Syllabus

for Courses affiliated to the

Kerala University of Health Sciences
Thrissur 680596

BACHELOR OF MEDICINE AND
BACHELOR OF SURGERY

Course Code 001

(2016-17 Academic year onwards)

2016
2. COURSE CONTENT

2.1 Title of course:
BACHELOR OF MEDICINE AND BACHELOR OF SURGERY – Abbreviated as MBBS

2.2 Objectives of course

i. National Goals
At the end of undergraduate programme, the medical student shall endeavour to 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, fulfil 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.

ii. Institutional Goals
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 human 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, action research and documentation skills

f. Be familiar with the basic factors which are essential for the implementation of the National Health Programmes including practical aspects of the following:
1. Family Welfare and Maternal and Child Health (MCH),
2. Sanitation and water supply,
3. Prevention and control of communicable and non-communicable diseases,
4. Immunization,
5. Health Education,
6. Indian Public Health Standard (IPHS) of health at various level of service delivery, medical waste disposal
7. Organisational & Institutional arrangements.
   
g. Acquire basic management skills in the area of human resources, materials and resource management related to health care delivery; General and Hospital Management, principal inventory skills and counselling.

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.

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 and rehabilitative aspects of medicine.

To undertake the responsibilities of service situation 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.

It is important to make the physician capable of addressing the ethical dilemmas he will face during the practice. A physician trained should be able to identify analyse, make decisions and implement it on the basis of underlying ethical principles. This can be done only by integrating ethical principles in the curriculum.

The practice of medicine is becoming more and more evidence based. The student should be able to use the evidence based scientific medicine in practice.

Being scientific and ethical is not enough to be a good practitioner of medicine, our students should be able to communicate well with the patients, relatives and the public and help them in decision making. This requires training in communication and counselling skills. It is important to introduce these skills as part of curriculum.

2.3 Medium of instruction:
   Medium of instruction shall be English.

2.4 Course outline
The Period of 4 ½ years is divided into three phases as follows:-

a. Phase-I (2 semesters) – consisting of pre-clinical subjects (Human Anatomy, Physiology including Bio-Physics, Bio-chemistry and introduction to community Medicine including Humanities). Besides 60 hours for introduction to Community Medicine including Humanities, rest of the time shall be somewhat equally divided between Anatomy and Physiology plus Biochemistry combined (Physiology 2/3 and Biochemistry 1/3)

b. Phase-II (3 Semesters)- 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 those detailed below in Phase III. Out of the time for Para-clinical teaching approximately equal time to be allotted to Pathology, Pharmacology, Microbiology and Forensic Medicine and Community Medicine combined (1/3 Forensic Medicine and 2/3 Community Medicine.

c. Phase-III (Continuation of study of clinical subjects for seven semesters after passing Phase-I). The clinical subjects to be taught during Phase II and III are Medicine and its allied specialities, Surgery and its allied specialities, 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 time distribution shall be as given in subject wise syllabus.

The Medicine and its allied specialities training will include General Medicine, Paediatrics, Tuberculosis and Chest, Skin and Sexually Transmitted Diseases, Psychiatry, Radio-Diagnosis, Infectious Diseases etc. The Surgery and its allied specialities training will include General Surgery, Orthopaedic Surgery including Physiotherapy and Rehabilitation, Ophthalmology, Otorhinolaryngology, Anaesthesia, Dentistry, Radio-therapy etc. The Obstetrics and Gynaecology training will include family medicine, family welfare planning etc.

(3) The first 2 semesters (approximately 240 teaching days) shall be occupied in the Phase I (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 (Para-clinical/clinical) group of subjects until he has passed in all the Phase I (Pre- clinical) subjects.

(4) After passing pre-clinical subjects, 1½ year (3 semesters) shall be devoted to para-clinical subjects. Phase II will be devoted to para-clinical and clinical subjects, along with clinical postings. 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 practicals, clinicals or/and group discussions. Learning process should include living experiences, problem oriented approach, case studies and community health care activities.
2.5 Duration

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.

2.6 Syllabus

1. Phase Distribution and Timing of Examinations

The nine semesters of six months each are distributed to three phases as detailed below:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Semesters</th>
<th>Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I</td>
<td>I and II</td>
<td>I MBBS, Anatomy, Physiology, Biochemistry</td>
</tr>
<tr>
<td>Phase II</td>
<td>III, IV and V</td>
<td>II MBBS, Pharmacology, Pathology, Microbiology, Forensic Medicine</td>
</tr>
<tr>
<td>Phase III</td>
<td>VI and VII</td>
<td>III MBBS Part I Ophthalmology, Otolaryngology, Community Medicine</td>
</tr>
<tr>
<td></td>
<td>VIII and IX</td>
<td>III MBBS Part II General Medicine, General Surgery, Obstetrics and Gynaecology and Paediatrics</td>
</tr>
</tbody>
</table>

Note: Passing the 1st professional examination (I MBBS) is compulsory before proceeding to Phase II training.

A student, who fails in the IIrd professional examination, shall not be allowed to appear in IIIrd professional Part I examination unless he passes all subjects of IIrd professional examination.

(Passing in IIIrd professional (Part I) examination is not compulsory before entering into semesters VIII and IX training, however passing of IIIrd professional (Part I) is compulsory for appearing for IIIrd professional (Part II) examination.)

The following topics (Details under discussion) shall be incorporated in to the syllabus as deemed appropriate

1. Health Care Counselling
2. Ethics
3. Pain & palliation
4. Evidence based Medicine
5. Antibiotic stewardship

2.7 Total number of hours
First and second semesters -240 working teaching days

Semester I Time table

<table>
<thead>
<tr>
<th>Day</th>
<th>8am - 9 am</th>
<th>9am - 10 am</th>
<th>10am - 1pm</th>
<th>1p.m to 2 p.m</th>
<th>2p.m - 4 p.m</th>
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</thead>
<tbody>
<tr>
<td>Monday</td>
<td>Anatomy</td>
<td>Physiology</td>
<td>Anatomy dissection</td>
<td></td>
<td>Practical - PHY/BIO/HIST</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Physiology</td>
<td>Anatomy</td>
<td>Anatomy dissection</td>
<td></td>
<td>Practical - PHY/BIO/HIST</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Anatomy</td>
<td>Physiology</td>
<td>Anatomy dissection</td>
<td></td>
<td>Practical - PHY/BIO/HIST</td>
</tr>
<tr>
<td>Thursday</td>
<td>Physiology</td>
<td>Anatomy</td>
<td>Anatomy dissection</td>
<td>Lunch</td>
<td>Practical - PHY/BIO/HIST</td>
</tr>
<tr>
<td>Friday</td>
<td>Biochemistry</td>
<td>Anatomy</td>
<td>Anatomy Dissection (10a.m-12p.m)</td>
<td></td>
<td>Physiology</td>
</tr>
<tr>
<td>Saturday</td>
<td>Anatomy</td>
<td>Physiology</td>
<td>Community medicine</td>
<td></td>
<td>ANA/BIO/PHY</td>
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</table>

Semester II Time table

<table>
<thead>
<tr>
<th>Day</th>
<th>8am - 9 am</th>
<th>9am - 10 am</th>
<th>10am - 12 noon</th>
<th>12 noon - to 1 p.m</th>
<th>1p.m - 4 p.m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>Anatomy</td>
<td>Biochemistry</td>
<td>Practical - PHY/BIO/HIST</td>
<td>Anatomy dissection</td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td>Physiology</td>
<td>Anatomy</td>
<td>Practical - PHY/BIO/HIST</td>
<td>Anatomy dissection</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>Biochemistry</td>
<td>Physiology</td>
<td>Practical - PHY/BIO/HIST</td>
<td>Anatomy dissection</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>Physiology</td>
<td>Biochemistry</td>
<td>Practical - PHY/BIO/HIST</td>
<td>Anatomy dissection</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>Anatomy</td>
<td>Biochemistry</td>
<td>Physiology</td>
<td>Anatomy dissection (2-4p.m)</td>
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<tr>
<td>Saturday</td>
<td>Biochemistry</td>
<td>Anatomy</td>
<td>Physiology</td>
<td>PHY/ANA/BIO/PHY</td>
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</table>
### Third Semester classes: 18 weeks

<table>
<thead>
<tr>
<th>Day</th>
<th>8am - 9 am</th>
<th>9 am -12 noon</th>
<th>12 noon - 1 p.m</th>
<th>1-2 p.m</th>
<th>2 p.m - 4 p.m.</th>
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</thead>
<tbody>
<tr>
<td>Monday</td>
<td>Paraclinical lectures</td>
<td>Clinical posting</td>
<td>Paraclinical lectures</td>
<td>Practical Para clinical</td>
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</tr>
<tr>
<td>Tuesday</td>
<td>Paraclinical lectures</td>
<td>Clinical posting</td>
<td>Paraclinical lectures</td>
<td>Practical Para clinical</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>Paraclinical lectures</td>
<td>Clinical posting</td>
<td>Paraclinical lectures</td>
<td>Practical Para clinical</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>Paraclinical lectures</td>
<td>Clinical posting</td>
<td>Paraclinical lectures</td>
<td>Practical Para clinical</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>Paraclinical lectures</td>
<td>Clinical posting</td>
<td>Paraclinical lectures</td>
<td>Practical Para clinical</td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td>Paraclinical lectures</td>
<td>Clinical posting</td>
<td>Paraclinical lectures</td>
<td>Practical Para clinical</td>
<td></td>
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### Fourth and fifth Semester classes: 42 weeks

<table>
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<th>Day</th>
<th>8am - 9 am</th>
<th>9 am -12 noon</th>
<th>12 noon - 1 p.m</th>
<th>1-2 p.m</th>
<th>2 p.m - 4 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>Lectures in clinical subjects</td>
<td>Clinical posting</td>
<td>Lectures in Paraclinical subjects</td>
<td>Practical Para clinical</td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td>Lectures in clinical subjects</td>
<td>Clinical posting</td>
<td>Lectures in Paraclinical subjects</td>
<td>Practical Para clinical</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>Lectures in clinical subjects</td>
<td>Clinical posting</td>
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<td>Practical Para clinical</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>Lectures in clinical subjects</td>
<td>Clinical posting</td>
<td>Lectures in Paraclinical subjects</td>
<td>Practical Para clinical</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lunch</td>
<td></td>
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</tbody>
</table>
### Sixth, Seventh, Eighth & Ninth Semester classes 82 weeks

<table>
<thead>
<tr>
<th>Day</th>
<th>8am - 9 am</th>
<th>9 am - 12 noon</th>
<th>12 noon - 1 p.m</th>
<th>1-2 p.m</th>
<th>2 p.m - 4 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>Lectures in Clinical subjects</td>
<td>Clinical posting</td>
<td>Lectures in Clinical subjects</td>
<td></td>
<td>Practicals/Demonstrations in Clinical Subjects</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Lectures in Clinical subjects</td>
<td>Clinical posting</td>
<td>Lectures in Clinical subjects</td>
<td></td>
<td>Practicals/Demonstrations in Clinical Subjects</td>
</tr>
<tr>
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<td>Clinical posting</td>
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<td></td>
<td>Practicals/Demonstrations in Clinical Subjects</td>
</tr>
<tr>
<td>Friday</td>
<td>Lectures in Clinical subjects</td>
<td>Clinical posting</td>
<td>Lectures in Clinical subjects</td>
<td></td>
<td>Practicals/Demonstrations in Clinical Subjects</td>
</tr>
<tr>
<td>Saturday</td>
<td>Lectures in Clinical subjects</td>
<td>Clinical posting</td>
<td>Lectures in Clinical subjects</td>
<td></td>
<td>Practicals/Demonstrations in Clinical Subject</td>
</tr>
</tbody>
</table>

**Note:** These are suggested time tables. Adjustments where required, depending upon the availability of time and facility, are made. *(Institutional adjustments)*

2.8 Branches if any with definition
Present in clause 2.10 of the curriculum.

2.9 Teaching learning methods

As shown in clause 2.4 course outline.

2.10 Content of each subject in each year

HUMAN ANATOMY

(I) GOAL

The broad goal of teaching of undergraduate students in Anatomy aims at providing comprehensive knowledge of the gross and microscopic structure and development of human body to provide a basis for understanding the clinical correlation of organs or structures involved and the anatomical basis for the disease presentations.

(II) OBJECTIVES

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

(A) Knowledge
- Comprehend the normal disposition, clinically relevant interrelationships, functional and cross sectional anatomy of the various structures in the body.
- Identify the microscopic structure and correlate elementary ultra-structure of various organs and tissues and correlate the structure with the functions as a prerequisite for understanding the altered state in various disease processes.
- Comprehend the basic structure and connections of the central nervous system and analyse the integrative and regulative functions of the organs and systems. He/She shall be able to explain the developmental basis of the major variations and abnormalities.
- Demonstrate knowledge of the basic principles and sequential development of the Organs and systems; recognize the critical stages of development and the effects of common teratogen, genetic mutations and environmental hazards. He/She shall be able to explain the developmental basis of the major variations and abnormalities.

(B) Skills
At the end of the course the student shall be able to:
- Identify and locate all the structures of the body and mark the topography of the living anatomy
- Identify the organs and tissues under the microscope
- Understand the principles of Karyotyping and identify the gross congenital anomalies.
- Understand principles of newer imaging techniques and interpretation of Computerized Tomography (CT) Scan sonogram etc.
- Understand clinical basis of some common clinical procedures i.e. intramuscular and intravenous injection, lumbar puncture and kidney biopsy etc.
(C) Integration

From the integrated teaching of other basic sciences, students shall be able to comprehend the regulation and integration of the functions of the organs and systems in the body and thus interpret the anatomical basis of disease process.

(III) DETAILED SYLLABUS-DETAILS OF THE COURSE

Duration of the Course
Semesters 2
Total number of hours 650
Lectures 95
Seminars 37
Practicals 518

Innovation session (projects, structured discussion, integrated teaching, formative evaluation and revision) Part of practicals:

DETAILS OF LECTURES

1. General Anatomy : 15hr
   • Epithelium: Classification, simple and compound epithelium, glandular and sensory epithelium : 2hr
   • Connective tissue: Cells, matrix : 2hr
   • Cartilage: Classification, structure, cells and matrix : 1hr
   • Bone: Types, types of epiphysis, microscopy. Ossification in brief, blood supply : 2hr
   • Joints: Classification and structure of synovial joint : 1hr
   • Vascular tissue: Elastic artery, medium sized artery, large vein : 1hr
   • Lymphatic tissue: General features, lymph node- structure and function, spleen, structure and circulation, Tonsil, Thymus : 2hr
   • Muscular tissue: Structure of Skeletal, Smooth and cardiac Muscles : 1hr
   • Skin: Structure of thin and thick skin : 1hr
   • Nervous tissue: Neurons, Neuroglia, peripheral nerve structure optic nerve structure, Schwann cells, myelination, myelinated nerve fibre, Ganglia : 2hr

2. General Embryology : 11hr
   • Oogenesis, Ovarian Cycle : 1hr
   • Menstrual cycle : 1hr
   • Male reproductive system- Spermatogenesis : 1hr
   • Fertilization, Implantation, assisted reproductive techniques : 1hr
   • Bilaminar embryo : 1hr
• Trilaminar embryo : 1hr
• Intraembryonic mesoderm and folding of embryo : 1hr
• Formation and circulation of placenta : 2hr
• Foetal membranes : 1hr
• Twinning and teratology (Structure of Umbilical cord and placenta to be taught along with General Embryology) : 1hr

2 Gross Anatomy
(X-rays and surface marking of each region to be taken after the dissection of the corresponding region is completed)

Upper Limb : 4hr
• Brachial plexus : 1hr
• Mammary gland : 1hr
• Shoulder joint:
• Palmar space : 1hr

Seminars (Give more importance to applied Anatomy) : 8hr
• Axilla and Axillary artery : 1hr
• Venous and lymphatic drainage of upper limb : 1hr
• Radio-Ulnar joints, Pronation & supination : 1hr
• Brachial artery, Anastomoses around elbow joint : 1hr
• Radial nerve, Ulnar nerve, Median nerve : 2hr
• Retinacula : 1hr
• Elbow joint, wrist joint, Ist carpometacarpal Joint : 1hr

Lower Limb : 4hr
• Hip joint : 1hr
• Arches of foot : 1hr
• Knee joint : 1hr
• Development of Limbs, Dermatomes of Upper and Lower Limbs : 1hr

Seminars (Give more importance to applied Anatomy) : 6hr
• Venous and lymphatic drainage of lower limb : 1hr
- Femoral triangle, Adductor canal: 1 hr
- Obturator nerve, Sciatic Nerve: 1 hr
- Femoral artery and nerve: 1 hr
- Ankle joint, Popliteal fossa: 1 hr
- Sub talar joint, inversion and eversion: 1 hr

**Thorax**: 9 hr

- Thoracic wall (including movements): 1 hr
- Pleura: 1 hr
- Lungs including development of lung: 1 hr
- Pericardium: 1 hr
- Blood supply of heart: 1 hr
- Arterial arches: 1 hr
- Foetal circulation: 1 hr
- Development of heart: 2 hr

**Seminars** (Give more importance to applied Anatomy)

- 5 hr
  - Mediastinum-Boundaries and contents: 1 hr
  - Thoracic duct, Esophagus, Thoracic Aorta: 1 hr
  - Veins of Thorax: 1 hr
  - Chambers of heart-All chambers: 1 hr
  - Splanchnic nerves, sympathetic trunk: 1 hr

**Genetics**: 4 hr

- Classification of chromosomes, karyotyping, sex chromosomes, Barr body: 1 hr
- Normal male, normal female, Chromosomal aberrations-in brief: 1 hr
- Turner’s syndrome, Klinefelter’s syndrome and Down’s syndromes (Charts to be shown) Genetic Counseling, Pedigree Chart, Genetic Engineering and inheritance: 2 hr
### Head & Neck

- Scalp : 1hr
- Parotid Gland : 1hr
- Development of face : 1hr
- Pituitary gland : 1hr
- Dural venous sinuses : 1hr
- Cervical fascia : 1hr
- Development of branchial arches : 1hr
- Extra Ocular muscles : 1hr
- T. M. Joint : 1hr
- Thyroid gland : 1hr
- Cervical Sympathetic : 1hr
- Pharynx : 1hr
- Larynx : 1hr
- Eyeball, Layers-development in brief : 1hr
- Tongue : 1hr
- Facial Nerve : 1hr
- Middle Ear : 1hr

### Seminars (Give more importance to applied Anatomy)

- Suboccipital triangle : 12hr
- Eyelid and lacrimal apparatus : 1hr
- Nasal cavity, PNS : 1hr
- Soft palate, Palatine tonsil : 1hr
- Muscles of facial expression : 1hr
- Vessels and nerves of the face : 1hr
- Posterior triangle of neck : 1hr
- Anterior triangles of neck : 1hr
- Mandibular nerve, occulomotor nerve : 1hr
- Submandibular and sublingual gland : 1hr
- Lymph nodes of head and neck : 1hr
- Hyoglossus muscle : 1hr

### Brain and Spinal Cord

- Spinal cord- external features and blood supply : 1hr
- Blood supply of brain- Superficial and deep, : 1hr
- Meninges & cisterns : 1hr
- Medulla oblongata : 1hr
- Pons : 1hr

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**Seminars (Give more importance to applied Anatomy) : 12hr**

**Brain and Spinal Cord : 15Hr**
• Cerebellum
• 4th Ventricle
• 3rd Ventricle, Lateral ventricles
• Midbrain
• Sulci, gyri and functional areas of cortex
• White matter & Internal capsule
• Visual pathway
• Basal ganglia
• Thalamus
• Development of CNS IN BRIEF including functional Column

Abdomen, Pelvis, and Perineum : 16hrs
• Anterior abdominal wall and Rectus sheath
• Inguinal canal, Spermatic cord and descent of testis
• Peritoneum in brief
• Development of GIT, derivatives and anomalies
• Stomach including development
• Portal vein
• Liver
• Kidney-gross features, development and anomalies
• Diaphragm-gross features, development
• Uterus-gross features, development and anomalies
• Prostate and male urethra
• Rectum and Anal canal
• Urinary bladder
• Perineal Pouches
• Ischiorectal fossa
• Pelvic floor

Seminars (Give more importance to applied Anatomy Lymphatic drainage and blood supply of all organs should be given importance) : 6hr
• Duodenum and development
• Pancreas, spleen
• Extra hepatic biliary apparatus
• Coeliac trunk, Supra renal gland
• Ureter, Pudendal nerve
• Caecum, Vermiform appendix

Diagrams
I Cross Section Diagrams

A upper limb
<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Fig.</th>
<th>Pg.No</th>
<th>Book</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Section through middle of arm</td>
<td>68</td>
<td>68</td>
<td>Cunningham's manual of practical Anatomy 15th Edn Vol. 1</td>
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<tr>
<td>2.</td>
<td>Oblique section through the hand</td>
<td>88</td>
<td>90</td>
<td>Cunningham's manual of practical Anatomy 15th Edn Vol. 1</td>
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**B. Lower limb**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Fig.</th>
<th>Pg.No</th>
<th>Book</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Transverse section through middle of right thigh</td>
<td>80.2</td>
<td>1351</td>
<td>Gray's Anatomy 40th Edn</td>
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<tr>
<td>2.</td>
<td>Transverse section through middle of leg</td>
<td>182</td>
<td>196</td>
<td>Cunningham's manual of practical Anatomy 15th Edn Vol. 1</td>
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<tr>
<td>3.</td>
<td>Transverse section through knee joint</td>
<td>202</td>
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<td>Cunningham's manual of practical Anatomy 15th Edn Vol. 1</td>
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**C. Neck**

Transverse section through the neck at the level of cricoid(C6 level) cartilage: 62 76 Cunningham's manual of practical Anatomy 15th Edn Vol-3

**D. Thorax**

1 Horizontal section through the thorax at the level of T-4 Vertebra: 70 58 Cunningham's manual of practical Anatomy 15th Edn Vol-2

**E. Abdomen**

1 Horizontal section through the abdomen at the level of epiploic foramen-T12 vertebra: 139 124 Cunningham's manual of practical Anatomy 15th Edn Vol-2

2 Horizontal section through the abdomen at the level pylorus - L1 vertebra: 128 116 Cunningham's manual of practical Anatomy 15th Edn Vol-2

3 Horizontal section through the abdomen at the level of -L4: 129 116 Cunningham's manual of practical Anatomy 15th Edn Vol-2

**F. Brain**

1 Transverse section of spinal cord showing ascending & descending tracts: 6.8 80 IB singh Text Book of Neuro Anatomy 9th Edn.

2 Transverse section of medulla at the level of Pyramidal decussation: 8.2 96 IB singh Text Book of Neuro Anatomy 9th Edn.

