### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### **SECTION A**

1. Discuss briefly the aetiology, Clinical Features, Complications and management of Infective Endocarditis (2+3+2+3 = 15 marks)
2. Write short notes on: (5 x 6 = 30 marks)
  - a) Secondary Hypertension
  - b) Diagnosis and Clinical features of Chronic Renal Failure
  - c) Treatment of COPD
  - d) DOTS
  - e) Management of hepatic encephalopathy

#### **SECTION B**

3. A 25 year old female patient came with history of sudden onset of weakness of the right half of the body (3+3+4=10 marks)  
Enumerate the aetiology of stroke in a young patient (15-45 years )  
How will you arrive at the diagnosis?  
How will you manage a patient with stroke
4. Write short notes on: (5 x 6 = 30 marks)
  - a) Immunological markers of Hepatitis 'B' infection and their significance
  - b) H. Pylori infection
  - c) Differential diagnosis of unilateral oedema of the lower limb
  - d) Classification and aetiology of Portal Hypertension
  - e) Aetiology and diagnosis of Nephrotic syndrome

## MEDICINE

### PAPER II

Systemic Medicine including Infectious, Tropical Medicine, Psychiatry and Dermatology

Time: 3 hours

Max. Marks: 80

#### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### SECTION A

1. Describe briefly the pathogenesis, clinical features and management of Diabetic Ketoacidosis (3+4+3 = 10 marks)
  
2. Write short notes on: (5 x 6 = 30 marks)
  - a) A man has been bitten by a stray dog on his face. The wound is lacerated. Outline the management
  - b) Clinical features of Psoriasis
  - c) Classification of Hansen's Disease
  
  - d) Bipolar disorder
  - e) Sex linked recessive inheritance

#### SECTION B

3. A 22 year old female patient has been brought to the hospital with alleged history of ingestion of an insecticide. Her pupils are small (pin point) and she has profuse sweating (3+4+3 = 10 marks)
  - a) What is your diagnosis? What other signs do you look for in this patient?
  - b) Outline the management of this case
  - c) What complications can occur in this patient?
  
4. Write short notes on: (5 x 6 = 30 marks)
  - a) Lab Diagnosis and treatment of Acute Gouty Arthritis
  - b) Diagnosis of Rheumatoid Arthritis
  - c) Aetiology and management of Autoimmune Hemolytic Anemia
  - d) Blood component therapy
  - e) Complications of Falciparum Malaria

## SURGERY

### PAPER I

Time: 3 hours

Max. Marks: 80

#### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### General Surgery-Burns, Shock, Blood transfusion, Breast and Endocrine

##### **Section I**

1. A 60 year old woman is brought to casualty with near total burns sustained in a closed room.
  - a) How will you evaluate this patient to assess extent and depth of burns? (3 marks)
  - b) What other complication she can have due to the nature of the injury? (2 mark)
  - c) Outline the management of the case. Discuss how you will evaluate and (5 marks)(Total 10 marks)
  
2. Write short notes on: (5 x 6 = 30 marks)
  - a) Blood stained discharge from the nipple
  - b) Triage
  - c) Glasgow coma scale
  - d) Prophylactic antibiotics in surgery
  - e) Universal precautions against HIV

#### Orthopaedic Surgery

##### **Section II**

3. A 50 year old woman reports to the outpatient department with back pain of 3 months duration. She was found to be having a kyphotic deformity with local tenderness at D10 level. She had loss of weight and weakness in the lower limbs with spasticity.
  - a) What is the most probable diagnosis (2 marks)
  - b) Give the differential diagnosis (2 marks)
  - c) Give three relevant investigative procedures (3 marks)
  - d) Outline the management and prognosis (3 marks)(Total 10 marks)
  
2. Write short notes on: (5 x 6 = 30 marks)
  - a) Barlow's test
  - b) Soft tissue pathology in congenital talipes equinovarus
  - c) Management of fracture of the scaphoid
  - d) Radiological signs of scurvy
  - e) Classification of open fractures

## SURGERY

### PAPER II

Time: 3 hrs.

Max. Marks: 80

Surgical Gastroenterology, Oncology

#### Section I

1. A young man comes to the hospital with sudden onset abdominal pain and vomiting of 2 days duration. On examination he has diffuse tenderness and abdominal guarding.
  - a) Discuss briefly the differential diagnosis (3 marks)
  - b) What investigations would help in diagnosis? (2 marks)
  - c) Outline the principles of management. (5 marks)(Total 10 marks)
  
2. Write short notes on: (5 x 6 = 30 marks)
  - a) Oschner-Sherren regime for appendicitis
  - b) Courvoisier's law
  - c) Staging of Hodgkin's disease
  - d) Indications for splenectomy
  - e) Pancreatic pseudo-cyst

Allied specialities – Urology, Paediatric Surgery, Neurosurgery, Plastic Surgery, Trauma, CTVS, Anaesthesiology, Dentistry

#### Section II

3. A 60 year old man presents with passage of blood stained urine of recent onset
  - a) Enumerate the possible causes (3 marks)
  - b) What investigations would be required in this patient to determine the cause? (3 marks)
  - c) Outline the principles of management. (4 marks)(Total 10 marks)
  
4. Write short notes on: (5 x 6 = 30 marks)
  - a) Flail chest
  - b) Meconium ileus
  - c) Cleft lip
  - d) Epidural analgesia
  - e) ERCP

## PAEDIATRICS

Time: 3 hours

Max. Marks: 80

### ANSWER ALL QUESTIONS

Each Section to be answered in separate Answer Book  
Illustrate your answer with suitable diagrams

#### **SECTION A**

Vital Statistics and National Health Programmes, Growth & Development, Nutrition, Immunization, Fluid S Electrolyte imbalance, Genetics, Adolescent Medicine, Child Psychiatry

1. a) Enumerate the principles of Growth and Development (5 marks)  
b) Mention the various factors affecting Growth and Development with suitable example for each (5 marks)
2. Write short notes on: (5 x 6 = 30 marks)
  - a) Typhoid vaccine – Oral and parenteral
  - b) Nutritional Rickets – Biochemical and radiological changes
  - c) Metabolic acidosis – 3 cases and treatment
  - d) Breath holding spells – Management
  - e) Management of Protein Energy Malnutrition

#### **SECTION B**

Neonatology, Systemic Paediatrics, Infectious Diseases, Paediatric emergencies, Procedures, Paediatric surgical problems.

3. A 6 year old child came to the hospital with history of high grade intermittent fever of 4 days duration associated with chills and rigors. On examination child had splenomegaly.
  - a) What is the most probable diagnosis? (1 mark)
  - b) Mention the relevant investigations needed to arrive at the diagnosis (4 marks)
  - c) iii) Drugs used in treatment of this condition (5 marks)
4. Write short notes on: (5 x 6 = 30 marks)
  - a) Hyaline membrane disease – Diagnosis and treatment
  - b) Management of Acute ITP – Diagnosis and treatment
  - c) Diagnosis of Bacterial Endocarditis
  - d) Management of first episode of Nephrotic syndrome
  - e) Management of Cyanotic spells

PONDICHERRY UNIVERSITY

GRADUATE MEDICAL CURRICULUM FOR M.B., B.S. COURSE

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