3 Transverse section of medulla at the level of sensory decussation: 8.3 97 IB singh Text Book of Neuro Anatomy 9th Edn.

4 Transverse section of medulla at the level of olive: 8.4 98 IB singh Text Book of Neuro Anatomy 9th Edn.
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### II SAGITTAL SECTION

| 1 | Sagittal section through shoulder | 64 | 65 | Cunningham's manual of practical Anatomy 15th Edn Vol-1 |
| 2 | Median section of brain | 238 | 255 | Cunningham's manual of practical Anatomy 15th Edn Vol-3 |
| 3 | Median section through male pelvis | 235 | 216 | Cunningham's manual of practical Anatomy 15th Edn Vol-2 |
| 4 | Median section through female pelvis | 236 | 216 | Cunningham's manual of practical Anatomy 15th Edn Vol-2 |

### 111 GROSS ANATOMY

#### A Upper limb

| 1 | Typical spinal Nerve | 2 | 6 | Cunningham's manual of practical Anatomy 15th Edn Vol-1 |
| 2 | Brachial plexus | 24 | 33 | Cunningham's manual of practical Anatomy 15th Edn Vol-1 |
| 3 | Anastomosis around elbow joint | 80 | 82 | Cunningham's manual of practical Anatomy 15th Edn Vol-1 |
| 4 | Superficial palmar arch 4 Deep palmar arch | 90 | 92 | Cunningham's manual of practical Anatomy 15th Edn Vol-1 |

#### B Lower limb

<p>| 1 | Femoral triangle | 131 | 140 | Cunningham's manual of practical Anatomy 15th Edn Vol-1 |
| 2 | Longitudinal arches of foot - Medial - | 213 | 226 | Cunningham's manual of practical Anatomy 15th Edn Vol-1 |</p>
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The question on the diagrams in the question paper carrying 4 marks
(2marks each in both Paper 1 & paper 2 should be STRICTLY limited from the above list only)

DETAILS OF PRACTICALS- Dissection including Osteology and Histology)

Upper Limb : 60hrs

- Introduction, Pectoral region and axilla, cutaneous nerves and vessels
- The brachial plexus, Axillary artery
- The dissection of back
- The free upper limb Lymph vesels and lymph nodes of upper limb cutaneous nerves of upper limb and deep fascia of upper limb
- The shoulder- movements of the limb at the shoulder, the shoulder joint
- The arm- Cubital fossa, anterior compartment, Posterior compartment of arm
- The forearm and hand, Palmar aponeurosis, superficial palmar arch, Flexor retinaculum, Flexor tendons
- The arteries and nerves of the flexor compartment of the forearm
- Muscles of the front of the forearm and hand, deep palmar arch, Fascial compartments of the palm
- The extensor compartment of the forearm and the hand, Extensor tendons of the fingers Joints of the upper limb
- Elbow joint, wrist joint, radio ulnar joints, intercarpal, carpo metacarpal & Intermetacarpal joints

Lower limb : 60hrs

- Front of thigh, femoral triangle, adductor canal
- Medial side of thigh
• Gluteal region
• Popliteal fossa
• Back of thigh
• Hip joint
• Front of leg and dorsum of foot, superficial dissection
• Anterior compartment of leg
• Lateral and medial compartments of leg, back of leg
• Sole of the foot I and II layers, III and IV layers, V and VI layers
• Knee joint, Ankle joint, Tibio-fibular and other joints, revision

Thorax : 30hrs

• Introduction: Walls of thorax,
• Cavity of thorax, pleura
• Mediastinum, Root of lungs Autonomic nervous system
• The lungs, Anterior mediastinum
• Middle mediastinum, surface anatomy of the heart, blood supply
• Chambers of heart, right atrium, right ventricle, left ventricle
• Aorta, superior mediastinum arch of aorta, left atrium
• Conducting system of heart, Thoracic part of aorta Vagus, Oesophagus, Thoracic duct, Posterior intercostal vessels,
• Joints of thorax, Revision

Head & Neck : 130 hrs

• Cervical vertebrae, Skull, The scalp
• The temple and the face, Nerves and vessels of scalp and superficial temporal region, The superficial dissection of face
• The side of the neck, Posterior triangle, Sub occipital triangle
• The anterior triangle of neck, The median region of the front of neck, subdivisions of anterior triangle,
• The cranial cavity: Structures seen after removal of cerebrum, Anterior cranial fossa, middle cranial fossa, posterior cranial fossa
• Deep dissection of the face: Nerves of the face, Structures in the cheek and lips The eyelids, The lacrimal apparatus
• The orbits, The structures in the orbits, extraocular muscles, nerves, ophthalmic artery
• The parotid region, The parotid gland, facial nerve, vessels
• The temporal and infratemporal region Temporal fascia, Temporalis muscle
• The superficial contents of the infratemporal fossa Temporomandibular joint, The deeper contents of the infratemporal fossa,
• the submandibular gland, mylohohyiod muscle, hyoglossus
• The mouth and pharynx, Pharyngeal wall, subdivisions of pharynx, soft palate
• The cavity of the nose, nasal septum, lateral wall
• The larynx,
• The tongue
• The organs of hearing and equilibrium

☆
• The eye ball
• The contents of the vertebral canal,
• The joints of the neck.

**Brain**: 42 hrs

• Introduction: The membranes of the brain- meninges
• The blood vessels of the brain
• The medulla, pons,
• The cerebellum, The fourth ventricle The midbrain,
• The cerebrum – sulci, gyri & functional areas
• The White matter of cerebrum III ventricle, the lateral ventricle and the choroid fissure
• The thalami and the optic tracts
• The deep dissection of the hemisphere, deep nuclei of the telencephalon,
  The nuclei and connections of the thalamus, Cerebral topography

**Abdomen**: 124 hrs

• Introduction: Anterior abdominal wall muscles, inguinal canal Nerves and vessels of anterior abdominal wall
• Male external genital organs
• Dissection of the loin
• Abdominal Cavity Shape, Boundaries, Divisions of peritoneal cavity Ligaments of liver, Spleen
• Oesophagus, Vagal trunk, Stomach
• Mesentery, Superior mesenteric artery, Inferior mesenteric artery, Arterial anastomosis in GI tract, Structure of small intestine, Large intestine
• Duodenum, Portal vein, Ducts of liver Pancreas, Liver, Gall bladder, Cystic duct
• Abdominal structures in contact with diaphragm Autonomic nervous system Supra renal glands, The kidneys, Abdominal part of ureter
• The diaphragm, The posterior abdominal wall muscles,The inferior vena cava,
  Lymph nodes of posterior abdominal wall, The nerves of posterior abdominal wall,
• The pelvic viscera, ovaries, uterine tubes, Pelvic part of ureters
• Urinary bladder, Internal surface of urinary bladder, Ductus deferens, Prostate, Male urethra,
• Uterus, Rectum, Anal canal
• Vessels of lesser pelvis, nerves of lesser pelvis, Obturator nerve, Autonomic nerves
• The muscles of lesser pelvis, pelvic diaphragm
• Joints of pelvis

**Perineum**: 12 hrs

• Ischiorectal fossa,
• Perineal pouches Perineal body, Pudendal canal

**Histology**: 60 hrs

• Epithelium
• Connective tissue
• Cartilage- Hyaline, elastic, fibro cartilage
• Bone- Compact bone- C.S & L.S
• Muscles- Skeletal, Smooth, cardiac
• Nervous tissue- neuron, nerve fibre, sciatic and optic nerves, sympathetic, spinal ganglia
• Blood vessel- Large and medium sized artery, large and medium sized vein
• Lymphoid tissue- lymph node, spleen, thymus, palatine tonsil
• Skin- thin, thick
• Mammary gland-active & inactive
• Placenta & umbilical cord
• Respiratory system- trachea & lung
• Nervous system- spinal cord, cerebrum cerebellum
• Cornea, retina
• Endocrine system- thyroid, parathyroid, supra renal, pituitary
• Excretory system- kidney, ureter, urinary bladder
• Reproductive system
  a) Male - Testis epididymis, vas deferens, prostate
  b) Female – ovary, uterus- proliferative and secretory, cervix, fallopian tube

Digestive system
• Salivary glands - mucous, serous & mixed,
• Pancreas, liver, gall bladder,
• Tongue – filiform, fungiform & circumvallate,
• Oesophagus stomach-fundus, pylorus,
• Duodenum, jejunum, ileum,
• Large intestine, vermiform appendix

Genetics
• Demonstration of karyotyping charts- Normal male, Normal female, Down syndrome, Turner's Syndrome, Klinefelter's Syndrome, Chromosome spread

Prescribed text books
1. Cunningham’s Manual of Practical Anatomy-3 Volumes
2. Essentials of Human Anatomy-A.K.Datta, 3 Volumes
3. Inderbir Singh’s Text Book of Anatomy -3 volumes
4. Human Embryology - I.B.Singh
5. IB Singh’s Text Book of Human Neuro Anatomy
6. Human Neuro Anatomy-VishramSingh
7. Text Book of Human Histology-Inder Bir Singh
8. Surface and Radiological Anatomy-A. Halim & A.C.Das
9. Text Book of Osteology by I.B.Singh
11. Clinically Anatomy-A Problem solving approach by Neeta VKulkarni -2 Volumes

*
Reference text Books

1. Gray's Anatomy
2. Cunningham's text book of Anatomy
3. Grant's Atlas of Anatomy
4. Langman's Medical Embryology- T. W. Sadler
5. Clinical Neuro Anatomy- Richard S Snell
7. Essentials of Human Genetics- Bhatnagar, Kothari and Lopa Mehta
8. Histology Atlas- De Fiore
9. Text Book of Histology -Hamilton Bailey
10. Clinically Oriented Anatomy- Keith L Moore
11. Gray's Anatomy for students- Richard L Drake
12. The Developing Human- Moore and Persaud
13. Clinical Anatomy by Regions Richard S Snell
14. Human genetics -S.D.Gangane
15. Text Book of Human Histology-Gunasekharan

Evaluation
University Examination

Theory
Paper I - 50 marks , Paper II – 50 marks

Viva Voce – 20 marks – 4 stations, Embryology, Osteology, Radiology,

Surface marking

Theory-Topic Division

Paper I - General Embryology, General Anatomy, Genetics, Upper Limb, Lower Limb, Thorax
Paper II - Head and Neck, Brain, Abdomen, Pelvis, Perineum

University Practicals
Total 40 marks

- Histology - 15 marks
  a) 14 spotters of ½ mark each to include one Karyotype also
  b) Discussion 2 slides, one systemic and one general = 4 marks each

- Gross Anatomy - 25 marks
  a) 10 spotters X 1 mark = 10 marks
  b) Discussion
    i) Above diaphragm – 8 marks
    ii) Below diaphragm – 7 marks

☆
I) GOAL
The broad goal of teaching undergraduate students in Biochemistry is to make them understand the scientific basis of life processes at the molecular level and to orient them towards the application of this knowledge in solving clinical problems.

II) OBJECTIVES
(A) Knowledge: At the end of the course, the student shall be able to;

(a) Describe the molecular and functional organization of a cell and lists its subcellular components.
(b) Delineate structure, function and inter-relationship of bimolecular and consequences of deviation from normal.
(c) Summarize the basic and clinical aspects of Enzymology with emphasis on diagnostic enzymes.
(d) Describe digestion & assimilation of nutrients and consequences of malnutrition
(e) Integrate the various aspects of metabolism and their regulatory pathways
(f) Explain the biochemical basis of inherited disorders with their associated consequence
(g) Describe mechanisms involved in maintenance of body fluid, and pH homeostasis
(h) Outline the molecular mechanisms of gene expression and regulations, the principles of genetic engineering and their application in medicine.
(i) Summarize the molecular concept of defenses and their application in medicine.
(j) Outline the biochemical basis of environmental health hazards, biochemical basis of cancer and carcinogenesis
(k) Familiarize with the principles of various conventional and specialized laboratory investigations, instrumentation analysis and interpretation of a given data.
(l) Suggest experiments to support theoretical concepts and clinical diagnosis.
(B) Skills At the end of the course, the student shall be able to

1. Make use of conventional techniques and instruments to perform biochemical analysis relevant to clinical screening and diagnosis
2. Analyze and interpret investigative data
3. Demonstrate the skills of solving scientific and clinical problems and decision making

(C) Integration: The knowledge acquired in Medical Biochemistry shall help the students to integrate molecular events with structure and function of the human body in health and diseases.

DURATION

Duration of the course: 2 semesters

Total number of hours: 240 (Lectures: 160 Hours & Practicals and Innovative sessions: 80Hrs) Innovative sessions include projects, seminars, structured discussion, integrated teaching, formative evaluation and revision

DETAILED SYLLABUS DETAILS OF COURSE BIOCHEMISTRY:

- Essays must be framed from topics with three stars.
- Five and three marks questions must be framed from topics with three stars or two stars.

[THEORY: 160Hrs]

PAPER 1 (90Hrs)

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<td>1.1</td>
<td><strong>Structure and Functions of cell and cellular organelles</strong></td>
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<td>1.2</td>
<td>** Diseases associated with organelle. Fractionation of organelles (in brief) and their marker enzymes**</td>
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<td>BIOMOLECULES (15Hrs)</td>
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<td><strong>PROTEINS:</strong> **Classification of aminoacids based on structure, metabolic fate, nutritive value</td>
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<td>**Properties of amino acids: Ionic properties of amino acids, Isoelectric pH and its importance; Buffering action of aminoacids and proteins</td>
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<td>**Peptide bonds; Biologically important peptides; **Structural organization of proteins Primary Structure of insulin</td>
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<td>**Secondary structure</td>
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<td>**Tertiary and Quaternary structure ; Myoglobin, Collagen and hemoglobin; Protein folding in brief, Prion Diseases</td>
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<td>*Proteins: Classification based on composition &amp; solubility, shape, function and nutritional value, limiting aminoacids and mutual supplementation</td>
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<td>**Denaturation, Coagulation; Precipitation of protein –Isoelectric precipitation, precipitation using salts ,heavy metals and organic solvents</td>
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<td>*Reactions: Reducing property ,Oxidation, Reduction, Dehydration and Condensation (Details of reactions along with practicals)</td>
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| 2.10 | *Glycosidic bonds – N linked & O linked with examples  
* Amino sugars, deoxy sugars with examples  
* Disaccharides – reducing & nonreducing , Highlight clinical importance of lactulose | 1Hr |
| 2.11 | **Polysaccharides : Homopolysaccharides, Heteropolysaccharides  
**Glycosaminoglycans – composition, distribution and function  
* mucopolysaccharidosis – Types , common features & enzyme deficiency | 1 Hr |
| 2.12 | *Blood group antigens – Basic composition &Types  
**Dietary fibre – Definition, types function & clinical significance | 1Hr |
| 2.13 | **LIPIDS**: Definition, Classification with examples |
| | * Fatty acids: Definition, Alpha and omega numbering system, Classification; Clinical significance of MUFA & PUFA; Essential fatty acids; Trans fatty acids |
| | 1 Hr |
| 2.14 | *Cholesterol: Structure, Biologically important compounds derived |
| | *TAG: Composition & Function |
| | **Phospholipids – Composition & Functions |
| | *Phospholipases: Clinical highlights: Viper venom, Respiratory distress syndrome |
| | 1 Hr |
| 2.15 | **Membranes**: Structure & Composition (Functions will be dealt in Physiology classes) |
| | *Micelle & Liposomes |
| | 1 Hr |

<p>| 3 | <strong>ENZYMES</strong> (7 Hrs) |
| 3.1 | **Definition, IUBMB classification with examples, Coenzymes &amp; Cofactors |
| | 1 Hr |
| 3.2 | **Concept of active site, Specificity of enzymes; Factors affecting enzyme activity, Km value and its significance |
| | 1 Hr |
| 3.3 | ***Enzyme inhibition: Competitive, noncompetitive, uncompetitive with examples |
| | 1 Hr |
| 3.4 | ***Suicidal inhibition, Allosteric inhibition and feedback inhibition with examples |
| | (High light: Enzyme inhibition and drug designing) |
| | 1 Hr |
| 3.5 | *** Enzyme regulation in biological systems – Compartamentalization, allosteric regulation, covalent modification, zymogen activation, induction, repression &amp; Derepression |
| | 1 Hr |
| 3.6 | **Clinical enzymology: Diagnostic importance of enzymes; Functional &amp; nonfunctional enzymes; **Iso-enzymes: Definition, Separation and examples – CPK &amp; LDH |
| | 1 Hr |
| 3.7 | **Other enzymes of diagnostic importance: Transaminases (AST, ALT), ALP, GGT, NTP, ACP, Amylase, Lipase, Choline esterase, Enolase |
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<td><strong>Malabsorption: Lactose intolerance</strong></td>
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<td><strong>5.2</strong> Rappaport Lubering pathway, Significance of 2,3 BPG, Cori’s cycle</td>
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<td><strong>5.4</strong> Gluconeogenesis; Definition, substrates, reactions &amp; key enzymes,</td>
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<td><strong>5.5</strong> Regulation, Significance, Glucose alanine cycle</td>
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<td><strong>5.6</strong> Glycogenesis</td>
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<td><strong>5.9</strong> HMP shunt pathway; Tissues operating, Oxidative phase in detail &amp; mention the products of non oxidative phase,</td>
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<td>**Significance of HMP shunt pathway, G6PD, Transketolase</td>
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<td>*Uronic acid pathway in brief, Significance of the pathway, Pentosuria; Polyol pathway and its importance</td>
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<td>***Regulation of blood glucose: Fed &amp; fasting state; Organs, Glucose transporters, Hormones, Enzymes involved</td>
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<td>**Insulin: Receptor, mechanism of action, insulin release, Actions of insulin related to metabolism in brief</td>
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<td>***Diabetes Mellitus: Definition, Types &amp; etiology, Diagnostic criteria, Metabolic derangements</td>
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<td>***Laboratory diagnosis and monitoring of glycemic control and complications</td>
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<td>**GTT: Indications, Procedure, Interpretation, Types of GTT curves, Mini GTT, Extended GTT, IV GTT &amp; GCT in brief</td>
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<td>5.19</td>
<td>**Hypoglycemia: Definition, causes, clinical features, biochemical basis of Management, Glycosurias and reducing substances</td>
</tr>
</tbody>
</table>

<p>| 6 | **METABOLISM OF LIPIDS **(18Hrs) |
| 6.1 | **Fatty acid biosynthesis: Fatty acid Synthase complex, reactions; Regulation; |
| 6.2 | *Elongation and desaturation of fatty acids |
| 6.3 | Fatty acid oxidation: *** Beta oxidation; Definition, Fatty acid transport &amp; carnitine, steps |
| 6.4 | 2 Hrs |</p>
<table>
<thead>
<tr>
<th>Energetics, regulation &amp; disorders</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oxidation of odd chain fatty acid &amp; fate of propionylcoA</strong></td>
</tr>
<tr>
<td>Oxidation of unsaturated fatty acid &amp; very long chain fatty acid</td>
</tr>
<tr>
<td>Alpha &amp; Omega oxidation of fatty acid; in brief; *In born errors associated</td>
</tr>
<tr>
<td><strong>Ketone bodies: Formation &amp; utilization</strong></td>
</tr>
<tr>
<td>Metabolic background of ketoacidosis in DM and starvation and differential diagnosis by laboratory</td>
</tr>
<tr>
<td><strong>Adipose tissue: Types, Liver adipose tissue axis, Adipokines; Hormone sensitive lipase</strong></td>
</tr>
<tr>
<td><strong>Fatty liver: Causes, Lipotropic factors, fate of fatty liver</strong></td>
</tr>
<tr>
<td><strong>Cholesterol: Synthesis up to mevalonate in detail and mention the intermediates of important reactions up to cholesterol, Regulation</strong></td>
</tr>
<tr>
<td><strong>Metabolic fate: Formation of bile salts and its significance, Mention other biologically compounds derived from cholesterol</strong></td>
</tr>
<tr>
<td><strong>Lipoproteins: Definition, General structure of lipoproteins, classification, separation; Metabolism of chylomicrons</strong></td>
</tr>
<tr>
<td><strong>Metabolism of VLDL &amp; LDL</strong></td>
</tr>
<tr>
<td><strong>Metabolism of HDL</strong> Two types of HDL &amp; Lp(a) and their significance</td>
</tr>
<tr>
<td>Lipid profile; Dyslipidemia; Dietary management &amp; role of statins</td>
</tr>
<tr>
<td>Lipid storage disorders: NiemannPick, Taysach’s, Gaucher’s, Fabry’s disease in brief</td>
</tr>
<tr>
<td>Eicosanoids: <strong>Prostaglandins &amp; Thromboxanes</strong>; Major steps of formation; <strong>Biochemical actions &amp; therapeutic uses</strong> Mention Leukotrienes &amp; Lipoxins</td>
</tr>
</tbody>
</table>

**METABOLISM OF AMINOACIDS** (20Hrs)
| 7.1 | *Dynamic state of body proteins, Body aminoacid pool; Inter organ transport of amino acids,* Nitrogen balance and PEM | 1 Hr |
| 7.2 | **Reactions; Transdeamination (transamination + Oxidative deamination); Non oxidative deamination | 1Hr |
| 7.3 | ***Formation and detoxification of ammonia (urea Cycle) Regulation, Energetics, Hyperammonemia, Biochemical basis of management of hyperammonemia | 2Hrs |
| 7.4 | **One carbon metabolism | 1Hr |
| 7.5 | **Metabolism of glycine:, Compounds synthesized and inborn errors | 2 Hrs |
| 7.6 | **metabolism of serine, role as a component of proteins | 1Hrs |
| 7.7 | **Metabolism of Sulfur containing amino acids: Metabolism of Cysteine | 2Hrs |
| 7.8 | Glutathione, Taurine, Transulfuration, PAPS;*Excretion of Sulfur | |
| 7.9 | **Metabolism of Methionine, Transmethylation | 2Hrs |
| 7.10 | Inborn errors associated with metabolism of S containing amino acids | |
| 7.11 | **Metabolism of aromatic amino acids: Phenyl alanine and tyrosine; Compounds synthesized, Inborn errors associated | 3Hrs |
| 7.12 | **Catabolism of catecholamines, VMA formation & excretion and its significance | |
| 7.13 | **Metabolism of Tryptophan and compounds (niacin melatonin, serotonin, indoxyl) formed in brief | 2Hrs |
| 7.14 | **Hartnup disease and its diagnosis** Effect of PLP on Tryptophan metabolism | |
| 7.15 | *Formation and excretion of 5HIAA and its clinical significance | |
| 7.16 | *Histidine metabolism & Inborn error associated**FIGLU excretion test | 1Hr |
| 7.17 | *Glutamic acid, GABA; Glutamine; *Aspartic acid, Asparagine | |
| 7.18 | *Metabolism of Arginine, NO, Polyamines. | 3Hrs |
| 7.19 | *Branched chain aminoacid metabolism (1st two steps only required) &MSUD *Biologically important amines; *Amino acids and amino acid derivatives acting as neurotransmitters; *Organic acidurias | |
| 7.20 | **TRICARBOXYLIC ACID (TCA) CYCLE & ELECTRON TRANSPORT CHAIN (ETC) | (4Hrs) |
### TCA Cycle: Final Common oxidative Pathway of metabolism

**Reactions, regulation, energetics & inhibitors; Anaplerotic reactions; Amphibolic role**

---

### High energy compounds: definition and examples

---

### ETC: Components and sites of ATP synthesis; Mechanism of oxidative phosphorylation; ATP synthase Inhibitors

**Brown adipose tissue**

---

### Integration of metabolism, Adaptations in starvation: Life style diseases, BMI obesity, Metabolic syndrome (Mention NASH, PCOS) Atherosclerosis

---

### METABOLISM OF HEME

#### Heme synthesis: Heme synthetic pathway, regulation & effects of lead poisoning

---

#### Porphyrias: Types, Enzyme defects, manifestations and investigations of blood & urine (Acute intermittent Porphyria in detail and others in brief)

---

#### Heme catabolism: Formation & fate of bilirubin (uptake, conjugation, secretion); Formation & Fate of urobilinogen & sterobilinogen

---

#### Serum bilirubin: Types, Blood levels in healthy subjects; Properties;

#### Jaundice: Definition, Classification, Causes & differential diagnosis by biochemical tests

---

#### Neonatal hyperbilirubinemia, Kernicterus & biochemical basis of treatment in brief

---

#### Haemoglobinopathies: Different types and Hbs in detail (Hb electrophoresis, Sickling test); Thalassemias: Alpha and beta thalassemia in brief

---

### FAT SOLUBLE VITAMINS

#### Vitamin A: Different chemical forms, dietary sources, RDA Vitamin A;

#### Absorption, transport and storage; Functions of vitamin A, Wald’s visual cycle

---

Deficiency manifestations and its prevention; Hyper vitaminosis

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<table>
<thead>
<tr>
<th>Chapter 10</th>
<th>Topics</th>
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</thead>
<tbody>
<tr>
<td>10.3</td>
<td>***Vitamin D: Chemical nature, dietary sources, RDA Vitamin D; Active form of vitamin D – its formation and actions</td>
</tr>
<tr>
<td>10.4</td>
<td>Deficiency manifestations in children and adults and its prevention</td>
</tr>
<tr>
<td>10.5</td>
<td>**Vitamin K: Chemical forms, dietary sources, biochemical Functions, RDA and deficiency manifestations Highlight: Vitamin K administration to preterm babies &amp; Vitamin K and Prothrombin time **Vitamin E: Chemical forms, Biochemical Functions (focus lipid peroxidation and antioxidant function in brief) and deficiency manifestations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 11</th>
<th>WATER SOLUBLE VITAMINS</th>
<th>(6Hrs)</th>
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<tr>
<td>11.1</td>
<td>**Thiamine: Chemical nature, dietary sources, RDA, coenzyme form, biochemical functions, deficiency manifestations Highlight: Transketolase assay to detect deficiency</td>
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<td>11.2</td>
<td>*Riboflavin, Pyridoxine: Chemical nature, dietary sources, RDA, coenzyme form, biochemical functions, deficiency manifestations</td>
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<tr>
<td>11.3</td>
<td>*Pantothenic acid, Niacin, Biotin: Chemical nature, dietary sources, RDA, Coenzyme form, biochemical functions, deficiency manifestations</td>
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<tr>
<td>11.4</td>
<td>*Folic acid: Chemical nature, dietary sources, RDA, coenzyme form, biochemical functions, deficiency manifestations (One carbon metabolism along with amino acid metabolism)</td>
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<tr>
<td>11.5</td>
<td>**Vitamin B₁₂, Vitamin C: Chemical nature, dietary sources, RDA, role as coenzymes</td>
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<tr>
<td>11.6</td>
<td>Biochemical functions, deficiency manifestations; *Antivitamins</td>
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<tr>
<th>Chapter 12</th>
<th>MINERALS</th>
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<tr>
<td>12.1</td>
<td>*Classification of minerals based on RDA **Calcium: Dietary sources, biochemical functions, RDA, Blood levels in healthy subjects, regulation of blood calcium level, Hypocalcaemia, Hypocalcaemia.</td>
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<tr>
<td>12.2</td>
<td>Phosphorus, Magnesium, Copper: Dietary sources, biochemical functions, RDA,</td>
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<td>12.3</td>
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<tr>
<th>Section</th>
<th>Topic</th>
<th>Note</th>
<th>Duration</th>
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<tr>
<td>12.4</td>
<td><strong>Iron</strong>: Dietary sources, RDA, Absorption, transport &amp; storage; Causes of iron deficiency &amp; Iron deficiency Anemia; Hereditary Hemochromatosis.</td>
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<td>2Hrs</td>
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<tr>
<td>12.5</td>
<td>*Iodine, Potassium, Sodium, Chloride, Zinc, Selenium, Fluoride, Manganese, Magnesium: in brief</td>
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<td>1Hr</td>
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<tr>
<td>13</td>
<td><strong>HOMEOSTATIC MECHANISMS IN THE BODY</strong></td>
<td>(5Hrs)</td>
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<tr>
<td>13.1</td>
<td>Acid base balance: *Acids, bases, pH, pK, Buffers, Henderson-Hasselbalch equation</td>
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<td>2hrs</td>
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<tr>
<td>13.2</td>
<td><strong>Body buffers, respiratory &amp; renal regulation of blood pH</strong></td>
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<tr>
<td>13.3</td>
<td><strong>Disorders of acid base balance</strong></td>
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<td>2Hrs</td>
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<tr>
<td>13.5</td>
<td>*Anion gap Assessment of acid base balance by blood gas parameters</td>
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<tr>
<td>13.6</td>
<td>Fluid and electrolyte balance: *Regulation of osmolality and maintenance of fluids in the various body compartments and related disorders</td>
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<td>1Hr</td>
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<tr>
<td>14</td>
<td><strong>MOLECULAR BIOLOGY</strong></td>
<td>(22Hrs)</td>
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<tr>
<td>14.1</td>
<td>*Nucleotide chemistry: Structure of purine &amp; pyrimidine bases, nucleosides, nucleotides</td>
<td></td>
<td>1Hr</td>
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<tr>
<td>14.2</td>
<td>Purine synthesis and catabolism: *Purine synthesis: Synthetic pathway in brief – Source of constituent atoms, rate limiting steps, first nucleotide formed and the formation of other nucleotides from IMP</td>
<td></td>
<td>1Hr</td>
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<tr>
<td>14.3</td>
<td>**Purine catabolism: Pathway, Hyperuricemia, Gout, Biochemical principles of treatment of Gout; *Lesch-Nyhan syndrome, Hypouricemia</td>
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<td>1Hr</td>
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<td>14.4</td>
<td>*Pyrimidine synthesis and degradation, Orotic aciduria</td>
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<td>2Hrs</td>
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<tr>
<td>14.5</td>
<td>*Synthesis of dNTPs (deoxy nucleotide triphosphates) *Nucleotide analogues &amp; Folic acid antagonists</td>
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<td>14.6</td>
<td><strong>Nucleic acids</strong>: Structure and organization of DNA; Different types of DNA, Different types of RNA, difference between DNA &amp; RNA; *Mitochondrial DNA</td>
<td>2Hrs</td>
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<tr>
<td>14.7</td>
<td><em>Cell cycle</em> and *<strong>Replication</strong>: Process of replication (prokaryotes); DNA polymerase (prokaryotes &amp; eukaryotes); Inhibitors</td>
<td>2Hrs</td>
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<tr>
<td>14.8</td>
<td>*<em>DNA repair mechanisms, Examples of DNA repair defects, <em>Telomerase</em></em></td>
<td>1Hr</td>
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<tr>
<td>14.9</td>
<td>*<strong>Transcription</strong>: Process of transcription (prokaryotes and differences in eukaryotes); RNA polymerases (prokaryotes &amp; eukaryotes); Inhibitors</td>
<td>2Hr</td>
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<tr>
<td>14.10</td>
<td><strong>Post transcriptional modifications (hnRNA &amp; primary tRNA transcript)</strong>; *RNA editing with an example (apo B_48 &amp; apo B_100); <em>Reverse transcriptase; <em>Ribozyme</em></em></td>
<td>1Hr</td>
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<tr>
<td>14.11</td>
<td>**Genetic code, *<em>t RNA; <em>Ribosomes &amp; Polysomes</em></em></td>
<td>1Hr</td>
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<tr>
<td>14.12</td>
<td>*<strong>Translation</strong>: Different phases of translation (eukaryotes differences in prokaryotes); **Post translational modifications; Inhibitors protein targeting</td>
<td>2Hrs</td>
<td></td>
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<tr>
<td>14.13</td>
<td>*Regulation of gene expression (lac operon model, gene amplification, gene rearrangement)</td>
<td>2Hrs</td>
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<tr>
<td>14.14</td>
<td>DNA based techniques: <strong>Recombinant DNA technology</strong> Applications in clinical medicine</td>
<td>1Hr</td>
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<tr>
<td>14.15</td>
<td><strong>Applications in clinical medicine; Gene therapy, RFLP, DNA finger printing</strong></td>
<td>1Hr</td>
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<tr>
<td>14.16</td>
<td><strong>Blotting techniques (Southern, Northern &amp; Western)</strong>; <strong>PCR*Antisense therapy</strong></td>
<td>1Hr</td>
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<tr>
<td>14.17</td>
<td><em>Biochemical basis of inherited disorders &amp; screening of genetic disorders; Mode of inheritance</em>*</td>
<td>1Hr</td>
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<tr>
<td>14.18</td>
<td>*<strong>Mutations: Definition, types with examples; Mutagens, Ame’s test</strong></td>
<td>1Hr</td>
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<tr>
<td>15</td>
<td>IMMUNOGLOBULINS (3hrs)</td>
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<tr>
<td>15.1</td>
<td><strong>Immunoglobulin: Types, Structure (general structure and structure of IgM &amp; IgA);</strong></td>
<td>2Hrs</td>
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<tr>
<td>15.2</td>
<td>&amp;Functions ; *Hypergammaglobulinemia ; * Hypergammaglobulinemia</td>
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<tr>
<td>15.3</td>
<td>*AIDS (Structure of HIV virus ,major genes &amp; antigens), Natural course of HIV infection Immunology of AIDS, Laboratory diagnosis &amp;monitoring, Biochemical basis of retroviral therapy</td>
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<tr>
<td>16</td>
<td>BIOCHEMISTRY OF CANCER (3Hrs)</td>
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<tr>
<td>16.1</td>
<td>**Biochemistry of cancer: Cell cycle, Cyclins and apoptosis. Etiology of cancer;</td>
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<tr>
<td>16.2</td>
<td>Carcinogenesis: Oncogenic virus; Oncogenes ;Tumor suppressor genes,</td>
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<tr>
<td>16.3</td>
<td>**Tumor markers ; *Anticancer drugs * Monoclonal antibodies</td>
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<tr>
<td>17</td>
<td>CLINICAL BIOCHEMISTRY (7Hrs)</td>
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<tr>
<td>17.1</td>
<td>**Plasma proteins: Types ; Functions ; Separation ; Abnormal patterns in clinical diseases ; A G ratio; Acute phase proteins</td>
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<td>17.2</td>
<td>**Electrophoresis of serum proteins ;Multiple myeloma &amp;Bence Jones proteins</td>
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<td>17.3</td>
<td>**Chromatography and diagnosis of inherited disorders of metabolism (Example: Aminoaciduria)</td>
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<td>17.4</td>
<td>** Cardiac markers ***Liver function tests and interpretation</td>
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<td>17.5</td>
<td>*Thyroid function tests and interpretation</td>
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<td>17.6</td>
<td>**Renal function tests and interpretation</td>
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<tr>
<td>17.7</td>
<td>*Radioactivity :Radioactive isotopes used in Medicine ;Diagnostic, therapeutic and research applications; Radiation hazards</td>
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<td>18</td>
<td>XENOBIOTICS (2Hrs)</td>
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<tr>
<td>18.1</td>
<td>**Detoxification and Biotransformation of xenobiotics: Different phases</td>
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<td>18.2</td>
<td>*Metabolism of alcohol, brief mention of environmental toxins</td>
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<td>19</td>
<td>FREE RADICALS AND ANTIOXIDANTS (1Hr)</td>
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<tr>
<td>19.1</td>
<td>Free radicals: Generation, Types, lipid peroxidation. Antioxidants: Different types</td>
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## Practical Syllabus [Total: 80Hrs]

### Qualitative Experiments

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<th>2 Hr Sessions</th>
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<tr>
<td>Reactions of Carbohydrates: Glucose, Fructose, Lactose, Sucrose</td>
<td>4 (8hrs)</td>
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<tr>
<td>Proteins: Precipitation of Proteins</td>
<td>1 (2Hrs)</td>
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<tr>
<td>Proteins: Color reactions</td>
<td>1 (2Hrs)</td>
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<tr>
<td>Reactions of Albumin</td>
<td>1 (2Hrs)</td>
</tr>
<tr>
<td>Reactions of Urea, Uric acid &amp; Creatinine</td>
<td>1 (2Hrs)</td>
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<tr>
<td>Identification of biologically important substance in given solution</td>
<td>1 (2Hrs)</td>
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<tr>
<td>Normal constituents of urine – Inorganic &amp; Organic constituents</td>
<td>2 (4Hrs)</td>
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<tr>
<td>Abnormal constituents of urine</td>
<td>2 (4Hrs)</td>
</tr>
<tr>
<td>Demonstration of electrophoresis of serum proteins &amp; interpretation</td>
<td>1 (2Hrs)</td>
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<tr>
<td>Demonstration of paper chromatography/TLC urinary aminoacids &amp; interpretation</td>
<td>1 (2Hrs)</td>
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<tr>
<td>Hemin crystal preparation and microscopic examination</td>
<td>1 (2Hrs)</td>
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</tbody>
</table>

### Quantitative Experiments

| Introduction to clinical chemistry: Collection of blood samples, Anticoagulants, Collection of 24 hour urine sample and Urine preservatives Principles of colorimetry | 1 (2Hrs) |
| Estimations of levels of glucose, urea, creatinine, total protein and albumin in blood | 5 (10Hrs) |

### Chart Discussion

Clinical cases along with biochemical test results for interpretation and discussion

<p>| Jaundice – Hepatic, Hemolytic and Obstructive jaundice | 1 (2Hrs) |
| Diabetes mellitus - Cases based on diabetes mellitus, Diabetic ketoacidosis, Hyper | 1 (2Hrs) |</p>
<table>
<thead>
<tr>
<th>Condition</th>
<th>Charts Based On</th>
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<tbody>
<tr>
<td>Osmolar nonketotic coma, Hypoglycemia, IGT, IFG</td>
<td>1(2Hrs)</td>
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<tr>
<td>GTT curves – Normoglycemia, Diabetes mellitus, IFG, IGT, Alimentary glycosuria, Renal glycosuria, Hypoglycemia</td>
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<tr>
<td>Charts based on HbA1C &amp; Microalbuminuria</td>
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<td>Myocardial infarction: Markers</td>
<td>1(2Hrs)</td>
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<td>Pancreatitis: Markers</td>
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<td>Prostate Cancer: Markers</td>
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<td>Nephrotic syndrome, Glomerulonephritis</td>
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<tr>
<td>Charts based on alcoholism, atherosclerosis, lipid profile, fatty liver</td>
<td>1(2Hrs)</td>
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<tr>
<td>Charts based on acid base parameters related to Metabolic acidosis, Metabolic alkalosis, Respiratory acidosis and Respiratory alkalosis (Only uncompensated cases)</td>
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<tr>
<td>Charts based on TFT related to Hypothyroidism &amp; Hyperthyroidism</td>
<td>1(2Hrs)</td>
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<td>Charts based on Metabolic syndrome, Gout</td>
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<tr>
<td>Charts based on inborn errors of metabolism (Lactose intolerance, Galactosemia, Fructosuria, von Gierke’s disease, PKU, MSU, Hartnup’s disease, Alkaptonuria, Albinism, Pheochromocytoma Carcinoid syndrome, Lesch Nyhan syndrome)</td>
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<tr>
<td>Charts based on Vitamins: Vit A, D, K, Thiamine, Niacin, Ascorbic acid, Pyridoxine, Folic acid</td>
<td>1(2Hrs)</td>
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<tr>
<td>Charts on replication fork, Xeroderma pigmentosum, HNPCC, HIV major genes &amp; antigens</td>
<td>1(2Hrs)</td>
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</table>
Charts based on enzyme inhibition: Competitive Non competitive, Suicidal inhibition

<table>
<thead>
<tr>
<th>OBJECTIVE STRUCTURED PRACTICAL EXAMINATION (OSPE) Practice sessions</th>
<th>2 (4Hrs)</th>
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</thead>
</table>

**SPOTTERS:** Based on tests, instruments, charts, microscopic slides, graphs, nutrition, reference ranges of routine parameters, major concepts, reagents, Indicators.

| Seminars: (Guide lines for evaluation. (Colleges can make their own marking scheme) |
|------------------------------------------|----------|
| • Allot 10 topics for a day. |
| • Assign a single topic for a student for presentation lasting for 10 minutes |
| • All the students should learn all the 10 topics. Those who present topic will be evaluated based on the presentation; others will be evaluated either by MCQ based post test or assignments based on the topic presented. |
| (10 MCQs just after the presentation part of the session or assignment submitted within a week) |
| • Marks: 10 marks for presentation & 10 marks for MCQ |
| • Consider 10 % of this mark for internal assessment |

**Distribution of marks for practical session**

<table>
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<tr>
<th>Items</th>
<th>Marks</th>
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<tbody>
<tr>
<td>Qualitative experiment</td>
<td>10 marks.</td>
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<tr>
<td>• The questions may be reworded so that the application of the experiment is highlighted.</td>
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</tr>
<tr>
<td>• Question cards may be used to elicit more information</td>
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<tr>
<td><strong>Sample questions are provided below which are only for guidance. Colleges can prepare their own question bank.</strong></td>
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</tr>
<tr>
<td>Quantitative experiment</td>
<td>10 marks The questions may be reworded so that the application of the experiment is highlighted</td>
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</table>

**Sample questions are provided below**
which are only for guidance. Colleges can prepare their own question bank.

<table>
<thead>
<tr>
<th>Task</th>
<th>Marks</th>
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<tbody>
<tr>
<td>Chart discussion</td>
<td>10</td>
</tr>
<tr>
<td>Spotters</td>
<td>5 marks -10 spotters – 10x0.5=5 marks</td>
</tr>
<tr>
<td>OSPE</td>
<td>5 marks. Two OSPE stations with 2.5 marks each. One performance station and one writing station using suitable question cards. Sample questions and grading sheets provided for guidance only</td>
</tr>
<tr>
<td>Record</td>
<td>[Assessment of record keeping should be done along with internal assessment. But submission of record during University Practical Examination is compulsory to meet the requirement of attending practical examination]</td>
</tr>
</tbody>
</table>

Sample questions for QUALITATIVE EXPERIMENT

1. i) Identify whether the sugar solution contains a monosaccharide or disaccharide?

[By doing relevant tests (Benedict’s test, Barfoed’s test/ Alkali destruction test, it is to be identified and reported).

ii) Related questions (2 or 3 questions may be kept on the seat as a question card) some examples related to the above question are given below

1. Name 2 reducing disaccharides. What are their components?

2. What is the type of linkage between the monosaccharides in these sugars?

☆
3. What is the shape of the osazone?

4. Name a condition where a disaccharide is excreted in urine

5. Name the dietary source for any of these disaccharides

6. Which enzyme can hydrolyze it in the GIT?

7. What will happen if this enzyme is deficient?

**Q II.i) Observe the results of these tests and suggest the identity of the sugar. Do you need any other test to confirm the nature of the sugar? If so perform the test and confirm**

**Q III.i) How will you identify the monosaccharide supplied in the solution? Glucose or fructose**

Some questions related to the above question are given below Q II & Q III

1. Give 2 differences between these sugars

2. Name the dietary source

3. Name a disaccharide containing this sugar

4. Name a homopolysaccharide containing this sugar

**Q IV. With the help of a test explain the reducing property of glucose**

1. What is the clinical use of this test?

2. Is this test specific for glucose?, if not name two non carbohydrate and two carbohydrate substances giving this test positive?

3. Name a test that specifically detects glucose.

**Q V. The urine sample from a 6 year old boy gave a positive Benedict’s test. Mother complains that the child is losing weight in spite of increased appetite**

**Identify the sugar (performance of tests)**

1. Enumerate the causes of Glycosurias

2. Give two inherited causes of Glycosurias

3. Name a non sugar reducing compound

4. Is there an indication for performing plasma glucose estimation in this patient? If so explain.
Sample questions for QUANTITATIVE EXPERIMENT

Q I. A retired school teacher aged 62 yrs complaining of increased thirst, hunger, passing urine more frequently and losing weight. Urine showed glucose oxidase based strip test positive.

1. What is the blood test required to diagnose diabetes mellitus and Do it & furnish the result. [The examiner can discuss the value obtained, method used and possible causes of an abnormal result at the end. ]

2. Give the diagnostic criteria of diabetes mellitus

3. What are IFG and IGT?

4. Name a blood test that reveals mean glucose level over the previous 12 weeks. What is the level of this parameter suggestive of normal glycemic status?

5. Name one test used as a early marker of diabetic nephropathy and retinopathy

Q II. A 5 year old admitted to pediatric ward due to severe diarrhea vomiting and reduced urine output. He is dehydrated. A sample of blood is sent for investigations to assess the renal function.

1. Name two blood test useful to assess renal function

2. Name the analyte which is elevated in dehydration and also in renal disease. Do the estimation of it and submit the report.

3. What is the current Gold standard test to detect renal function

OSPE General Guidelines:

• OSPE questions prepared for experiments should be observable and structured and should be completed within five minutes.

In addition to experiment, the questions kept at the writing station will help to derive the concealed concepts related to the experiment eg: inference /clinical correlations/reference range etc.

A few model OSPE questions are furnished below along with check list for structured observations. A set of common laboratory reagents and lab ware should be arranged at the station. So that students can select the required reagents according to the OSPE questions.

Advantages OSPE:

• Practising OSPE questions will sharpen the skills
Sample OSPE questions

1. Glucose solution is provided in a numbered beaker/test tube. Show that it is an aldose by doing one test

<table>
<thead>
<tr>
<th>Steps</th>
<th>Observations</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Selection of a test to show glucose is an aldose: Seliwanoff's test/Rapid Furfural test</td>
<td>0.5</td>
</tr>
<tr>
<td>2</td>
<td>Step-1</td>
<td>0.5</td>
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<tr>
<td>3</td>
<td>Step-2</td>
<td>0.5</td>
</tr>
<tr>
<td>4</td>
<td>Write down the observation and inference</td>
<td>0.5</td>
</tr>
<tr>
<td>5</td>
<td>Overall performance of the student in terms of choice of proper glassware, cleanliness, handling of reagent bottles, accuracy and precision.</td>
<td>0.5</td>
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</table>

2. Demonstrate the amino acid Tyrosine/Tryptophane, in the given protein solution.
3. Test to distinguish monosaccharides from disaccharides
4. Test to demonstrate the presence of ketone bodies/bile salts in urine
5. Test to detect the presence of uric acid/creatinine in a solution

Note: Appropriate question cards with a minimum of 3 questions, may be used at the writing station.

MARKS

<table>
<thead>
<tr>
<th>University examination</th>
<th>Marks</th>
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</thead>
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<tr>
<td>Theory paper I &amp; II (50+50)</td>
<td>100</td>
</tr>
<tr>
<td>Theory - Internal assessment</td>
<td>20</td>
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<tr>
<td>Viva</td>
<td>20</td>
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<tr>
<td>Practical</td>
<td>40</td>
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<tr>
<td>Practical - Internal assessment</td>
<td>20</td>
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<tr>
<td>Total</td>
<td>200</td>
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</table>
SUGGESTED BOOKS IN BIOCHEMISTRY

Books for study:

1. Text of Biochemistry for Medical students by Vasudevan & Sreekumari
3. Text of Biochemistry for Medical students R Text of Biochemistry for Medical students Rafi M.D
5. Practical Biochemistry for Medical students by Vasudevan
6. Practical Biochemistry by Geetha Damodaran K

Books for Reference:

1. Principles of Biochemistry by Lehninger
2. Biochemistry with Clinical Correlations by Thomas. M. Devlin
3. Biochemistry by Stryer
4. Biochemistry-A case oriented Approach by Montgomery
HUMAN PHYSIOLOGY

(I) GOAL

The broad goal of the teaching of undergraduate students in physiology aims in providing the student, a comprehensive knowledge of the normal functions of the organ systems of the body and their interactions to facilitate understanding of the physiological basis of health and changes in disease.

(II) LEARNING

OBJECTIVES A.

Knowledge

At the end, a medical student in Physiology should be able to explain:

(a) Functions of organ systems in a normal subject.
(b) Contribution of organ systems and their integration in maintenance of homeostasis
(c) Altered physiology on exposure to stress, and during disease process
(d) Compare the normal and abnormal data; interpret the same to assess health status
(e) Physiological principles underlying pathogenesis and treatment of disease.
(f) Reproductive physiology as relevant to National Family Welfare programme
(g) Basic laboratory investigations relevant for a rural set up
(h) Concept of professionalism
(i) Approaches to the patient with humanity and compassion

B. Skills

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

(a) Conduct experiments designed for study of physiological phenomena

(b) Interpret experimental / investigative data

(c) Distinguish between normal and abnormal data derived as a result of tests which he/she has performed and observed in the laboratory

C. Integration

At the end of the integrated teaching, the student shall acquire an integrated knowledge of organ structure and function and its regulatory mechanisms.
(III) DETAILED SYLLABUS

DETAILS OF THE COURSE
Duration of the course: 2 semesters
Total number of hours: 480

Lectures: 160  Practical: 120
Innovative session (Projects, seminars, structured discussion, integrated
teaching, formative evaluation and revision: 200

DETAILS OF CLASSES IN PHYSIOLOGY

GENERAL PHYSIOLOGY  3 hrs

Introduction to Physiology, Principles of Homeostasis, Transport Mechanism,
Intercellular communication. Body fluid compartments- divisions, composition,&
determination(mention Fick’s Principle)Blood volume-normal value, abnormalities-
Hypervolemia & Hypovolemia.

HEMATOLOGY  21 hrs

Introduction  1hr

Blood - Functions, composition, Properties – specific gravity, viscosity – definition,
normal values & variations

Plasma proteins:  1hr
Types, Quantity, Functions, AG ratio- Importance to be given for functions -
Abnormal
proteins to be dealt in biochemistry

Red Blood Cells  1hr
Morphology, composition and functions, normal RBC count and variations--------
Properties – to be dealt in practical’s

Haemoglobin  1hr
outline only normal basic structure, normal content, functions, types (Hb A, Hb A2 and
Hb

F) abnormal Hbs (only two - Thalassemias & Haemoglobin S – mention only
details in Biochemistry)

Erythropoiesis  1hr
Sites (intra and extra uterine) different stages, Factors influencing & regulating
Erythropoiesis Life Span of RBC and its destruction (outline), jaundice (mention –
details in Biochemistry).

Anaemias  1hr
definition, classifications (etiologic, morphological), physiological basis of anaemias (briefly), iron deficiency anaemia, Pernicious anaemia, aplastic anaemia, Hemolytic anaemia (briefly), Polycythemia - primary and secondary

**White Blood Cells:** 4hrs
Classification, morphology (details in practical classes), lifespan Properties and functions – Neutrophil, Eosinophil, Basophil, Monocyte, Lymphocyte. Normal total and differential count (methods in practicals), variations Leucocytosis, Leucopenia, leukaemia (definition, mention difference from leucocytosis), agranulocytosis

**Immunity** 1hr
Reticulo endothelial system ½hrs

**Platelets:** 1 hr
Morphology, properties and functions, normal count, variations, thrombopoiesis, and factors influencing this

**Haemostasis** 4 hrs
Primary (vasospasm, platelet plug formation) and Secondary (extrinsic and intrinsic mechanisms of coagulation of blood) Clot retraction (mention)

Anticlotting mechanisms in vivo -factors that limit clot formation (Protein C, Protein S and antithrombin III) and fibrinolytic system (all in brief).


Prothrombin time and PTT (principles only) Thrombosis and Embolism – mention

Blood volume - Normal volume, abnormalities, hypervolemia & hypovolemia (mention)

**Blood groups** 2 hrs
ABO and Rh systems, inheritance, differences, Bombay group, Landsteiner’s laws I and II Mention about Bombay blood group, no need of other minor blood groups

Blood grouping and cross matching (importance), concept of universal donor and recipient
ABO and Rh incompatibility – important manifestations, erythroblastosis foetalis. Management and preventive measures, Medicolegal and clinical importance (briefly)

**Blood banking and transfusion** 1 ½hrs
Blood transfusion – indications, precautions and complications

Blood Banking – anticoagulants used, storage, changes during storage – Lymph – 1 hr

formation, circulation, functions

Tissue fluid – formation, circulation and functions Starling’s hypothesis – edema formation

2 hrs

Seminars/tutorials

INTEGRATED TEACHING – 6 hrs

1. Pathology dept

Anaemia blood smear – Normal and abnormal - 1 hour

2. Transfusion medicine department

Transfusion of blood components – with special reference to recent advances, Modern trends in blood banking - 1 hour

2. Microbiology department

Immune mechanisms - 1 hour

CARDIOVASCULAR SYSTEM – 26 hrs

Functional anatomy of heart and blood vessels Chambers, valves, great vessels, Systemic and pulmonary circulations

Properties of cardiac muscle, Excitability, rhythmicity, conductivity, contractility, to review only as it is dealt in NMP

Conducting system of heart, parts of conducing system, origin and spread of cardiac impulse, abnormal pacemakers, conduction defects

Cardiac cycle:

Definition, phases, events of cardiac cycle Pressure changes – Atria, Jugular vein (mention clinical significance). Ventricles – right and left, Aorta and Pulmonary artery, Volume changes – in different chambers. Heart sounds – causes, character, murmur (definition, physiological basis)

Arterial Pulse - genesis and characters of normal pulse

Common abnormalities – to be dealt in practical classes

Venous blood flow-Venous tone, valves
Definition, Principles of recording of ECG (details in practical) Leads – unipolar and bipolar, commonly used 12 Leads, Normal tracing in Lead II – normal waves, intervals and segments, how HR is determined, correlation with action potential and phases of cardiac cycle,

Correlation between different events of cardiac cycle – (diagrammatic representation)

Clinical uses of ECG – (mention).

(Abnormal ECG pattern in myocardial infarction, cardiac arrhythmias. Effect of changes in ECF K+, Ca++ and Na+ conduction defects to be dealt in practical)

**Cardiac output:**

Definition, normal values, variations Fick’s principle – mention (Methods & other methods of measurement details not required). Regulation of cardiac output – heart rate - Regulation of heart rate, stroke volume – determinants, regulation

**Hemodynamics:**

General principles including physical laws governing flow of blood in heart and blood vessels not in detail)-Pressure – resistance - flow relationship, Poiseuille-Hagen formulæ, law of Laplace Laminar flow, turbulent flow, Reynold’s number, critical closing volume Importance of peripheral resistance, venous circulation, venous tone to be dealt with blood pressure. Regulation of blood flow

Structure & function of different segments of blood vessels. Correlate with function, local regulation including autoregulation of blood flow, vasoconstrictors and vasodilators, substances secreted by endothelium.

**Arterial Blood pressure:**

Systolic and diastolic pressures– definition, normal values, variations Define end pressure and lateral pressure, Bernoulli’s principle (mention) Pulse pressure, Mean arterial pressure

- definition, normal values Determinants of Systolic and diastolic pressures Measurement– details in practical class

Regulation - neural and humoral.( short term, intermediate and long term)

Cardiovascular reflexes, Local regulation including auto regulation of blood flow, vasoconstrictors and vasodilators, substances secreted by endothelium (important ones)

Effects of gravity, Posture and Exercise on B.P Hypertension & hypotension in practicals
Coronary, cerebral, capillary, cutaneous, splanchnic circulation

Fetal, pulmonary, renal to be taught in respective system

**Circulatory shock**

Types pathophysiology, stages, compensatory mechanisms

**Cardio-vascular & Respiratory adjustments in health**

–effect of gravity (+ve and –ve),

weightlessness (brief)

**Effect of exercise**

To be dealt after both Respiratory & CVS is over - Refer Respiratory system

**RESPIRATORY SYSTEM**

**LECTURES 16hrs**

**Introduction**

Define respiration, Organisation and functional anatomy of respiratory system

Tracheobronchial tree, Respiratory unit, Alveoli (structure and functions), Pleura, pleural fluid Functions of different parts of respiratory system including non-respiratory functions

**Mechanics of respiration:**

Inspiration and expiration, muscles of inspiration and expiration and their actions,

Pump handle and bucket handle movements, expansion of thorax and lungs, Types of breathing Pressure changes during normal respiratory cycle – intra (alveolar) pulmonary and intra thoracic (alveolar) pressure changes, development of negative intra thoracic pressure

Surfactant – functions (surface tension, alveolar stability, alveoli kept dry, interdependence of alveoli), hyaline membrane disease, ARDS Law of laplace – application

**Measurement of pulmonary ventilation**

Spirometry in practicals

Lung volumes (mention) static & dynamic lung volumes TV, IRV, ERV, RV, VC TLC, FEV, FRC

– Residual volume (measurement not needed) RMV, MVV, breathing reserve, closing volume (mention) to be dealt with practicals Ventilation – pulmonary and alveolar Dead space – Anatomical & Physiological- definition, normal values, variations (1-2 eg) (Measurement not needed)
Pressure – volume relationship - 1 hr

Elastic behaviour of lungs, total and lung compliance – normal values Airway resistance, work of breathing (brief outline –it is to overcome elastic, nonelastic and airway resistance), factors affecting bronchial tone, 1-2 conditions where work of breathing is increased.

Pulmonary blood flow: - 1 hr

Volume, pressure, factors influencing – nervous and chemical factors, unique features. Variations in regional pulmonary blood flow, ventilation – perfusion ratio and its importance

Pulmonary exchange of gas & Mechanism - 2 hrs

Composition of inspired air, expired air, partial pressures gas composition of Arterial & venous blood,. Structure of blood gas barrier, factors affecting diffusion across respiratory Membrane diffusion capacity for O2 & CO2, O2 transport in blood, oxygenation of Hb, O2 carrying capacity, O2 content, % saturation, coefficient of O2 utilization, Properties of Hb that facilities O2 transport O2 dissociation curve, factors shifting curve to right and left, P50 foetal Hb, Myoglobin, carboxy Hb–

CO2 transport in blood 1 hr

Different forms of transport, chemical reactions involved, changes occurring in lungs Haldane and Bohr effect -

Regulation of respiration: 3 hrs

Neural control – neural centers, genesis of respiratory rhythmicity, ramp signal (experimental evidence not required), Voluntary control, Reflex control Breath holding and braking point. Chemical control – stimuli, chemoreceptors (peripheral and central), ventilatory response to hypercapnea, hypoxia and change in H+ ion concentration.

Hypoxia: - 1 hr

Definition, types, clinical features, Oxygen therapy - Cyanosis, asphyxia and dyspnea, Definition, CO poisoning (mention), Periodic breathing Cheyne – stokes and biots breathing, voluntary hyperventilation

Environmental Physiology: 1 hr

High altitude, rapid ascent, Mountain sickness, Acclimatization Effects of UV rays, Dysbarism
Effects of increased barometric pressure

Seminar/Tutorials
Nitrogen narcosis, High pressure nervous syndrome, Oxygen toxicity
Decompression sickness (Caissons disease) Cardiovascular & Respiratory changes during exercise - Space physiology, effect of “G” forces on respiratory system

INTEGRATED TEACHING
Artificial respiration (delete Holger Neilson method) CPR with Mannequien Pulmonary function tests to be dealt in practicals & include in record

GASTROINTESTINAL SYSTEM

Introduction to G.I. Physiology:
General organization of G.I. tract Neural control of G.I function Enteric nervous system, Autonomic control Mechanism of enzyme secretion by glands in general.

Salivary Gland
- Saliva composition, function, control of secretion.
Conditioned and unconditioned reflex disturbances in salivary secretion-in anxiety and dehydration

Gastric Secretion
- Gastric juice: Composition, functions, gastric HCL. secretion-mechanism and regulation of secretion. Gastric juice-functions, phases of secretion and regulation. Gastrin-functions and regulation of secretion. Mucosal barrier, pathophysiology of peptic ulcer in brief

Pancreas, Liver and gall bladder
Exocrine Pancreas; Pancreatic juice: Composition, function, and regulation of secretion (neural and humoral – CCK and secretin)-applied importance (mention steatorrhoea).
- Functions of Liver, Composition and functions of bile, control of secretion Functions of gall bladder, filling and emptying of gall bladder Enterohepatic circulation, Jaundice – prehepatic, hepatic and post hepatic in brief

Small intestine
Composition, regulation of secretion, and functions of intestinal juice Small intestine Functions-

Large intestine
- Functions – secretory, motor, absorptive, synthesis of short chain fatty acids.

Movements of G.I. tract -
Movements to be taught in respective segments of GIT
Electrophysiology of smooth muscle in the GIT (revise) – BER, MMC. Peristalsis – definition, basis, functions. Mastication – definition, muscles involved, functions
Deglutition – definition, muscles involved, stages functions & abnormalities
Gastric motility – types, regulation, abnormal movements Gastric emptying – duration, factors affecting vomiting.

Movements of small intestine & Large intestine- Types with reference to BER mixing, pendular, movements of villi and peristalsis.

Defecation reflex, Diarrhoea, Role of dietary fibre, bacterial flora
Seminar/tutorials 4hrs
Gastro intestinal hormones

Assignment 4hrs
(Gastrin, CCK-PZ, Secretin, Villikinin, VIP, GIP)

INTEGRATED TEACHING 2hrs
Liver and biliary system (depts of physiology, anatomy, biochemistry and internal medicine

RENAL SYSTEM LECTURES 10 hrs
Introduction- 1hr
Functions of kidney – homeostasis, as an endocrine organ Functional anatomy of Kidney Nephron-structure, parts, function, types (in detail)

Glomerular filtration: 2hrs
Definition, rate, filtration membrane, forces governing filtration and permeability of the membrane, measurement of GFR Clearance values – definition, values for glucose, insulin, and urea

Tubular functions: 1 hr
Tubular reabsorption – define Sodium, glucose, water, urea, electrolytes - sites, mechanisms involved Tubular maximum, Glomerulo tubular feedback, and Renal threshold ,Water - reabsorption in different segments – obligatory and facultative Tubular secretion – H+ (acidification), K+ Filtered load, -

Acidification of urine & Role of kidney in acid base balance 1hr
Mechanisms and sites of H+ secretion, pH changes along renal tubules, fate of H+ in the renal tubule (buffer systems), non-ionic diffusion. –

Concentration of urine 2hrs
Counter current system – multiplier, exchanger Cortico medullary gradient – factors maintaining (ADH, permeability characteristics of renal tubule, role of urea and vasa recta) Osmotic gradient along renal tubules Diuresis – definition, osmotic and pressure diuresis

Micturition: 2 hrs
Functional anatomy of bladder - muscles and sphincters and innervation of bladder, Filling and emptying of bladder, Cystometrogram Micturition reflex and its higher control, voluntary control Abnormalities of micturition – deafferented, decentralised and automatic bladder –

Urine – Normal volume, constituents abnormal – dealt in biochemistry

Mention polyuria, oliguria, anuria

**Basic principles of haemo & peritoneal dialysis** – Artificial kidney

RFT dealt in biochemistry

**Seminar /Tutorials** 6hrs

**SKIN AND TEMPERATURE REGULATION** 2 hrs

Functions of skin, Methods of heat conservation and loss in human body
Regulation of body temperature – role of skin, hypothalamus Hyperthermia, Fever, hypothermia

**NERVE MUSCLE PHYSIOLOGY** 11hrs

**Excitable tissue** 1hr


Nerve fibers Types, classification, and functions

**Resting membrane potential.** 1hr

Definition, ionic basis and genesis -
Nerve action potential. -

Definition, ionic basis and properties, Monophasic action potential 1hr

**Transmission of nerve impulses.** 1hr
Types (myelinated and unmyelinated), differences in impulse transmission. Velocity of conduction and factors affecting it

**Peripheral nerve injury.** 1hr
Wallerian degeneration, regeneration, denervation hypersensitivity

**Neuromuscular junction.** 1hr
Functional anatomy, transmission of impulses across neuromuscular junction, EPP. Neuromuscular blocking drugs (important ones with clinical correlation). Pathophysiology of Myesthenia Gravis
Muscles:
2hrs

Cardiac muscle:
2hrs
Structure, properties. Action potential- Definition, ionic basis and properties, Comparison with nerve and muscle action potential. Pacemaker potential - molecular basis, properties -

Smooth muscle:
1 hr
Types, Structure, innervation and neuromuscular junction. Plasticity (cystometrogram to explain). –

Seminar/tutorials

Comparison of structure & function of three types of muscle

INTEGRATED TEACHING in Practicals
1hr

EMG

NERVOUS SYSTEM
LECTURES -38 hrs

Organization of nervous system:
2hrs

CSF:
2hrs
Formation, circulation, composition and functions –Lumbar puncture. Blood brain barrier

Synapse:
3hrs
Types. Functional anatomy of typical chemical synapse and synaptic transmission. Synaptic potentials – EPSP, IPSP –ionic basis and comparison with action potential. Properties of synapses (one way conduction, synaptic delay, synaptic inhibition, convergence, divergence, summation, fatigue, after discharge and synaptic plasticity).
Synaptic inhibition – types, mechanisms. Neurotransmitters – facilitatory and inhibitory with 2-3 eg and clinical applications Factors affecting signal transmission - 1hr

**Reflex action & Sensory receptors**

Definition, reflex arc – components Classification with examples - Mono and polysynaptic, Somatic and visceral, Superficial and deep with mention of examples (details of reflexes in motor system)

Sensory receptors. Classification (recent view), types (phasic and tonic), properties - adaptation Receptor potential, comparison with action potential.

**Sensory tracts** - 3hrs


**Pain** – 1hr


**Sensory Cortex, Motor cortex & Cerebral Cortex** (not to be asked in exam) 1hr

Location – primary area, secondary area, association areas. Salient histological features. Body representation -sensory homunculus. Functions of primary, secondary and association areas. : Brodmann’s areas- Lesions -

**Motor system** – 2hrs

Introduction, levels of motor control, review cross section of spinal cord.

Review cross section of spinal cord – various ascending and descending Pathways Stretch reflex – details and function Inverse stretch reflex, Reciprocal innervation, Other poly synaptic reflexes Pathological – Babinski sign

**Descending tracts**. 3hrs
Muscle spindle Structure -function-regulation

General organisation, Pyramidal and extra pyramidal tracts, their functions. Mention as medial and lateral systems, Upper motor neurons and lower motor neurons. Upper motor neuron and lower motor neuron lesions – differences Effects of lesions at various levels - hemiplegia, paraplegia, monoplegia

**Cross section of spinal cord &Injuries of spinal cord** 2hrs

- complete transection, incomplete transection, hemisection, section of anterior and posterior roots, injury to motor nerve

**Basal ganglia** – 2hrs


**Cerebellum**- 2hrs

Evolutional divisions & functions. Deep cerebellar nuclei, connections in relation to functions, Neuronal circuit (mention). Cerebellar lesion – features and their physiological basis -

**Reticular formation:** 1hr

ARAS, descending reticular system –explain control of muscle tone

**EEG and sleep.**- 1hr

Define EEG, principle of recording, Normal waves (á, å, ä and è), alpha block, Clinical uses

Sleep-Genesis, types,& stages of sleep-Differences between REM & NREM sleep

**Limbic system & Prefrontal lobe** 1hr

Organisation, connections (mention important ones) and functions -1hr

**Vestibular apparatus:** 2hrs

Functional anatomy - gross structure, receptors, receptor potential Functions & abnormalities-

Muscle tone, posture, equilibrium. 1hr

Basis of maintenance – stretch reflex, higher control, Postural reflexes – mention with levels of integration (details not required). Regulation of muscle tone and posture (righting reflexes not included) -

**Hypothalamus** 1hr

Functional anatomy, Nuclei & functions

**Higher functions of the brain:** 2hrs
Conditioned reflex, Learning - Memory – types & basis
Speech – Types, Mechanisms of speech, Aphasia – types –
**Autonomic nervous system:**

2hrs

Organization and functions

**SEMINAR / TUTORIAL -**

8hrs

Autonomic nervous system, hypothalamus, Limbic system, cross section of Spinal cord, CSF

**SPECIAL SENSES**

**LECTURES – 16 ½ hrs**

**Olfaction**

1hr

Receptor, pathway, lesions – anosmia, parosmia -

**Taste:**

1hr

Taste buds, receptor, primary taste sensations, pathway -

**Vision:**

10 ½hrs

Introduction. Functional anatomy of eye –
Review. Chambers of the eye, intraocular fluids - aqueous humor, vitreous humor.
Lens - characteristics, changes with age, aphakia, cataract. Retina – Histology to
be reviewed, Macula lutea, fovea centralis – Explain - 1 1/2 hr
Basic optics. - 2hrs
Optical system of the eye. Refractive media of eye - Refracting surfaces & refractive
and near points Errors of refraction – chromatic and spherical aberrations,
hypermetropia, myopia, and Astigmatism presbyopia, – causes (brief) features and
corrective lenses. Contact lenses (mention)

Visual receptors, adaptation, Muscles of eye - 3hrs
(cones and rods). Structure in detail. Visual pigments, role of vitamin A.
Phototransduction.(only neural signaling) Adaptations of visual receptors - Dark
adaptation and light adaptation. Electrophysiology of receptors, receptor potential,
lateral inhibition. Electroretinogram (mention) Duplicity theory of vision, photopic
and scotopic vision – Muscles of eye- Names, nerve supply and movements of eyeball

Corresponding points, double vision and squint (mention)Color vision

Primary, secondary and complementary colors (mention). Hue, brightness and
saturation (mention). Trichromatic and Opponent Process Theories. Color blobs –
location and function. Color blindness. Afterimages, contrasts -

**Visual Pathways. 2hrs**

Monoocular and binocular vision. Visual signals - Processing in the Retina. Effects of
leision at different levels. Macular sparing (recent views) Visual cortex – all areas and
functions
Visual reflexes. Pupillary light reflex (direct and indirect) - pathway, lesion, Miosis & mydriasis (mention).

Accommodation and accommodation reflex (Near response) – 3 components - Pupillary constriction, convergence of eye balls, and increased anterior curvature of lens.. –

Accomodation reflex – pathways, lesions. - 2hrs

Tests of Vision -Field of vision, Visual acuity, Color vision – definition, details of tests in practicals

AUDITION 4hrs

Acoustics – frequency, amplitude of sound, pitch, intensity, and quality of sound. Functional anatomy of the ear. Functions of external, middle and inner ear - 1hr

Cochlea – structure, Organ of corti. Hair cell physiology- receptor potential. Mechano-electrical transduction by hair cells. Endocochlear potential. Discrimination of pitch (travelling wave theory) and intensity of sound - 2hr

Auditory pathway. Sound localization, pitch discrimination, masking of sounds. Deafness (conduction and nerve deafness) – 1hr

Audiometry (details in practicals) - 1hr

ENDOCRINOLOGY

General endocrinology& Hypothalamus - 3hrs

Names and organisation of Endocrine glands in human body Hormone – definition, and classification – on chemical nature. General hormones and local hormones – autocrine, paracrine and endocrine.hormones. Mechanism of action of hormones. Hormone receptors – cell membrane and intracellular, Mechanism of action via the different receptors – basics with 2 examples, Second messenger system –brief. Control of secretion of hormones in general – the + ve and –ve feed back with 2 examples. Abnormalities of hormone function – decrease, increase, receptor dysfunction, abnormal hormones or antibodies to be dealt with individual glands

Hypothalamus Functional anatomy, Hormones (Releasing and inhibiting), their physiological actions Interrelationship between hypothalamus and pituitary glands – Infundibulum -hypothalmo –pituitary tract and portal system.
**Pituitary gland**

Hormones of anterior and posterior pituitary. Growth hormone - physiological actions and regulation of secretion in detail. Hyper and hypofunction – Acromegaly, Gigantism and Dwarfism. Other hormones to be dealt with the target glands, Mention intermediate lobe hormones - pro opiomelanocortin and MSH -

**Thyroid gland:**

Hormones- names, biosynthesis (details in biochemistry), transport, physiological actions and regulation of secretion (H-P-T axis). Thyroid function tests (details in biochemistry). Hyper and hypofunction in children and adults – Cretinism, Myxedema, Hyperthyroidism -

**Pancreas – Endocrine.**


**Adrenal gland:**

Adrenal Cortex: 3hrs


Adrenal medulla: Hormones (catecholamine), regulation of secretion, Pheochromocytoma -1hr

**Calcium homeostasis**

-2hrs

Normal calcium metabolism (outline).Parathyroid hormone, calcitonin and vitaminD - target organs and physiological actions. Hypocalcemia and tetany -

**Other endocrine glands & Local Hormones-**

1hr

Physiological actions and regulation of secretion –Kidney, Pineal body (retino
hypothalamic tract – very brief). Thymus, Heart, Local hormones, Histamine, Sub P, bradykinin, serotonin, prostaglandins, Sources and physiological actions -

SEMINARS / TUTORIALS -

Physiology of growth and development. Correlation of actions of different hormones from childhood, puberty and adulthood (briefly) -1hr

PHYSIOLOGY OF REPRODUCTION

LECTURES -11hrs

Introduction 1hr

Briefly on hormonal factors influencing development of genitalia. Developmental abnormalities-(adrenogenital, hermaphroditism). Puberty – normal, precocious and delayed puberty -

Male reproductive system. 2hrs

Functions of testis – endocrine -testosterone (functions and regulation of secretion) - Factors influencing Spermatogenesis and regulating it. Abnormalities of testicular function - cryptorchidism, male hypogonadism (mention) Erection, ejaculation, composition of semen, sterility -

Female reproductive system: 2hrs

Ovarian hormones- estrogens, progesterone, relaxin. Control of ovarian functions by H- P-Gonadal axis. Pituitary gonadotropins (FSH, LH), Prolactin – physiologic actions, regulation of secretion

Menstrual cycle: 2hrs

Menstrual, proliferative and secretary phases. Ovarian, uterine and vaginal changes during menstrual cycle. Hormonal regulation. Abnormalities of ovarian function - anovulatory cycle, infertility. Menarche, menopause. Castration before and after puberty -

Pregnancy & Lactation – 3hrs


Contraception: 1hr

Temporary and permanent methods in males and females, and their physiological basis -

INTEGRATED TEACHING - 1hr

Induction of ovulation, in vitro fertilization, Infertility (with O &G dept)
DETAILS OF PRACTICALS

**Human Physiology**

- Use and care of microscope and microscopic examination of blood
- PCV, ESR, osmotic fragility
- Haemoglobin estimation and blood indices
- RBC count
- WBC count
- Examination of peripheral blood smear
- Differential WBC count – normal, abnormal, anaemias
- ABO grouping, Rh typing
- Bleeding time, clotting time
- Recording of BP – effects of posture and exercise
- Recording of arterial pulse only
- Respiratory movements demonstration
- General examination
- Examination of Respiratory system
- Examination of CVS
- Examination of higher functions and sensory system
- Examination of Motor system
- Examination reflexes
- Examination of cranial nerves 1-6
- Examination of cranial nerves 7-12
- Revisions as required

**Experimental physiology** (Demonstration through e-modules / recorded graphs)

- Appliances in experimental physiology Laboratory including physiograph
- Pithing, muscle nerve preparation, mounting, effects of different types of stimuli
- Simple muscle twitch
- Two successive stimuli, repetitive stimuli and fatigue
- Genesis of tetanus and Starling’s law of muscle
- Effect of load and after load on muscle contraction
- Effects of variations of temperature on muscle contraction
- Velocity of nerve impulse
- Normal cardiogram of frog’s heart and effects of heat and cold.
- Effect of temperature on frog’s heart
- Refractory period of frog’s heart
- Stannius ligatures. Properties of cardiac muscle – all or none law, treppe, summation of subminimal stimuli
- Effect of vagal stimulation on frog’s heart
- Perfusion of frog’s heart – action of ions, action of drugs
Demonstration Only
Electro encephalogram (EEG), Electro miogram (EMG),
Electro Cardio Gram (ECG), Audiometry, Perimetry,
Spirometry

**Recommended Text Books**

3. Text book of Physiology by G.K.Pal
4. Text book of Physiology by A.K.Jain (2volumes)

**Reference Books**

   Subramaniam, HD Sing, S. Chand and Company
2. Wintrobe’s Hematology
3. Williams text book of Endocrinology
4. Snell’s neuroanatomy
5. Samson Wright’s applied physiology
6. Best and Taylor’s Physiological Basis of Medical Practice
8. Best and Taylor’s basis of Medical Practice by J B West-William and Walkins

**EVALUATION**

M.C.I. Guidelines

1. Problem solving exercises
2. OSPE (Objective Structured Practical Examination)

3. Viva Voce – with practicals

Pattern of questions in Theory paper

**Paper 1**: Blood, CVS, Respiration, Renal, Environmental Physiology, Digestion, Regulation of Temperature,

**Paper II**: General Physiology, CNS, Special senses, Muscle and Nerve, Endocrinology, Reproduction, Growth and development,

- Structured Essay (preferably case scenario) - I no.(10 marks)
- Short questions- 2 nos. (5 marks x 2 = 10 marks)
- Write briefly on- 5 nos. (3 marks x 5 = 15 marks)
- Draw labelled diagrams- 2 nos. (2½ marks x 2 = 5)
- Physiological basis/Give reasons - 5 nos. (2 marks x 5 = 10)

**Physiology Practical Exam**

- Max marks - 40 (university) + 20 (Internal) = 60 marks
  - Practical - I (20 marks)
    - Spotters - 10 marks
    - Amphibian graph – 5 marks
    - Short hematology – 5 marks
  - Practical - II (20 marks)
    - Clinical Exam - 10 marks
      - Long hematology (any one of the following - RBC count / WBC count / Peripheral Smear) - 10 marks

**Mark distribution**

- Theory: (Total-140 marks)
  - Theory Paper I + II = (50 + 50) = 100 marks (University)
  - Viva- 20 marks
  - Internal assessment- 20 marks

Practicals : (Total-60 marks)
• Practicals I& II-(20+20) =40 marks (University)

• Internal assessment - 20 marks

• Aggregate : 200 marks

• Internal Assessment

Based on day to day performance assessed by daily evaluation, short examinations, tutorials, seminars, sessional examinations etc.

Theory – Pattern of Question paper - Two papers of three hours duration (50 marks each)

OBJECTIVE STRUCTURED PRACTICAL EXAMINATION (OSPE)

SPOTTERS : 10 Numbers- Based on calculations, instruments, charts, microscopic slides of blood cells, graphs, (including graphs from systems, amphibian expts-skeletal muscle/cardiac muscle) clinical history, clinical skill)

Seminars :

Guide lines:

• Allot 8 topics for a day.

• Assign a single topic per student for presentation that lasts 10 minutes

• All the students should learn all the 8 topics to participate in the post test session (10 questions) after the presentation session

• Marks: 10 marks for presentation & 10 marks for post test
  Consider 10 % of this mark for internal assessment

List of Assignment topics and Seminar topics can be prepared by the department. Records should be maintained with marks assigned during internal assessment

FORENSIC MEDICINE AND TOXICOLOGY

GOAL

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

Learning objectives-

1. Be conversant with medical ethics, etiquette, duties rights and legal
responsibilities of the physician towards patients, profession, society, state and humanity at large and implications of medical negligence.

2. Be aware of relevant existing laws and procedures including the recent developments applicable to medical practice.

3. Identify, examine, document and prepare report/certificate in medico legal cases/situations in accordance with the law of the land.

4. Recognize and manage common medico legal problems including cases of poisoning in conformity with the medical procedure.

5. Perform medico legal postmortem examination and interpret the findings and results of other relevant investigations to logically conclude the cause, manner and time since death.

6. Preserve and dispatch specimens in medico legal/postmortem cases and other concerned materials to the appropriate government agencies for necessary examination.

7. Be aware of the general principles of environmental, occupational and preventive aspects of toxicology.

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<thead>
<tr>
<th>Period of study</th>
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<th>III, IV and V Semester.</th>
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<tr>
<td>Duration of training</td>
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<td>Methods of instructions</td>
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<tr>
<td>Lecture</td>
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<tr>
<td>Practicals and Innovative sessions</td>
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<td>70 hrs.</td>
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<tr>
<th>TOPIC</th>
<th>Method of teaching</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Forensic medicine</td>
<td>Lecture</td>
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<tr>
<td>1</td>
<td>Definition of forensic medicine, Forensic pathology and medical jurisprudence</td>
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<tr>
<td>2</td>
<td>Introduction to the subject, historical aspects of forensic medicine.</td>
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<td>3</td>
<td>Inquest procedures</td>
<td>Lecture</td>
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<td>4</td>
<td>Courts in India and their powers. Supreme court, High court, Sessions court, Assistant sessions court and Magistrate courts.</td>
<td>Innovative session</td>
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<td>5</td>
<td>Court procedures. Summons, warrant, Conduct money, Oath/affirmation, Types of witnesses, Recording of evidence, Conduct of doctor in witness box, Perjury, Hostile witness.</td>
<td>Practical</td>
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<td>6</td>
<td>Medical certificates and Medico legal reports. Birth, death, wound, drunkenness, potency, Sexual offence cases, intimation, notification.</td>
<td>Lecture</td>
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<td>7</td>
<td>Death and Causes</td>
<td>Lecture</td>
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<td>8</td>
<td>Definition, diagnosis and certification (as per MCCD rules), somatic, molecular and brain death. Sudden natural deaths, suspended animation. Changes after death. A) Algor mortis, Livor mortis, Rigor mortis, cadaveric spasm, cold stiffening, heat stiffening.</td>
<td>Practical demo.</td>
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<tr>
<td>Identification</td>
<td>Lecture</td>
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<td>A Definition.</td>
<td>Practical</td>
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<tr>
<td>B) Identification of persons, dead bodies and remains of a person by sex, age, biometry, dental features, scars, moles, tattoos, dactylography, personal belongings photography, super imposition, DNA.</td>
<td>Group discussion</td>
<td>2</td>
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<tr>
<td>10 Medico legal autopsy and exhumation.</td>
<td>Lecture</td>
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<tr>
<td>A) Definition of medico legal and clinical/pathological autopsy.</td>
<td>Practical</td>
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<tr>
<td>B) Objectives, procedures and formalities of medico legal autopsy.</td>
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<td>C) Preservation of articles and tissues of importance during autopsy.</td>
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11 Mechanical injuries or wounds.  

A) Definition of wound, injury, hurt, assault, battery. (Gp. discn.)

B) Classification of injuries, description of blunt force and sharp force injuries

C) Fire arms - principles, types. Examination and interpretation of fire arm wounds. Comparison microscopy.

D) Medico legal aspects of injuries: Difference between ante mortem and postmortem injuries, determination of different types of injuries, defense wounds, hesitation cuts, fabricated wounds, simple and grievous hurt, suicidal, accidental and homicidal injuries, causes of death by mechanical injuries, legal classification of fatal injuries.

E) Regional injuries: Injuries to head, neck, thorax, abdomen, pelvis, genitalia, vertebral column and bones.

F) Injuries due to traffic occurrences.

G) Injuries due to physical agents and their medico legal importance: (Project) Heat, cold electricity and lightning. Explosion injuries.

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<td>11</td>
<td>Mechanical injuries or wounds.</td>
<td>Innovative</td>
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<tr>
<td></td>
<td>A) Definition of wound, injury, hurt, assault, battery.</td>
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<td>B) Classification of injuries, description of blunt force and sharp force injuries</td>
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<td>C) Fire arms - principles, types. Examination and interpretation of fire arm wounds. Comparison microscopy.</td>
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<td>D) Medico legal aspects of injuries: Difference between ante mortem and postmortem injuries, determination of different types of injuries, defense wounds, hesitation cuts, fabricated wounds, simple and grievous hurt, suicidal, accidental and homicidal injuries, causes of death by mechanical injuries, legal classification of fatal injuries.</td>
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<td>E) Regional injuries: Injuries to head, neck, thorax, abdomen, pelvis, genitalia, vertebral column and bones.</td>
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<td>F) Injuries due to traffic occurrences.</td>
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<td>G) Injuries due to physical agents and their medico legal importance: (Project) Heat, cold electricity and lightning. Explosion injuries.</td>
<td>Innovative</td>
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<td>12.</td>
<td>Asphyxial deaths: Definition, causes, types, postmortem appearances and medico legal significance of violent-asphyxial deaths like hanging, strangulation, suffocation, smothering, choking, drowning, traumatic asphyxia.</td>
<td>Lecture</td>
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<td>13</td>
<td>medico legal aspects of Deaths due to starvation-forced feeding.</td>
<td>Practical</td>
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<tr>
<td>14</td>
<td>Human sexual functions:</td>
<td>Lecture</td>
<td>2</td>
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<tr>
<td><strong>A).</strong> Potency, sterility, virginity, pregnancy, delivery.</td>
<td>Lecture</td>
<td>3</td>
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<td><strong>B) Abortion, MTP, sterilization,</strong> artificial insemination and their legal aspects.</td>
<td>Innovative</td>
<td>2</td>
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<tr>
<td><strong>C) Sexual offences and abnormal sexual practices.</strong></td>
<td>Lecture</td>
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<tr>
<td><strong>D) Legal aspects of the above.</strong></td>
<td>Lecture</td>
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</table>
| 15 | Biological fluids:  
A) Blood-preservation and dispatch of samples, importance of blood groups in disputed paternity, hazards of blood transfusion.  
B) Seminal and salivary stains-preservation, dispatch and importance of grouping.  
C) Principles of laboratory tests for identification of the above and interpretation of the results |
|   | Lecture 1  
Practical 3 |
| 16 | Forensic psychiatry:  
A) Definition and brief overview of common mental illnesses.  
B) True and feigned mental illnesses  
C) Civil and criminal responsibilities of mentally ill persons.  
D) Indian mental health act with special reference to admission, care, |
|   | Lecture 3  
Practical
18. Medical jurisprudence:

| A) Indian medical council and state medical councils, their functions and disciplinary control. |
| Lecture | Innovative |
| B) Duties and rights and privileges of a registered medical practitioner. |
| (Gp.discn) | Innovative |
| C) Professional conduct, etiquette and ethics in medical practice. |
|  |
| - Ethics underlying human interactions - Respect, Trust, confidentiality in doctor – patient relationship |
| - Cardinal Principles of medical ethics- Autonomy, Beneficence, Non-Maleficence, Justice |
| Seminar – with case examples |
| D) Professional secrecy and privileged communication. |
| E) Medical negligence: Civil, criminal, contributory negligence, vicarious responsibility, res-ipsa-loquitur medica |
| prevention of negligence and defence in medical negligence suits. |
| F) Consent; Types, age in relation to consent, consent in relation to mental illness and alcohol intoxication, |
con sent in emergency situations.  
Informed Consent as a bond of trust  
between patient and the doctor.  
Empowering Autonomy through  
information sharing

| 19. | Forensic toxicology:  
Definition and general principles  
A) of  
management of a case of  
poisoning.  
B) Medico legal duties of a doctor in  
poisoning  
a case of ,  
preservation  
and dispatch of viscera for chemical  
analysis. Role  
of chemical examiner’s  
laboratory  
and forensic science  
laboratory in brief.  
C) Diagnosis and principles of  
therapy and medico legal aspects of  
the following poisons, giving special  
emphasis to those  
of regional  
importance  
a) Corrosive poisons: strong  
mineral acids, alkalies and organic  
acids-(carbolic, formic and oxalic  
acid).  
b) Metallic poisons: Lead, Arsenic,  
Mercury | Lecture | 2 |
| | Innovatie | 5 |
| | (Seminar) | 4 |
| | Innovatie | Integration |
| | Pharmacology | Pharmacology |
c) Animal poisons-snake and scorpion bites.

d) Deliriants: Dhatura, Cannabis and Cocaine.

e) Inebriants: Methyl and Ethyl alcohol.

f) Asphyxiants: Carbon monoxide, carbon dioxide, Hydrogen sulphide and Cyanides.

g) Cardiac poisons: Cerbera odollam, Cerbera thevitia, Nerium odorum.

h) Insecticides: Organophosphorous compounds, Carbamates and Organochloro compounds, Aluminium phosphide and Zinc phosphide.

D) Drug abuse and dependence.

E) Inorganic non metallic poisons: Phosphorous.

F) Organic vegetable irritants: Abrus precatorius, capsicum, calotropis, Semicarpus anacardium, Croton.

G) Convulsants: Strychnine.

H) Paralytic agents: Curare.

I) War gases and industrial gases.

J) Chloral hydrate.

K) Mechanical poisons.
<table>
<thead>
<tr>
<th>SKILLS</th>
<th>Level of achievement</th>
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<tbody>
<tr>
<td></td>
<td>Able to perform independent</td>
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<tr>
<td>1. Prepare certificates of birth and death. Prepare death verification Differenciating Death verification and death certification</td>
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<td>2. Prepare dying declaration.</td>
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<td>3. Give evidence in court of law as expert witness.</td>
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<td>4. Collect, preserve and properly label and dispatch specimens of medico legal importance.</td>
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<tr>
<td>5. Diagnose and manage common acute and chronic poisoning.</td>
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<tr>
<td>6. Perform medico legal duties in case of poisoning.</td>
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<tr>
<td>7. Observe ten medico legal autopsies and enter in practical record.</td>
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<tr>
<td>8. Age estimation from bones, skiagrams and dentition</td>
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<tr>
<td>9. Examination of injuries and weapons and report writing.</td>
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<td>10. Examination of an alcohol intoxicated person and report writing.</td>
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<td>11. Examination of victim and accused in sexual offence cases.</td>
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<tr>
<td>12. Study of specimens of poisons.</td>
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<tr>
<td>13. Study of wet and models, charts etc.dry specimens,</td>
<td>13</td>
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*Suggested topics for integrated teaching*
1. Examination of injured person and report writing. Integration with surgery casualty posting.
2. Examination of victim of sexual assault cases and report writing. Integration with casualty management posting.
3. Forensic psychiatry. Integration with psychiatry posting.
4. Management of cases of poisoning. Integration with medicine.
7. Medico legal issues in Clinical practice including casualty
8. Medical documentation and Medical records
9. Death due to anaphylaxis
10. Death in Hospitals (Anaesthetic/Surgical/Alleged negligence)

**Suggested topics for e-learning**

1. Ethical and medico legal issues in clinical practice. Examples for this topic in real life situations - Integrated learning with invited clinical faculty- giving actual patient examples of medico-legal dilemas.
2. Child abuse.
3. POCSO Act
4. HIV/AIDS.
5. Torture medicine.
7. Narco analysis.
8. Brain finger printing

**Prescribed books**

1. Practical Forensic medicine. B.Umadethan, CBS publishers & distributors.
2. Forensic Medicine and Toxicology, Dr. P.C. Ignatius.

**Reference books**

7. J.B. Mukherjee’s forensic medicine and Toxicology. R.N. Karmakar 2007.

Evaluation
Internal assessment examinations may be conducted as per the discretion. examination per semester, without violating MCI norms. : Minimum one

<table>
<thead>
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<th>Theory</th>
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<tr>
<th>Grand Total</th>
<th>100</th>
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Topics and mark allotment

- Medical jurisprudence 20%
  (Ethics to be given due importance)
- Court and legal procedures 10%
- Thanatology, M/L autopsy 8%
- Asphyxial deaths 10%
- Traumatology 10%
- Sexual jurisprudence 20%
- Infanticide 10%
- Trace evidences 5%
- Forensic psychiatry 2%
- Toxicology 5%

MICROBIOLOGY

A. GOAL

The broad goal of the teaching of undergraduate students in Microbiology is to provide an understanding of the natural history of infectious diseases in order to deal with the etiology, pathogenesis, laboratory diagnosis, treatment and control of infections in the
community.

B. OBJECTIVES

1. Knowledge

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

i. State the infective microorganisms of the human body and describe the host parasite relationship
ii. List pathogenic microorganisms (bacteria, viruses, parasites, fungi) and describe the pathogenesis of the diseases produced by them
iii. State or indicate the mode of transmission of pathogenic and opportunistic organisms and their sources including insect vectors responsible for transmission of infection
iv. Describe mechanisms of immunity to infections
v. Acquire knowledge on suitable antimicrobial agents for treatment of infections and scope for immunotherapy and different vaccines available for prevention of communicable diseases
vi. Antibiotic policy/stewardship
vii. National control programs for infectious diseases. Eg. RNTCP, Malaria control program, STDs, NACO, Immunisation program.
viii. Apply methods of disinfection and sterilization to control and prevent hospital and community acquired infections
ix. Recommend laboratory investigations regarding bacteriological examination of food, water, milk and air.

2. Skills

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

1. Plan and interpret laboratory investigations for the diagnosis of infectious diseases and to correlate the clinical manifestations with the etiological agent

2. Identify the common infectious agents with the help of laboratory tests and determine the efficacy of antimicrobial agents against them.

3. Perform commonly employed bedside tests for detection of infectious agents such as blood film for malaria, filaria, gram staining, Acid Fast Bacilli (AFB) staining and stool sample of ova cyst etc.

4. Use the correct method for collection, storage, and transport of clinical specimens for microbiological investigations.

5. To learn to use the principles of evidence based decision making of microbiological tests.

3. Integration

The student shall understand infectious diseases of national importance in relation to
clinical, therapeutic and preventive aspects

C. DETAILED SYLLABUS

Duration of the course: 3 semesters-III, IV, V Total Number of Hours: 250 Lectures: 80 Practicals: 80 Innovative sessions: 90 (Project work, Seminars, Structures discussions, Integrated teaching, Formative evaluation, revision)

(The teaching should stress on Pathogenesis, Laboratory diagnosis, sterilization and disinfection, infectious diseases common in Kerala and India, Hospital infection, antibiotic use, Principles of immune prophylaxis and immunotherapy and applied and clinical microbiology. Basic morphology and life cycle of parasites required for lab diagnosis. Certain portions to be deleted—Detailed morphological, cultural, Biochemistry, and Antigenic characters,)

II. Systematic bacteriology 25 hrs

1. Gram positive Cocci-Staphyloccoci, Streptococi, Pneumococi
2. Gram negative Cocci-Neisseria
3. Gram Positive Bacilli-Corynebacterium, Listeria, Bacillus
4. Mycobacteria, Nocardia, Actinomyces
5. Clostridia, Nonsporing anaerobes.
6. Gram negative Bacillus-Haemophilus, Bordetella, Brucella, Enterobacteria/Yersinia
7. Pseudomonas, Pasteurella, Acinetobacter
8. Vibrio/Campylobacter
9. Mycoplasma, Legionella, Rickettsia, Chlamydia
10. Spirochetes

III. Virology 15 hrs

1. General characteristics of viruses.
2. Virus host interaction
3. Replication of virus
4. Pox virus, Herpes, Adenovirus
5. Papova, Retrovirus
6. Myxoviruses
7. Picorna virus
8. Hepatitis, Miscellaneous
9. Rhabdo virus
10. Arboviruses
11. Oncogenic viruses
12. HIV
13. Bacteriophages

**IV. Immunology**
12 hrs

1. Introduction Classification, type and cells involved in immunity
2. Antigen, Antibodies
3. Complement in health and diseases
4. Hypersensitivity
5. HLA antigens in health and diseases
6. Immunodeficiency diseases
7. Serological test in medical practice
8. Auto immunity
9. Tumour and transplantation immunology
10. Immunoprophylaxis and immunotherapy
11. Immunohaematology

**V. Parasitology (Topic presentation)**
12 hrs

1. Introduction of parasitic disease
2. Protozoal infections-Amoebiasis, Plasmodium, Leishmaniasis, Trypanosoma,
   Giardia, Balantidium, Cryptosporidium, Trichomonas, Toxoplasma,
   Pneumocystis-laboratory diagnosis of protozoal infection
3. Helminthus-intestinal nematodes, tissue nematodes, cestodes, trematodes-
   Laboratory diagnosis of helminthic infections

**VI. Mycology**
4 hrs

1. Introduction-Classification of fungi and general principles of lab diagnosis
2. Superficial infections
3. Subcutaneous infections-Mycetoma, Rhinosporidiosis
DETAILS OF PRACTICALS AND DEMONSTRATION

1. Techniques Simple stain, Gram Stain, Ziehl –Neelsen stain, Fungus Lactophenol cotton blue,

Parasitology stool examination

2. Clinical microbiology (Demonstration cum practical) 60hrs
   a. Oropharyngeal infection
   b. Wound infection
   c. Respiratory tract infections
   d. Meningitis
   e. Gastro intestinal infections
   f. Urinary tract infections
   g. Urethritis
   h. Blood culture techniques
   i. Equipments/Instruments
   j. Interpretation of lab results
   k. Infection control measures
   l. Community outbreak investigation and control measures
   m. Antibiotic stewardship and antibiotic policy

APPLIED MICROBIOLOGY (Discussion and Integrated teaching) 60hrs

1. Upper respiratory tract infections, infections of eye and ear
2. Pneumonia, Tuberculosis, Bronchitis-Aetiology, lab diagnosis, Prophylaxis
3. Rheumatic fever-Endocarditis, Myocarditis
4. Urinary tract infections
5. Enteric fever-P.U.O
6. Gastroenteritis-Cholera, other causes
7. Osteomyelitis-Arthritis, TB of bone
8. Meningitis, Pyogenic, Aseptic
9. Opportunistic infections
10. Sexually transmitted diseases
11. Hospital infection
12. Antimicrobial agents

TUTORIAL 10hrs

1. Normal flora
2. Anaerobic infections
3. Collection, transportation and preliminary processing of specimens
4. Laboratory diagnosis of viral infections
5. Investigations of epidemics in the hospital and community

TEXTBOOKS RECOMMENDED
Prescribed Books
2. A guide to Microbial Infections, Pathogenesis, Immunology, Laborator diagnosis and Control by Greenwood. Slack and Penthera
3. Essentials of Medical Microbiology, Apurba Sankar Sastry, Sandhya Bhatt.K
4. Textbook of Microbiology and Immunology, Subash Chandra Parija
5. Textbook of Parasitology by C. K. J. Paniker / Chakraborty /Pareja
6. Textbook of Parasitology by Chatterjee.

Reference Books
1. Medical Microbiology by Jawetz E, Melnick J L, Adelberg E A
2. Textbook of Immunology, Kuby

EVALUATION: There should be regular formative assessment

Internal assessment: The internal assessment marks for Microbiology are 15 for Practical and 15 for Theory. Since the minimum required for appearing for University exam is 35% the total minimum marks required for internal assessment would be 5.5 out of 15, There need to be a separate minimum for Practical and Theory internal assessment.

The total marks for Microbiology is 150 (Theory 80 (2 papers) + Viva 15 + Practical 25 + internal assessment 30).

The pass has to be decided as follows:
1. A candidate must obtain minimum 50% marks separately for University theory examination
2. A candidate must obtain minimum 50% marks separately for University practical examination
3. Total aggregate marks should be 75 out of 150 marks or more for pass.
4. Theory and Practical Internal assessment marks should be added to the marks obtained in Theory and Practical University exams respectively for deciding the pass
5. For Theory (80 + 15 viva + 15 marks internal assessment = 110) the minimum for pass should be 55 marks.
6. For Practical (25 + 15 marks internal assessment = 40) the minimum for pass should be 20 marks

Microbiology-two papers of 2 hour duration of 40 marks each

Microbiology paper I-General bacteriology, Immunology, & systematic bacteriology.

Structured Essay = 10 marks
Short Essays (2 XS) = 10 marks
PATHOLOGY

The broad goal of teaching undergraduates Pathology is to impart the knowledge skills and attitudes in the learner to understand the etiopathogenesis, morphology and pathological concepts related to various common diseases.

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

1. Know the principles of collection, handling, storage and dispatch of clinical samples from patient, in a proper manner.
2. Perform and interpret in a proper manner the basic clinico-pathological procedures.
3. Have an understanding of the common hematological disorders and the investigations necessary to diagnose them and determine their prognosis.
4. Understand the concept of cell injury, the change produced thereby, in different tissues and organs and the body capacity for healing.
5. Understand normal haemostatic mechanism, the derangements of these mechanisms and the effect on human system.
6. Understand the etiopathogenesis, the pathological effects, and the clinico pathological correlation of common infectious and non-infectious diseases.
7. Understand the concept of neoplasia with respect to etiology, gross and microscopic features, diagnosis and prognosis of neoplasia in different tissues and organs of the body.
8. Correlate normal and altered morphology (gross and microscopy) of different organ systems in different diseases to the extent needed for understanding of the disease processes and their clinical significance.
9. Have knowledge of common immunological disorders and their effects on human body.

Course content

1. Cell injury - 7Hrs
   • Cause and mechanism: Ischemic, Toxic injury and Apoptosis
   • Reversible cell injury: Types morphology, hyaline, fatty change
   • Irreversible cell injury: Types of necrosis, gangrene
   • Calcification: Dystrophic and Metastatic calcification

2. Inflammation and repair 7Hrs
   • Acute inflammation: features, causes, vascular and cellular events.
   • Morphological variants of acute inflammation
   • Inflammatory cells and mediators
   • Chronic inflammation: causes, types, non – specific and granulomatous with common examples
   • Wound healing by primary and secondary union, factors promoting and delaying the process and complications.

3. Immunopathology 5Hrs lecture +2hrs symposia
   • Immunopathology: organization, cells, antibodies and regulations of immune responses
   • Hypersensitivity: types and examples, antibody and cell mediated
   • Tissue injury with examples.
   • Autoimmune disorders like Systemic Lupus Erythematosus
   • Organ transplantation: immunological basis of rejection and graft versus host reaction.
   • Amyloidosis, classification, Pathogenesis, morphology.
   • HIV-AIDS, etiology, modes of transmission, pathogenesis, pathology, complications, diagnostic procedures and handling of infected materials and health education

4. Infectious diseases 5Hrs lecture +4hrs symposia
   • Mycobacterial diseases: tuberculosis and leprosy
   • Bacterial diseases: Pyogenic infections, typhoid, diphtheria, gram –ve infections, bacillary dysentery, syphilis
   • Viral: polio, herpes, rabies, measles: Rickettsial and Chlamydial infections

☆
• Fungal diseases and opportunistic infections
• Parasitic diseases: malaria, filariasis, amoebiasis, Kala azar, cysticercosis, hydatid disease

5. Circulatory disturbances  5Hrs lecture +2hrs symposia
• Oedema: pathogenesis and types
• Chronic venous congestion: lung, liver, spleen
• Thrombosis and embolism: formation, fate and effects
• Infarction: types, common sites, gangrene
• Shock: pathogenesis, types, morphological changes

6. Growth disturbances  7Hrs lecture
• Atrophy, hypertrophy, hyperplasia, Metaplasia, malformation, agenesis, dysplasia
• Neoplasia: causes, classification, histogenesis, biological behavior, benign and malignant, carcinoma and sarcoma
• Malignant neoplasia: grades and stages, local and distant spread
• Carcinogenesis: Environmental carcinogen, chemical, viral, occupational, hereditary and basics of molecular basis of cancer.
• Tumor and host interaction: systemic effects including para neoplastic syndrome, tumor immunology.
• Premalignant lesions
• Laboratory diagnosis: cytology, biopsy, tumor markers
• Tumors and tumor like conditions of soft tissues.

7. Miscellaneous disorders  4Hrs lecture +2hrs symposia
Autosomal and sex-linked disorders with examples. Genetics-cytogenetics, molecular genetics, non-Mendelian disorders (details of diseases not needed – only inheritance pattern) – lysosomal storage diseases
• Protein energy malnutrition and vitamin deficiency disorders
• Disorders of pigments and mineral metabolism such as bilirubin, melanin, haemosiderin.
• Environmental pathology – pathology of radiation injury and pollution injury (air and food)

8. Haematopathology  15Hrs lecture +2hrs symposia (Symposia for WBC disorders)
• Anaemia: classification and clinical features
• Nutritional anemia: Iron deficiency, folic acid/vit B12 deficiency anaemia including pernicious anemia
• Hemolytic anaemia: classification and investigation
• Hereditary hemolytic anaemia; thalassemia, sickle cell anemia, hereditary spheroctytosis and G 6 P D deficiency.
• Acquired Hemolytic anemia: malaria, Kala Azar, autoimmune, alloimmune, drug induced, microangiopathic
• Haemostatic disorders: platelet deficiency, ITP, drug induced, secondary
• Coagulopathies: coagulation factor deficiency, hemophilia, DIC and anticoagulant control
• Leucocytic disorders: Leucocytosis, leucopenia, leukemoid reaction.
• Acute and chronic leukemia: classification and diagnosis
• Multiple myeloma and dysproteinemias
• Blood transfusion: grouping and cross matching untoward reactions, transmissible infections including HIV and hepatitis. Blood components
• Myelodysplastic syndrome

• Myeloproliferative disorders: polycythemia, myelofibrosis

9. Cardiovascular Pathology  5Hrs lecture +4hrs symposia
• Acute rheumatic fever: etiopathogenesis and morphological changes and complications including rheumatic heart disease.
• Infective endocarditis: etiopathogenesis and morphological changes and complications.
• Atherosclerosis and ischemic heart disease: myocardial infarction
• Hypertension (pathology in various organs including kidney) and hypertensive heart disease
• Myocarditis
• Pericarditis
• Cardiomyopathy
• Vasculitis, aneurysm

10. Respiratory pathology  5Hrs lecture +2 hrs symposia
• Structure of bronchial tree and alveolar walls, normal and altered Inflammatory disease of bronchi: chronic bronchitis, bronchiectasis
• Pneumonias: lobar, broncho, interstitial
• Lung abscess: etiopathogenesis and morphology and complications
• Pulmonary tuberculosis: primary and secondary, morphologic types including pleuritis
• Concepts of obstructive and restrictive lung disorders – chronic bronchitis, emphysema, Asthma.
• Emphysema: type and pathogenesis.
• Occupational lung disorders: anthracosis, silicosis, asbestosis, mesothelioma.
• Atelectasis and hyaline membrane disease.
• Tumors: Epithelial Malignant Neoplasia of Lung, Etiopathogenesis
• Nasopharyngeal and laryngeal tumors

11. Renal & Urinary tract Pathology  3Hrs lecture +2hrs symposia
• Basics of impaired function and urinalysis
• Glomerulonephritis: classification, primary Proliferative and non-proliferative, secondary (SLE, polyarteritis, Amyloidosis, diabetes)
• Clinical presentation of renal disorders including nephritic, nephrotic syndrome, nephritic-nephrotic syndrome, acute renal failure, recurrent hematuria, CRF
• Morphology of MCD, FSGS, membranous and membranoproliferative GN
• Acute renal failure: acute tubular and cortical necrosis
• Pyelonephritis, reflux nephropathy, interstitial nephritis
• Nephrolithiasis and obstructive nephropathy
• Renal malformations (including dysplastic kidney) and polycystic kidney
• Renal cell tumors: renal cell carcinoma, nephroblastoma.
• Progressive renal failure and end stage renal disease
• Renal vascular disorders
• Urinary bladder: cystitis, carcinoma
• Urinary tract tuberculosis

12. Pathology of Gastrointestinal tract  6Hrs lecture +4hrs symposia
• Oral pathology: leukoplakia, carcinoma oral cavity and carcinoma esophagus
• Peptic ulcer: etiopathogenesis and complications, gastritis types
• Tumors of stomach: benign, polyp, leiomyoma, adenocarcinoma, other gastric tumors.
• Inflammatory disease of small intestine: typhoid, tuberculosis, Crohn’s disease, appendicitis.
• Inflammatory disease of large intestine: amoebic colitis, bacillary dysentery, ulcerative colitis
• Large and small intestine tumors: polyps, carcinoid, carcinoma, lymphoma
• Pancreatitis
• Salivary gland tumors
• Ischemic and pseudomembranous enterocolitis, diverticulitis
• Malabsorption – celiac disease, tropical sprue and other causes
• Pancreatic tumors: endocrine, exocrine and periampullary

13. Liver and Bilary tract pathology  5Hrs lecture +2hrs symposia
• Jaundice: types, etiopathogenesis and differentiation
• Hepatitis: acute and chronic, etiology, pathogenesis and pathology
• Cirrhosis: etiology, classification, pathology, complications
• Portal hypertension: types and manifestation
• Diseases of gall bladder: cholecystitis, cholelithiasis, carcinoma
• Tumors of liver: hepatocellular carcinoma, Metastatic tumours, tumor markers

14. Lymphoreticular System  3Hrs lecture
• Lymphadenitis: non – specific, granulomatous
• Non-Hodgkin’s lymphoma: classification, morphology
• Hodgkin’s lymphoma: classification, morphology
• Thymus-hyperplasia (myasthenia gravis), thymomas

15. Reproductive system  6Hrs lecture +2hrs symposia
• Disease of cervix: cervicitis, cervical carcinoma, etiology, cytological diagnosis
• Hormonal influences of different phases of menstrual cycle and the abnormality associated with it.
• Diseases of uterus: endometrial hyperplasia and carcinoma, adenomyosis, smooth muscle tumors
• Trophoblastic disease: hydatidiform mole and choriocarcinoma
• Diseases of breast: mastitis, abscess, fibrocystic disease Neoplastic lesions: fibroadenoma, carcinoma, phylloides
• Prostate: nodular hyperplasia, carcinoma
• Ovarian and testicular tumors
• Carcinoma of penis
• Pelvic inflammatory disease including salpingitis
• Genital tuberculosis.

16. Osteopathology 2Hrs lecture
• Osteomyelitis: acute, chronic, tuberculosis
• Metabolic diseases: rickets/osteomalacia, osteoporosis, hyper parathyroidism
• Neoplasms: osteosarcoma, osteoclastoma, Ewing’s sarcoma, chondro sarcoma and metastatic tumours
• Arthritis: rheumatoid arthritis, osteoarthritis and tuberculous arthritis.

17. Endocrine Pathology 8Hours
• Diabetes mellitus: types, pathogenesis, pathological changes in adrenals, kidney and other organs.
• Non neoplastic lesion of thyroid: iodine deficiency goiter, autoimmune thyroiditis, thyrotoxicosis, myxedema
• Tumors of thyroid: follicular adenoma. Carcinomas: papillary, follicular, medullary, anaplastic
• Lymphoma of thyroid
• Adrenal diseases: cortical hyperplasia, atrophy, tuberculosis, tumors of cortex and medulla
• Parathyroid hyperplasia and tumors

18. Neuropathology 1 Hours
• Inflammatory disorders: pyogenic and tuberculous meningitis, brain abscess, tuberculoma
• WHO classification of brain tumors
• CNS tumors – primary-glioma and meningioma and Metastatic tumours, schwannoma and neurofibroma
• CSF and its disturbances: cerebral edema, raised intracranial pressure
• Cerebrovascular disease: atherosclerosis, thrombosis, embolism, aneurysm, hypoxia, infarction and hemorrhage.
• Degenerative diseases: Alzheimer’s disease and parkinsonism
• Retinoblastoma and malignant melanoma choroid

19. Dermato-pathology 2 Hours
• Skin tumors: squamous cell carcinoma, basal cell carcinoma and malignant melanoma.
• Inflammatory dermatoses of skin – psoriasis, lichen planus, bullous diseases

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Examinations Skills

The students should be trained to perform independently the following

1. Be able to collect, store and transport Materials for various pathological tests
   Including histopathology, Cytopathology, Clinical pathology, hematology and
   Biochemistry
2. Interpret abnormal laboratory values of Common diseases
3. Do complete urine examination including Microscopy
   Do/perform and interpret haemoglobin estimation, TLC, DLC, ESR, PCV, blood smear
   preparation (thick and thin) and staining. Reporting peripheral smears
4. Do blood grouping
5. Adapt universal precautions for self-Protection against HIV and hepatitis

Practical:

One – third of allotted practical hours to be devoted to

a. Performing a complete urine examination and detecting abnormalities and correlating
   with pathological changes.
b. To performs with accuracy and reliability basic hematological estimations: TLC, ESR,
   PCV, DLC, peripheral smear, staining, reporting along with history.

One third of allotted practical hours to be devoted to

a. Identify and interpret gross and microscopic features of acute inflammations in
   organs such as appendix, lungs, meninges,
b. Cellular components of chronic and granulomatous
   inflammation, c. Granulation tissue, callous
d. Typhoid, tuberculosis, amoebic ulcers in intestine
e. Rhinosporidiosis, actinomycosis, malaria, kala-azar, filaria
f. Amoebic liver abscess, malaria liver and spleen, filarial lymphadenitis, cysticercosis
g. Fatty liver, Amyloidosis of spleen, kidney and liver
h. Types of necrosis: caseous, coagulative, liquifactive
i. Identify and interpret gross and microscopic features of organs in commonly
   occurring neoplastic and non-neoplastic diseases
j. Study cytology slides-fibroadenoma, squamous cell carcinoma, granuloma,
   Adenocarcinoma in fluid, papillary carcinoma thyroid

One third of allotted practical hours to be devoted to

a. Discussion of case studies -clinical, gross and microscopic features and other
parameters wherever applicable - to learn clinicopathological correlations inclusive of autopsy studies and cytology slides / cases.

**Clinicopathology posting** Clinical pathology for two weeks may be taken from the dept.willing to provide slots/can be arranged by reallocating the timings of theory classes and it may be done at the level of individual Institutions in accordance with the availability of slots in various departments.

**SUGGESTED TOPICS FOR INTEGRATED TEACHING/AUTOPSY/CPC Integrated seminars**

a. Rheumatic heart disease  
b. Ischemic heart disease  
c. Hypertension and Hypertensive disease  
d. Tuberculosis lung  
e. Nephrotic syndrome  
f. Inflammatory disease of small and large bowel  
g. Cirrhosis  
h. Metabolic bone disease  
i. Diabetes mellitus  
j. HIV/ AIDS  
k. Iron deficiency anemia  
l. Jaundice  
m. Malaria, Dengue, Chikungunya, Avian Flu, swine flu  
n. CML, Hemolytic anemia ,deficiency anemia, Leukemia.  
o. immunology  
p. infectious diseases  
q. clinical pathology(selected topics)  
r. multi-dimentional pathophysiology of chronic diseases

A minimum of seven topics in the integrated teaching should be organized with the help of medical education department and other clinical/nonclinical departments.

**TEACHING LEARNING METHODS.**

- Structured interactive sessions  
- Small group discussion  
- Practical including demonstrations using micro image projection system.  
- Problem based exercises  
- Autopsy case studies  
- Self learning tools  
- Seminar and symposia

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• E-modules (can be done by renovating part of museum as a digital lab)

LEARNING RESOURCE MATERIALS

• Text books
• Reference books
• Practical note books
• Internet resources

EVALUATION:

There should be regular formative assessment. In Formative assessment, day to day performance should be given greater importance and forms the basis of internal assessment.

Internal assessment

The internal assessment marks for Pathology are 15 for Practical and 15 for Theory. Since the minimum percentage required for appearing for University exam is 35%, the total minimum marks required for internal assessment would be 5.5 out of 15. There need to be a separate minimum for Practical and Theory internal assessment. The total marks for University exam in Pathology is 150 (Theory 80 (2 papers) + Viva 15 + Practical 25 + internal assessment 30).

The pass has to be decided as follows:

1. Total aggregate marks should be 75 out of 150 marks or more for pass.
2. Theory and Practical Internal assessment marks should be added to the marks obtained in
3. Theory and Practical University exams respectively for deciding the pass
4. For Theory (80 + 15 viva + 15 marks internal assessment = 110) the minimum for pass should be 55 marks.
5. For Practical (25 + 15 marks internal assessment = 40) the minimum for pass should be 20 marks.

If moderation is given (in the event of no double valuation) it should be added to Theory marks only since the logic for moderation is ambiguity in question paper. No moderation need to be given for practical exam.

Before printing, question Paper scrutiny should be strictly enforced in University exams since question papers shows many mistakes, which necessitates moderation.

Marks for internal assessment

Theory - 15 marks (including viva)
Practical - 15 marks
One exam for theory at the end of each semester (viva to be conducted preferably with each exam)
The last exam will be as per University exam pattern - theory, practical and viva

**Internal assessment may be calculated as follows**

Theory = 15 marks (minimum 3 exams)
Final theory exam - 5 marks
Best of other two exams - 5 marks
Seminar presentation/class tests - 2 marks
Viva - 3 marks
Practical = 15 marks
Records = 1 mark (Histopathology, clinical pathology and Autopsy/CPC records)
Records to be maintained and evaluated – Histopathology record, clinical pathology record, a common record of Post mortem findings in 10 cases and 5 clinicopathological conferences Practical = 14 marks

The details of marking scheme for Pathology Practical would be

<table>
<thead>
<tr>
<th></th>
<th>Internal Assessment exam marks</th>
<th>University exam marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripheral smear Reporting</td>
<td>20</td>
<td>10</td>
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<tr>
<td>Clinical Exercise Pathology</td>
<td>20</td>
<td>10</td>
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<tr>
<td>(1 out of 6)</td>
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<tr>
<td>Blood grouping</td>
<td>20</td>
<td>10</td>
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<tr>
<td>Urine analysis</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Spotters (20x3)</td>
<td>60</td>
<td>(20x3) 60</td>
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<tr>
<td>Records (4+3+3)</td>
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<tr>
<td>(HP + CLIP + Ax/ CPC) TOTAL</td>
<td>150</td>
<td>100</td>
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<tr>
<td>To be converted to</td>
<td>15</td>
<td>25</td>
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</tbody>
</table>

★
Marks for Record has to be added to Internal assessment in Practical only and not in the University Practical since it will result in duplication.

University examinations

Marks break up are

Theory 80 marks
Theory internal assessment 15 marks
Viva 15 marks

Total for theory 110 marks

Practical 25 marks
Practical internal assessment 15 marks

Total for practical 40 marks

Grand total for Pathology 150 marks

Pattern of theory paper (University)

There will be 2 theory papers of 2 hours duration
The theory papers for University are Paper I 40 marks and Paper II 40 marks.
The content area would be Paper I = Clinical pathology (disease aspects of hematology will be included in paper II only) + General Pathology Paper II = Systemic Pathology + Hematology

Detailed pattern of theory questions

Out of 40 marks for each paper the marking scheme would be:

Answer in single sentence - (4x1/2) = 2 marks

STRUCTURED (Case Study) ESSAY = 6 marks

Short answers questions (SAQ) 4x2 = 8 marks

STRUCTURED ESSAY = 8 marks

Write short notes on: (4x4) = 16 marks

Section A and B are needed in each paper only if there is no double valuation so
that each examiner can value one paper

If there is section A and Section B then the marking scheme for each paper will be as follows:

**Paper I**

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<tr>
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<tr>
<td>Problem based structured essay</td>
<td>6 marks</td>
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<tr>
<td>SAQ-4 questions</td>
<td>8 marks</td>
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<tr>
<td>Short notes- 1 question</td>
<td>4 marks</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Section B</th>
<th>20 marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard/modified</td>
<td>8 marks</td>
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</tbody>
</table>

**Paper II**

<table>
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<th>Section A</th>
<th>20 marks</th>
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<tbody>
<tr>
<td>Short notes</td>
<td>4 marks</td>
</tr>
<tr>
<td>Single word type</td>
<td>4 marks</td>
</tr>
<tr>
<td>Problem based structured essay</td>
<td>6 marks</td>
</tr>
<tr>
<td>SAQ-2 questions</td>
<td>6 marks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section B</th>
<th>20 marks</th>
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</thead>
<tbody>
<tr>
<td>Standard/modified</td>
<td>8 marks</td>
</tr>
</tbody>
</table>

**Practical-OSPE-(objective structured practical examination)**

Total marks = 25 marks

No marks for records in the university practical

Practical marks to be split up as follows

Procedural stations = four = 15 marks

Response stations/spotters = 20 stations = 10

Procedure stations (15 minutes per station) *(questions can be asked during the procedure)*

Blood grouping

Urine analysis (including sediments demonstrated as charts)

Peripheral smear preparation (thick and thin) /staining / Hb estimation/TLC/ESR/PCV

Peripheral smear reporting (one out of 5)

HMA  AML

CML

Neutrophilia

Eosinophilia

**Response station (spotters) (2minutes each=20 stations) (with questions)**

Specimens-mounted and wet = 7
Histopathology slides = 6
Hematology slide = 2 (one bone marrow)
Cytology slide = 1 (20% should be with Clinico pathologic correlation (CPC) i.e. 4 spotters in CPC)

Histogram interpretation = 1
Interpretative clinical pathology charts with photos = 1
Clinicopathological correlative exercise (specimens/slide combinations with clinical history) = 1 Instruments = 1

**Viva = 15 marks**

Total 4 stations for viva
Stations will be for Clinical pathology and hematology
General pathology
Systemic pathology I
Systemic pathology II
Pathophysiology of Pain

**Practicals guidelines**

The slides for histopathology will be divided into 30 for spotting and drawing in records and 20 for demonstration in class.
There would be

<table>
<thead>
<tr>
<th>For diagnosis/spotting</th>
<th>For demonstration</th>
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</thead>
<tbody>
<tr>
<td>1 Acute Appendicitis</td>
<td>1 CVC Lung</td>
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<tr>
<td>2 Granulation tissue</td>
<td>2 CVC Liver</td>
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<tr>
<td>3 Calcinosis cutis</td>
<td>3 Filarial Lymph node</td>
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<tr>
<td>4 T.B. lymph adenitis</td>
<td>4 Infarction (Spleen/placenta)</td>
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<tr>
<td>5 Lepromatous Lepresy</td>
<td>5 Actinomycosis/Aspergilosis</td>
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<tr>
<td>6 Rhinospondrosis</td>
<td>6 Fatty liver</td>
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<tr>
<td>7 Capillary Haemangioma</td>
<td>7 Warthin’s tumor</td>
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<td>8 Cirrhosis Liver</td>
<td>8 Neurofibroma</td>
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<td>9 Lipoma</td>
<td>9 Intradermal anevus</td>
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<td>Leiomyoma</td>
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<td>10</td>
<td>Fibroadenoma</td>
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<td>11</td>
<td>Pleomorphic Adenoma</td>
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<td>12</td>
<td>Schwanoma</td>
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<tr>
<td>13</td>
<td>Osteochondroma</td>
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<tr>
<td>14</td>
<td>Malignant Melanoma skin</td>
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<tr>
<td>15</td>
<td>Squamous cell carcinoma skin</td>
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<tr>
<td>16</td>
<td>BCC</td>
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<td>17</td>
<td>Hodgkin’s lymphoma</td>
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<td>18</td>
<td>MNG</td>
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<td>19</td>
<td>Papillary carcinoma thyroid</td>
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<td>20</td>
<td>Hashimoto’s thyroiditis</td>
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<td>21</td>
<td>Giant cell Tumor bone</td>
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<tr>
<td>22</td>
<td>Osteosarcoma</td>
</tr>
<tr>
<td>23</td>
<td>Adenocarcinoma colon</td>
</tr>
<tr>
<td>24</td>
<td>Teratoma ovary</td>
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<tr>
<td>25</td>
<td>Infiltrating duct carcinoma</td>
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<tr>
<td>26</td>
<td>Renal cell carcinoma</td>
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<tr>
<td>27</td>
<td>Tuberculoid Leprosy</td>
</tr>
<tr>
<td>28</td>
<td>Atheroma aorta</td>
</tr>
<tr>
<td>29</td>
<td>Meningioma</td>
</tr>
</tbody>
</table>

History for Histopathology slides can be given by examiner for spotting.
The specimens for histopathology will be divided into 50 for spotting /diagnosis and 23 for demonstration categories.

There would be

**Specimens**

For spotting /

**GIT**

1. Chronic Gastric Ulcer
2. Carcinoma Stomach with omental – metastasis, cancer pain, Nociceptive. Neuropathic pain, visceral pain
3. Lipomatous polyp intestine
4. Polyp small intestine
5. Typhoid ulcer intestine
6. Multiple Polyposis large intestine
7. Intussusception intestine
8. Gangrene intestine
9. Tuberculous ulcer intestine with stricture
10. Amoebic ulcer large intestine
11. Acute appendicitis
12. Carcinoma colon

**HEPATOBILIARY SYSTEM & PANCREAS**

1. Cirrhosis liver (Macronodular)
2. Calculous cholecystitis
3. Calcifying Pancreatitis
4. CVC liver
5. Angioma liver
6. Hemochromatosis liver- Perls stain
7. Fatty liver
8. Amyloidosis liver
9. Amoebic liver
10. abscess

**SPLEEN**

1. CVC Spleen
2. Infarction Spleen

**FGS**

1. Carcinoma Cervix
2. Leiomyoma uterus
3. Benign cystic Teratoma ovary
4. Adenomyosis uterus
5. Adenocarcinoma uterus
6. Vesicular mole
7. Choriocarcinoma uterus
MGS
1. Carcinoma Penis

BREAST
1. Fibro adenoma breast
2. Carcinoma breast

EYE
1. Retinoblastoma
2. Melanoma – Eye

RESPIRATORY SYSTEM
1. Fibroccaseous tuberculosis lung
2. Pulmonary artery embolism
3. Lung abscess
4. Bronchogenic Carcinom
5. Lobar pneumonia
6. Hydatid cyst lung

CVS
1. Atheroma aorta with thrombus
2. Aneurysm aorta
3. Fibrinous pericarditis
4. Mural Thrombus Heart

LYMPHNODES
1. Caseating TB adenitis
2. Lymphoma

THYROID
1. Multinodular goitre
2. Carcinoma thyroid

SALIVARY GLAND
1. Pleomorphic adenoma
2. Diffuse colloid goiter
3. Hashimoto’s thyroiditis
4. Adenoma thyroid

BONE
1. Sequestrum
2. Osteochondroma
3. Giant cell tumour bone
4. Osteogenic sarcoma
1. Melanoma deposits
2. Malunion
CNS
1. Suppurative Meningitis

SKIN AND SUBCUTANEOUS TISSUE
1. Calcinosis Cutis
2. Lipoma
3. Squamous cell Carcinoma Foot
4. Basal Cell Carcinoma
5. Melanoma Foot

URINARY SYSTEM
1. Renal Cell Carcinoma
2. Nephroblastoma
3. Carcinoma bladder
4. Hydronephrosis
5. Nephrolithiasis

The slides for hematology will be divided into 10 for spotting and 10 for demonstration. They would be

<table>
<thead>
<tr>
<th>For spotting</th>
<th>Demonstration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 HMA</td>
<td>1 Filaria</td>
</tr>
<tr>
<td>2 AML</td>
<td>2 Lymphocytosis with atypical lymphocyte</td>
</tr>
<tr>
<td>3 CML</td>
<td>3 Spherocyte-Spotter</td>
</tr>
<tr>
<td>4 Neutrophilia</td>
<td>4 Reticulocyte</td>
</tr>
<tr>
<td>5 Eosinophilia</td>
<td>5 Thalassemia with target cells</td>
</tr>
<tr>
<td>6 Megakaryocyte</td>
<td>6 Toxic granules</td>
</tr>
<tr>
<td>7 LE cell</td>
<td>7 Myeloperoxidase stain</td>
</tr>
<tr>
<td>8 Multiple myeloma</td>
<td>8 Megaloblast</td>
</tr>
<tr>
<td>9 Normoblast</td>
<td>9 Sickle cells-Spotter</td>
</tr>
<tr>
<td>10 Malaria – PV/PF</td>
<td>10 CLL</td>
</tr>
<tr>
<td>11 A plastic anaemia</td>
<td></td>
</tr>
</tbody>
</table>
Cytology slides (for spotting)

1. Fibroadenoma
2. Granulomatous reaction lymph node
3. Squamous cell carcinoma sputum
4. Cervical smear Invasive squamous cell carcinoma
5. Adenocarcinoma in body fluids
6. Papillary carcinoma thyroid

**Recommended Textbooks**

- Pathologic Basis of Disease - Robbins and Cotran 7th edition
- Text Book of Pathology - Harsh Mohan 6th edition
- General and Systematic Pathology - 5th edition - JCE Underwood
- Haematology - G E De Gruchy
- Text and Practical Haematology MBBS - Tejinder Singh
- Manual of Basic Techniques for Health laboratory - WHO

**PHARMACOLOGY**

I. **Goal:**

The broad goal of teaching Pharmacology to undergraduates is
- To impart knowledge, skills and attitudes to the students so that they can prescribe drugs safely, effectively and maintain competency in professional life.
- To inculcate in them a rational and scientific basis of therapeutics.

II. **Educational Objectives. a)**

**Knowledge**

At the end of the course, the learner shall be able to
- describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs
- list the indications, contraindications, interactions and adverse reactions of commonly used drugs
- indicate the use of appropriate drug in a particular disease with consideration of its cost, efficacy and safety for individual needs, and mass therapy under national health programmes
- integrate the list the drugs of addiction and recommend the management
- classify environmental and occupational pollutants and state the management issues
- explain pharmacological basis of prescribing drugs in special medical situations such as pregnancy, lactation, infancy, old age, renal and hepatic failure
- explain the concept of rational drug therapy in clinical pharmacology with special focus to usage of antimicrobial drugs.
- prescribe drugs for the control of fertility and be aware of the effects of drugs on the foetus.
- describe the clinical presentation and management of common poisoning including the bites and stings.
• state the principles underlying the concept of ‘Essential Drugs’
• evaluate the ethics and modalities involved in the development and introduction of new drugs
• understand principles of Evidence based Medicine
• understand the principles of pharmacoconomics

(b) Psychomotor Skills:
At the end of the course, the learner shall be able to:
• prescribe drugs for common ailments
• identify adverse reactions and interactions of commonly used drugs
• interpret the data of experiments designed for the study of effects of drugs and bioassays which are observed during the study
• scan information on common pharmaceutical preparations and critically evaluate drug formulations
• load the required dose of medicines accurately in hypodermic syringes; inject medicines by the intradermal, subcutaneous, intramuscular and intravenous routes using aseptic techniques.
• Set-up an intravenous drip and adjust the drip rate according to required dosage.
• calculate the drug dosage using appropriate formulae for an individual patient.
• administer the required dose of different drug formulations using appropriate devices and techniques (e.g., hypodermic syringes, inhalers, transdermal patches etc.)
• Advice and interpret the therapeutic monitoring reports of important drugs
• recognize and report adverse drug reactions to suitable authorities.
• analyse critically, drug promotional literature for proprietary preparations in terms of
  (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.
• 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
• communicate with patients regarding proper use of drug
• take adequate precaution during prescribing drug(s)
• understand the legal aspects of prescription
• counsel patients for compliance
• take adequate care to write prescriptions legibly
• understand rationality of polypharmacy
• update themselves regarding recent advances
- Basic Clinical communication skills
Examples of good and poor communication as Role Play - affecting rapport with patient and family, therapeutic relationship, trust, diagnosis and management. The stages of grief as described by Elisabeth Kubler Ross

(d) Integration

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Practical knowledge of rational use of drugs in clinical practice will be acquired through integrated teaching vertically with pre clinical & clinical subjects and horizontally with other para-clinical subjects.

**DETAILED SYLLABUS**

1. Period of training: 3rd, 4th & 5th Semester  
2. Duration of training: one and a half years  
3. Eligibility: Must have cleared Phase I (Anatomy, Physiology, Biochemistry)  
4. Time available for teaching: 300 hours

**Lectures: 125 hours Practicals: 75 hours**  
Innovative sessions & Internal Assessments: 100 hours

**DETAILS OF LECTURES**  
**Topic** | **Time (hours)**  
--- | ---  
Part I (Drug Oriented teaching) | 16 hours  
1. General Pharmacology and basic concepts of clinical Pharmacology | 16 hours  
• Introduction – definition, scope, various branches, drug nomenclature, orphan drugs  
• Mechanism of drug action /Pharmacodynamics (Receptor/Molecular mechanism is desirable to know)  
• Scope & relevance of clinical pharmacology  
• Routes of administration of drugs, new drug delivery system.  
• Pharmacokinetics – Absorption, distribution, metabolism and excretion.  
• Factors modifying drug action and drug dosage  
• Drug interactions and pharmacogenomics  
• Adverse drug reactions and Pharmacovigilance; Therapeutic drug monitoring and adherence  
• Essential drugs and fixed drug combination including pharmacoeconomics  
• Rational use of drugs  
2. Autonomic nervous system | 12 hours  
• Cholinergic neurotransmission and cholinergic drugs  
• Anticholinergics  
• Adrenergic neurotransmission and adrenergic drugs  
• Antiadrenergic drugs Skeletal muscle relaxants NO, VIP (self-study)  
3 Autacoids and related drugs | 3 hours  
Histamine receptor antagonists, their pharmacological actions, indications, adverse effects and precautions  
Pharmacology of drugs on prostaglandins and leukotrienes  
5HT receptors and their antagonists including treatment of migraine  
4 Central nervous system | 24 hours  
Drugs used in epilepsy and neuropathic pain; selection of appropriate drug for various
types of epilepsy and adverse drug effects
Sedative – 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
NSAIDS: Pharmacological action, indications, contraindications, adverse effects and drug interactions of commonly used drugs. WHO Analgesic ladder
Ladder Drugs and Emphasise on practical application of NSAIDs, weak and strong opioids.
Drug used in the treatment of parkinson’s disease: anticholinergic agents, dopamine agonists, MAOI, COMT:
Their indications, contraindications, adverse effects and drug interactions.
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)
Antidepressants use in neuropathic pain
Drugs of addiction abuse and dependence (self-study)
Drugs in manic depressive illness and psychosis
General anaesthetics; cardinal features, merits and demerits of commonly used anaesthetics, drug interactions
Preanaesthetic agents; uses, indications, contraindications adverse effects and drug interactions.
Local anaesthetic agents: Pharmacological basis, adverse drug reactions, indications and complications of spinal anaesthesia
Adjuvant analgesics – and use in chronic pain
Drugs for treatment of Alzheimer’s disease and cognitive enhancers – (seminar )

5 Cardiovascular System 15 hours
Anti-hypertensive drugs: MOA; adverse drug reactions drug interactions and basis of combining commonly used drugs
Pharmacology of calcium channel blockers Drugs affecting Renin-Angiotensin system Approaches to treatment of myocardial infarction. Drug used in treatment of angina pectoris.
Drug treatment of peripheral vascular disease (self-study)
Management of pain in PV diseases Pharmacology of vasodilators and cardiac glycosides; usage in CHF
Treatment of Paroxysmal supraventricular tachycardia, atrial dysrhythmias, sudden cardiac arrest and ventricular fibrillation.
Diuretics: 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; anti-diuretics.

6. Drugs affecting blood and blood formation 6 hours
Anticoagulants: MOA of heparin and oral anticoagulants indications, monitoring of therapy and treatment of bleeding due to their overdose, drug interactions.
Drugs inhibiting platelet aggregations, their indications and precaution for their use
Antianaemic drugs (seminar)
Treatment of shock (seminar)
Fibrinolytics and antifibrinolytics: indications, adverse reactions.
Hypolipidemics: MOA, adverse reactions and indications

7. Respiratory system 2 hours
• Drug use in treatment of bronchial asthma
• Antitussives, expectorants & mucolytics (seminar)

8. GIT 3 hours
• Pharmacotherapy of peptic ulcer: MOA, adverse drug reactions, contraindication and precautions
Antiemetics: MOA, uses, side effects.
Drug used in ulcerative colitis and irritable bowel syndrome Management of constipation and diarrhoea (seminar)

9. Drugs acting on Endocrine system 9 hours
• Thyroid hormones and antithyroid drugs: pharmacological action, indications, contraindications and side effects
• Drugs use 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 rational for such use, C/I and side effects.
• Pharmacological approaches to contraception, side effects, precautions during use and C/I.
• Uterine relaxants, and uterine stimulants, indications, side effects, C/I
• 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 (self-study)

10. Chemotherapy 17 hours
• General principals of chemotherapy, rational use of antimicrobial agents, indications for prophylactic and combined uses of antimicrobials including pre and probiotics
• Chemotherapeutic agents: penicillins, cephalosporins, aminoglycosides, broad spectrum antimicrobial agents, quinolones, sulphonamides macrolides and other newer drugs: their mechanism of actions, s/e, indications, resistance, and drug interactions. Drugs used for the treatment and prevention of infections – examples Tuberculosis, Leprosy, Malaria, Amoebiasis and other Protozoal infections, Fungal infections, Viral infections including HIV, STD, Helminthiasis, Leptospirosis etc.
• Antiseptics, disinfectants and their use based on their pharmacological properties. (Seminar) Anticancer drugs, mechanism of action, indications, s/e, C/I, Precautions, Pharmaco-economics.
Toxicology

General principles of treatment of poisoning
Management of overdosage with commonly used therapeutic agents
Heavy metal poisoning and heavy metal antagonists (seminar)

Miscellaneous
Vaccines (self-study)
Drugs modulating Immune system (seminar)
Vitamins, Nutritional supplement (self study)
Gene therapy (seminar)
Drugs acting on skin & mucus membrane (seminar)
Sports medicine (self-Study)
Antioxidants (self-Study)

Part II (Clinical Pharmacology and Therapeutics)
National Health programmes like:
1. Tuberculosis
2. Leprosy
3. HIV
4. Malaria
5. Syphilis and gonorrhea & STD (seminar)
6. Upper and lower respiratory infections;
7. OCP
8. Filariasis
9. Anaemia
10. Diabetes Mellitus
Rationale, regimen, prescription of the medicines and regimens used for national programs, basic counseling in these scenarios.

Infective/Parasitic conditions
1. Influenza
2. Urinary Tract infections (seminar)
3. Typhoid and other GIT infections
4. Amoebiasis
5. Worm infestations (seminar)
6. Fungal infections
7. Herpes and Hepatitis, other antivirals

Medical emergencies, Managing a Pain crisis
1. Acute myocardial infarction, acute angina attack, circulatory failure, sudden cardiac arrest, hypertensive emergencies
2. Acute anaphylaxis and other acute allergic states
3. Snake bites and insect bites
4. Acute poisoning and drug overdosage
5. Status epilepticus, febrile convulsions, acute mania
6. Acute severe asthma, acute rheumatic fever, acute gout
7. Acute colicky pains-intestinal, biliary, renal
8. Post-partum haemorrhage, uterine inertia

**Other topics**
1. Treatment of pain, Assessment, classification, management, Application of WHO Analgesics – as a seminar
2. Treatment of insomnia
3. Treatment of cough
4. Treatment of fever of unknown origin (PUO)
5. Drugs used in labour
6. IV 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)

**Details of Practicals**
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. Critical appraisal of drug promotional literature
7. Essentials of Clinical trials
8. Communicating to patients on the proper use of medication.
9. Prescription writing, prescription auditing based on rational drug use and FDC
10. Essential drugs list, National List of Essential drugs for India – adults, children and why are those particular drugs included. Controlled drugs amongst the essential list and their availability.
11. Use of drugs in pregnancy, lactation, children and elderly
12. Use of drugs in liver disease and renal disease
13. Preparation of percentage solution
14. Preparation and use of oral rehydration solution
15. Informed Consent Form (To teach it more as a document of good communication, trust and shared planning for care than as a legal requirement.)
16. Computer assisted learning (CAL)
17. Experimental pharmacology charts interpretation
18. Drug/drug and Drug/Food interaction.
19. Selection of P-drug
20. Irrational drug combinations, fallacies of using pre-combined drugs
**Teaching-Learning methods:**

Small group discussions, tutorials, project work and seminars. 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.

**Project work**

Each student has to collect data of one clinical case and write it down as project. Topics for Seminars (2 hours each)

1. Antianaemic drugs
2. Antitusives
3. Shock
5. Anthelmintics
6. Calcium metabolism
7. Dermatology – drugs acting on skin and mucous membrane
8. UTI & STD
9. Irritable bowel syndrome, ulcerative colitis & Eye disorders
10. Immuno Pharmacology
11. Laxatives and antidiarrhoeals
12. Alcohol
13. Osteoporosis, obesity, genetherapy
14. Heavy metal poisoning and heavy metal antagonists
15. Antiseptics
16. Superinfection, prophylactic use and misuse of antibiotics
17. Using analgesics in patients with poor renal function
18. Management of infections which are to be cared for without antibiotics – diarroheas, URTI, Uro-genital

**Topics for self-study**

1. Treatment of rhinitis
2. Carminatives, digestants & antiflatulents
3. Vitamins and antioxidants
4. Vaccines
5. Drug induced blood dyscrasias
6. Treatment of vertigo
7. Other protozoal infections
8. Drugs in pregnancy and infants.
9. NO, VIP
10. Drugs of addiction
11. Drug treatment of peripheral vascular disease
12. Anterior pituitary hormones
13. Drugs used in the treatment of infertility
14. Reactive oxygen species
15. Speciality based prescriptions and the resultant Polypharmacy – the new healthcare issue

**Recommended books for undergraduates**

1. Essentials of Medical Pharmacology by K.D.Tripathi (Prescribed)
2. Medical Pharmacology 3rd edition by Dr Padmaja Udaykumar (Prescribed)
3. Principles of Pharmacology by H.L.Sharma, K.K.Sharma (Prescribed)
4. Pharmacology and Pharmacotherapeutics. R.S Sathoskar and Bhandarkar (Prescribed)
5. Basic and Clinical Pharmacology Lange publications by Bertram G Katzung (Reference)
7. The Pharmacological Basis of Therapeutics by Goodman & Gilman (reference)

**Evaluation**

Internal Assessment – 3 sessional examinations
One exam for theory at the end of each semester
The last sessional exam will be model examination (as per University pattern) – theory, Practical and viva voce
Internal assessment for theory = 15 marks
Internal Assessment is calculated with following break up
Final theory - Paper I and Paper II = 80 marks
Seminar presentation and post-test = 20 marks
Project = 10 marks
Viva voce = 20 marks
Best of first two theory exams out of (n-1) = 20 marks
Total = 150 marks
Internal assessment for theory = 150 / 10 = 15 marks
Internal assessment for practicals = 15 marks
Record = 5 marks
Practicals = 25 marks
Total 25+5= 30/ 2= 15 marks
University examinations marks break up are
Theory - two papers of 40 marks each - 80 marks
Practical - 25 marks
Viva voce - 15 marks
Internal assessment
(Theory-15; practical 15) - 30 marks
Total - 150 marks
Pattern of Theory paper for final sessional exam and university exam
There will be 2 papers of 40 marks each. No division of question papers into section A and section B
Duration is 2 hours/ paper
Paper I

(Topics: General Pharmacology, ANS, CVS, blood, diuretics, CNS, autacoids, respiratory) I. Name the following - \( \frac{1}{2} \times 10 = 5 \) marks

II. Rational basis for use of drugs/ drug interactions /drug combinations - 1 x 4 = 4 marks

III. Write 2 uses and 2 adverse effects/preferred drug and route 1 x 4 = 4 marks

IV. Structured essay question (1) - 5 marks

V. Clinical problem (1) - 5 marks

VI. Choose the drug and justify - 1 x 5 = 5 marks

VII. Write briefly on (4 Nos) - 3 x 4 = 12 marks

Paper II

(Topics: GIT, Hormones, antibiotics, chemotherapy and miscellaneous)

I. Name the following \( \frac{1}{2} \times 10 = 5 \) marks

II. Mechanism of action of antibiotics/spectrum of antibiotics 1x5 =5marks

III. Write 2 uses and 2 contraindications/ precautions 1x4 = 4marks

IV. Rational basis for use of drugs/comment on the interactions produced 1x4=4marks

V. Structured essay question (1) - 5marks

VI. Clinical problem (1) - 5 marks

VII. Write briefly on (4 Nos) - 3x4= 12marks

Practicals

Total marks = 25 marks

Practical I - Objective Structured Practical Examination (OSPE)

Response stations -10

Time at each station is 5 minutes.

1. Prescription writing for prescription for common ailments - 1 = 2marks

2. Prescription for special groups – pregnant woman, children, elderly and patients with renal or hepatic disease) - 1 = 2 marks

3. Exercise on Drug interaction – 1 = 2 marks

4. Drug dosage calculation -1 = 1 mark

5. Dosage forms -1 = 1 mark

6. Drugs - 3 nos from different: groups = 3 marks

7. Device -1 = 1 mark

8. Diagram/Picture of plants or ADR -1 = 1 mark

9. Calculation of percentage solutions (normal saline, 5% dextrose/half normal saline/others) /ORS procedure) -1 = 1 mark

10. Sources of drug information – 1 = 1 mark

Total = 15 marks

Practical II- (Interactive sessions)
1. Clinical Pharmacology chart – 1 = 2 marks
2. Interpretation of experimental chart -1 = 3 marks
3. Interpretation of data (providing lab: reports) -1 = 1 mark
4. Criticize and rewrite informed consent form – 1 = 3 marks
5. ADR (clinical problem) -1 = 1 mark

OR
6. Give an irrational prescription with wrong dosage, wrong route, wrong frequency and inadequate supportive drugs. Exercise to correct the mistakes and form a rational prescription-1=3 marks

OR
7. Demonstrate route of administration (loading syringe, cleaning, different routes IM, IV, SC etc) or demonstrate use of Inhaler or use of eye drops, OC etc)

-1= 3 marks

VIVA VOCE
Total 4 stations each student to be examined by all the four examiners Total 15 marks

COMMUNITY MEDICINE

A. VISION
To develop a group of medical graduate who will be proactive in identifying and responding to public health challenges the society is facing.

B. MISSION
To bring out a group of Medical Graduates who can practice the science of medicine with Social responsibility and social accountability and provide cost effective, value based comprehensive health care.

C. GOAL
To equip the students to function efficiently and effectively as first level physicians in the community in accordance with the committed vision and mission of community medicine.

D. DEPARTMENTAL OBJECTIVES

D.1. GENERAL OBJECTIVE
To train Medical Students with knowledge, attitude and skills required to become doctors with empathy, and, who can effectively function as healthcare providers, decision makers, communicators, community leaders and managers in rural and urban settings.

D.2. SPECIFIC OBJECTIVES

D.2.1. KNOWLEDGE

1. To identify the multi-factorial determinants & dimensions of health and disease, dynamics of community behaviours and human society
2. To understand the structure and process of the health care delivery system
3. To identify the health needs of the community in general and vulnerable groups in particular
4. To understand the science of applied epidemiology and biostatistics and describe their application to health and disease in the community or hospital situation
5. To understand the environmental and occupational factors in health and disease
6. To identify the role of nutritional factors in health and science
7. To understand the concept of heredity and inheritance in relation to individual and community health
8. To understand the objectives, strategy, implementation monitoring and evaluation of all National Health Programmes (NHP)
9. To understand the population dynamics and their impact on health and disease
10. To enumerate the principles and components of primary health care and national health and related policies to achieve millennium development goals (MDG)
11. To understand the principles and techniques in health management and health economics
12. To understand the social dynamics and social factors in relation to health and disease
13. To understand the Gender issues in health and diseases
14. To understand the Developmental Health Interface & health of populations.

D.2.2. ATTITUDE

1. To see “the human being in disease, “not the disease in Human being” and provide health care in an environment of care and compassion
2. To safeguard human dignity, equity and solidarity adhering to professional ethics.
3. To acknowledge and respect the differences in the needs, values and cultures of different communities.
4. To assume social responsibilities at all times and take initiative in times of natural disasters, calamities and accidents.
5. Readiness to work in rural, tribal, urban slum areas and other constrained situations where services are most needed.

D.2.3. SKILLS

1. To diagnose and manage common health problems and emergencies using drugs rationally.
2. To identify community Health problems, prioritize them and chalk out solutions with local resources and community participation.
3. To deliver evidence based, need oriented, primary health care in a competent manner in diverse settings.
4. To work effectively as a health care team member with the community hand in hand with various sectors to bring about health promotion.
5. Use epidemiology and biostatistics as scientific tools to study the phenomenon of
health and disease and make rational decisions relevant to community and hospital situation.

6. To collect, compile, analyze and interpret health related data for disease surveillance and health promotion initiatives.

7. To communicate effectively and appropriately with people at large and patients and their families in particular.

8. To impart health education using appropriate tools and educational methods with special reference to national health issues.

9. To implement, monitor and evaluate National Health Programmes.

10. Be capable of syntheses between cause and illness in the environment of community and individual health, and respond with leadership qualities to institute remedial measures for these.

11. To manage human resources, money, material, time and information required for delivering health care.

D.3. INTEGRATION
Horizontal as well as vertical integrated teaching are conducted with in-house sister departments and extramural organizations (Government and non-Government) which are involved in the delivery of primary health care, implementation of National Health Programmes and/or running social welfare institutions.

Course Details
Duration of the course - First Semester, Third to Seventh semesters (330 hours)

Lectures - 130 hours –( Phase I – 30 hours, Phase II – 100 hours)
Practicals - First phase- 30 hours
          Second phase-170 hours

COURSE CONTENTS

I. CONCEPT OF HEALTH & DISEASE

1. Definition, concepts & evolution (history) of Public Health

2. Definition of health, holistic concepts of health including the concept of spiritual health, appreciation of health as a relative concept, dimensions & determinants of health.
   - Disease as an experience - Patient as a person with physical, emotional, psycho-social and spiritual concerns
   - How to recognize the role of patient-family unit as important in healthcare inputs
   - Quality of Life - What does quality of life mean? Examples of it being subjective
   - Subjectivity of symptoms - example pain
### CHARACTERISTICS OF AGENT, HOST AND ENVIRONMENTAL FACTORS IN HEALTH AND DISEASE


4. Understanding the concept of prevention & control of disease.

5. Understanding the natural history of disease and application of interventions at various levels of preventions

6. Introduction to various health indicators

7. Health profile of India—already in Chapter XIV

### SOCIAL AND BEHAVIORAL SCIENCES

8. Social and behavioral science, clinico-socio-cultural and demographic evaluation of the individual, family and community.

9. Assessment of barriers to good health and health seeking behavior

10. Role of family in Health and Disease

11. Socio-cultural factors related to health and disease in the context of urban and rural societies

12. Assessment of socio-economic status, effect of health and illness on socio-economic status

13. Doctor-patient relationship

14. Social Psychology, Community Behavior and community relationship, hospital sociology and psychology

15. Social security—Health Insurance: Organized sector, unorganized sector, special groups (Eg: elderly)

16. Impact of urbanization on health and disease—will be covered in chapter XIII

17. Poverty link to health and disease and poverty alleviation programmes

18. Household Poverty in India caused by Healthcare expenditure. Current status of Health Insurance in India

19. Intelligence—IQ and EQ

20. Personality—Types, Interpersonal relationships

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<td>Attitude, Behaviour, habits</td>
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<td>Emotions, Frustrations, role of emotions in health &amp; coping with emotions</td>
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<td>Conflicts-internal, interpersonal &amp; conflict resolutions, defence mechanisms</td>
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<td>Stress &amp; coping skills – integrated (Psychiatry)</td>
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</table>
| 17 | Ethics  
Confidentiality, Autonomy, Privacy, Human rights aspects of patient care |
| 18 | Learning – Types and skills |
| 19 | Development & Health interface-Poverty & Health, Health of the marginalized, Sustainable & inclusive development |
| 20 | Gender & Health including gender based violence, Epidemiology of violence and its prevention and control Life skill education |

### III ENVIRONMENT AND HEALTH

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<tr>
<td>1</td>
<td>Water: Concepts of safe and wholesome water, sanitary sources of waterborne diseases, water purification process. Water quality standards.</td>
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<td>2</td>
<td>Physical, Chemical &amp; bacteriological standards of drinking water quality and tests of assessing bacteriological quality of water.</td>
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<td>3</td>
<td>Health hazards of air, water, noise, radiation pollution.</td>
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<td>Concepts of water conservation, rainwater harvesting &amp; Global warming.</td>
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<td>Concepts of solid waste, human excreta and sewage disposal.</td>
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<td>Awareness of standards of housing and his effect of housing on health.</td>
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<td>7</td>
<td>Role of vectors in the causation of diseases.</td>
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<td>8</td>
<td>Identifying the features of vectors and their control measures.</td>
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<td>Life cycles of vectors and advantages and limitations of various vector control measures.</td>
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<td>Mode of action, application cycle of commonly used insecticides and rodenticides.</td>
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<td>11</td>
<td>Urban waste management.</td>
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</table>
| 12 | Recent and emerging issues in environmental health  
  a. Stockholm  
  b. Basel convention  
  c. Kyoto Protocol. etc |
| 13 | Radiation Prevention and Control |
| 14 | Newer methods of solid & liquid waste disposal  
  - Composting  
  - Solar (Renewable source of energy)  
  - e-waste |
C NGE. (INFORMATION, EDUCATION, COMMUNICATION)

IV. HEALTH PROMOTION AND EDUCATION/COMMUNICATION OR BEHAVIOURAL CHANGE. (INFORMATION, EDUCATION, COMMUNICATION) ----
   a. Understand the concepts of health Promotion and education, IEC, Behavioural change communication, Counselling
   b. Principles & methods of health promotion and education.
   c. Barriers of effective communication and methods to overcome them.
   d. Various methods of Health education with their advantages and limitations.
   e. Organizing health promotion and education activities at individual, family and community settings.
   f. Evaluation of health promotion and education programme.

V. NUTRITION

1 Common sources of various nutrients and special nutritional requirements according to age, sex, activity, physiological conditions
Real life knowledge on which Indian dietary component, fruits, vegetables, grains, grams have high sodium, high potassium, high fiber, high protein

   Introduction to current evidence on health impact of red meat, refined oil, white sugar, caffeine containing soft drinks, artificial tastes, flavours, dairy products, GM foods,

2 Nutritional assessment of individual families and the community by using appropriate method such as; anthropometrics, clinical examination 24 hour dietary recall and other methods of diet survey etc.

3 Plan and recommend a suitable diet for the individual and families as per local availability of food and economics status etc.

4 Common nutrition related health disorders (like protein energy, malnutrition, obesity, childhood obesity, Vitamin A deficiency, anaemia, iodine deficiency, fluorosis, food toxin diseases) and their control and management.

5 Food fortification, additives and adulteration food hygiene.

6 Social and cultural factors in nutrition and Health.

7 Important National nutritional programmes.

8 National Nutrition policy.

9 Nutritional surveillance, education and rehabilitation.

10 New WHO Growth Charts.

11 Principles of Therapeutic Diet

12. Food plate

VI. OCCUPATIONAL HEALTH

1 Relate the history of symptoms with specific occupations including agricultural related
occupation.
2 Employees State Insurance Act.
3 Specific occupational health hazards, their risk factors and its preventive measures. Primary Secondary and tertiary prevention including personal protective devices
4 Concepts of ergonomics.
5 Diagnostic criteria of various occupational related diseases.
6 Other legislations related to occupational health.
7 Digital Health Computer associated Illness.
8 Occupational health in unorganized sector
9 Integrated learning on non-pharmacological management of pain Visit to PMR department

VII. BIO-STATISTICS
a. Collection, Classification, analysis, interpretation and presentation of statistical data.
b. Application of Statistical methods in various study designs.
c. Common sampling techniques, simple statistical methods, frequency distribution, measures of central tendency and dispersion.
d. Apply common tests of significance in various study designs

VIII. BASIC EPIDEMIOLOGY
1. Epidemiology: definition, concepts, uses and its role in health and diseases.
2 Use of basic epidemiological tools to make a community diagnosis of the health situation, in order to formulate appropriate intervention measures.
3. Definition of the terms used in describing diseases transmission and control.
4 Modes of transmission and measures for prevention and control of communicable and non-communicable diseases.
5 General Principles of prevention and control of communicable, non communicable diseases and other health conditions of public health importance.
6 Principle Sources of Epidemiological data.
7 Definition, Calculation and interpretation of morbidity and mortality indicators standardization (Direct & Indirect)
8 Screening of health related attributes & issues need, uses and evaluation of screening tests.
9 Investigation of an epidemic of communicable disease and to understand the principals of control measures.
10 Epidemiological study design & Research Methodologies
11 Concepts of association, Causation and biases
12 Application of computers in epidemiology
13 Use of principles of epidemiology in practice of medicine
14 Introduction to Evedence based medicine
15 Use of diagnostic tests
IX. EPIDEMIOLOGY OF SPECIFIC DISEASES: COMMUNICABLE & NON COMMUNICABLE

Communicable and non-communicable diseases of public health importance, relevant to the region, for which National Disease control/Eradication Programmes have been formulated.


**Non Communicable Lifestyle Diseases:** Coronary heart diseases, Hyper tension, Stroke, Rheumatic heart disease, Cancers, Obesity, Diabetes, Blindness, Injury and Accidents.

1. Extent of problem, epidemiology and natural history of diseases
2. Public health important of particular diseases in local area.
3. Influence of social, cultural and ecological factors on the epidemiology of particular diseases
4. Diagnosing diseases by clinical methods, using essential laboratory techniques at primary care level.
5. Treatment of a case, as per National programme guidelines, and also follow up of case
7. Understand the principles of measures to control a diseases epidemic
8. Principles of planning, implementing and evaluating control measures for diseases at community level bearing in mind the public health importance of the diseases.
10. Management information system in a particular diseases

X. DEMOGRAPHY AND VITAL STATISTICS

2. Definition, Calculation and interpretation of demographic indices like birth rate, death rae, fertility rates.
3 Population dynamics of India.
4. Population control measures. Family planning methods including NSV and emergency contraception
5. National population policy.
6. Sources of Vital Statistics like census, SRS NFHS, NSSO etc.

XI. REPRODUCTIVE AND CHILD HEALTH

2. Screening of high risk groups and common health problems.
3. Local customs and practices during pregnancy, child birth, lactation and child feeding practices.
4. IYCF (Infant and young child feeding practices)
5. 
6. Organization, implementation and evaluation of reproductive child health (RCH)

7. Components, including child survival and safe motherhood (CSSM), Universal immunization Programme (UIP), Integrated child development services scheme (ICDS), integrated management of Neonatal and childhood illness (IMNCI), Janani Suresh Yojna (JSY) & Accredited Social Health Activist (Asha) under national rural health mission (NRHM) and other existing Programmes.
6. Various Family Planning methods, their advantages and shortcomings.
7. Medical Termination of Pregnancy and Act (MTP Act) & Pre Natal Diagnostic Test Act (PNDT Act)
8. Adolescent Health
10. Organizations, technical and operational aspects of the National family welfare Programme.
11. MCTS (Mother and Child Tracking System)

XII. SCHOOL HEALTH

1. Objectives and components of school Health programme
   a. Periodic Medical Examination of the children and the teachers
   b. Immunization of the children in the school.
   c. Health promotion and education
   d. Mid-day meals.
   e. WIFS (Weekly Iron and Folic Acid)

XIII. URBAN HEALTH

1. Common health problems (Medical, Social, environmental, Economical, Psychological) due to Urbanization of Urban Slum dwellers
2. Organization of health services in urban slums
XIV. HEALTH CARE SYSTEM IN INDIA

1. Concepts of Primary Health care and Comprehensive Health care.
2. Health profile of India
3. Health Care Delivery System in India and Infrastructure at peripheral, Primary, Secondary and tertiary care level
4. Job responsibilities of different category of workers in health System
5. Voluntary Health agencies working in India.

XV. HEALTH PLANNING, MANAGEMENT AND ADMINISTRATION

1. Concepts of Planning, Management, Public Health administration. Seminar on India’s National Policy – NPCDCS, elderly health, mental health and on Palliative Care
2. Components of health planning activity.
3. Classification and Understanding of various qualitative and quantitative Health management techniques.
4. Overview of administration at village, block, district, state and central level in India.
5. Integrated Disease Surveillance Project (IDSP)
6. Health Related Millennium Development Goals and sustainable development goals
8. Concepts of Health Economics
10. Role of Planning Commissions and Five year plan in development of health sector in India
11. Various health committees of government of India and their important recommendations
13. Inventory Control

XVI. DISASTER MANAGEMENT

1. Principles of disaster preparedness and application of these in disaster management.
2. Bio-terrorism
3. Pandemic Preparedness

XVII. LEGISLATION AND PUBLIC HEALTH

(Recent Amendments to be included)

1. Census act 1948
2. Registration of Birth and Death Act 1969
3. The Epidemic Diseases Act, 1897.
4. The Transplantation of Human Organs Act, 1994
5. The prevention of food Adulteration Act 1954(FSSAI)
6. The International Health Regulations
7. The Cigarettes and Other Tobacco Product Act 2003
8. The Narcotic and Psychotropic Substance Act 1958
9. The Medical Termination of Pregnancy Act 1971 (MTP Act)
10. The Dowry Prohibition Act
11. The Immoral Traffic (Prevention) Act 1956
14. The Child Labour (Prohibition and Regulation) Act 1986
16. The Factories Act 1948
17. The Employees State Insurance Act 1948
18. The Environment (Protection) Act 1986
20. The Consumer Protection Act 1986

XIX. INTERNATIONAL HEALTH

1. Role of various multilateral, bilateral international health organizations like WHO, UNICEF etc.
   . WHO Resolutions – on Non-communicable diseases, palliative care
   . Sustainable Development Goals as relevant to India
2. Organizational structure of these organizations
3. New International health Regulation (IHR)

XX. HEALTH CARE WASTE MANAGEMENT

2. Application of these principles in different setting of health care delivery system.
3. Safe Injection Practices
4. Universal Precautions

XVIII. HEALTH CARE OF ELDERLY

National Policy
1. Health problems of Aged
2. Preventive Geriatrics – Prevention of falls
3. Care of Aged

XIX. MENTAL HEALTH AND BEHAVIORAL PROBLEMS

1. Importance of mental health care in primary care settings.
2. Comprehensive Mental Health Care at primary care settings.
3. Common Mental Health disorders.
4. Substance use disorders Tobacco, Alcoholism and Drug Addiction - and prevention
5. Gender Issues and Women Empowerment
6. Gender Based Violence, Domestic Violence, Epidemiology Prevention and Control
7. Suicides

XX. DEVELOPMENT AND HEALTH INTERFACE
   1) Poverty and Health (Evidence based learning – to show real data )
   2) Poverty and Health
   3) Poverty Alleviation Programme
   4) Health of the marginalized – eg. Transgender, Tribals
   5) Sustainable and inclusive Development
   6) Universal health Concept in India, Sustainable Development Goals

XXI. GENETICS
   1. Epidemiology of Genetic Diseases
   3. Screening of Genetic Diseases
   4. Prevention and Control of genetic Diseases

XXII. DISABILITY
   1. Types of Disability
      Paraplegia/ Quadriplegia – as a seminar – prevention, and care of those who have irreversible paraplegia
      Physical, emotional concerns and management
      Assisting in Economic self sufficiency – as a social health concern of the doctor
      Role of Medical Social Workers
      – working as Multi disciplinary Team for total care

   2. Rehabilitation– Clinical and community level.
   3. Palliative Care
      Concept, need in the country, relevance Applicability in chronic disease
      Concept of Non-abandonment if disease is not curable
      2 levels – Palliative care Approach, generalist Palliative Care, Specialist Palliative Care
      -Where, How Palliative Care is to be delivered

      Concept of Home based care

SKILLS
The student should be able to do:

1. Elicit Clinico-social history. Describe agent, host and environmental factors in determining health and disease.
2. Identify, prioritize and manage common health problems of community.
3. Apply elementary principles of epidemiology in carrying out simple epidemiological studies.
4. Work as a team member in rendering health care.
5. Carry out health promotion and education effectively in the community.

Skills in relation to specific topics

1. Communication:

Should be well versed with the art of interviewing techniques to elicit the desired information & with art of counseling to counsel. The student should be able to communicate effectively with family members at home, patients at clinics or at home; and community. The student should also be able to communicate with individuals, family or a group for health promotion and education, and also with peers.

- Basic Communication Skills
- Importance of good communication skills
- Barriers – for the Patient and for the doctor
- Active listening
- Basic Clinical communication skills
- Examples of good and poor communication as Role Play - affecting diagnosis and management

In 3rd Professional Year
- The stepwise breaking of Bad News
Handling Collusion

2. Team Activity

Work as an effective member of the team; in planning and carrying out field work like school health, conduct health camps, investigation of epidemic etc.

3. Environmental Sanitation:
Able to assess environmental risk factors plan and suggest action
Able to collect water and stool samples for microbiological analysis
Able to identify insects of public health importance, able to use effective insecticides.
Vector Survey and control measures.
Newer methods of solid & liquid waste disposal
  • Composting
  • Solar (Renewable source of energy)
  • e-waste

4. Communicable and Non-Communicable disease.

• Eliciting Clinico-social history and examining the patients for diagnosis and treatment.
• Assessing the severity and/or classifying dehydration in diarrhea, upper respiratory tract infection, dog bite, leprosy, classify tuberculosis (Categorization) and STD.
• Fixing, Staining and examining peripheral smear for malaria, sputum for AFB, hemoglobin estimation, urine and stool examination.
• Adequate and appropriate treatment and follow up of public health diseases and of locally endemic diseases. (The Integrated Care Model of WHO for chronic conditions – 5 As – Assess, Advice, Agree, Assist, Arrange)
• Advice regarding prevention and prophylaxis against common and locally endemic diseases.
• Use of proper screening methods in early diagnosis of certain diseases, applicable at primary care level.
• Able to detect outbreak in early stage, spot mapping, investigation of outbreak, notification of notifiable diseases.
• Surveillance skills development, calculating various health indicators and their interpretations.

5. Reproductive and Child Health:

• Antenatal-examination of women, application of at risk approach in antenatal care.
• Intrapartum care –conducting a normal delivery, referral indications.
• Postnatal –assessment of new-born and mother, promotion of breast feeding, advice on weaning and family planning.
• Preventive oncology in women and barriers

• Immunization-able to immunize the eligible using desired routes, for providing vaccines.
  • Adverse Event Reporting
• Contraception-able to advice appropriate method.
• Able to insert any Intra Uterine Device (IUD) Condom demonstration.
6. Statistics:

- Able to draw sample using simple sampling techniques.
- Apply appropriate test of significance.
- Calculation of various health indicators and presentation of data

7. Nutrition:

Conduct complete nutritional assessment of individual using clinical, anthropometric and diet survey tools.
Ability to use and interpret road to health card.
Advice appropriate balance diet and suggest any dietary modification.
Nutritional promotion and education to specific groups and related to specific nutritional diseases.
Prescribe a therapeutic diet.

8. Occupational health:

Screening of workers for any occupation related health problem.

9. Managerial Skills:

Able to make community diagnosis and take remedial measure for improving health of community.
Organize antenatal, under five clinics, health education camps.
Ability to manage Health Management Information System, including maintenance of health records at primary care level.
Able to show effective leadership, supervision skill not only at primary care level but also in inter-sectoral coordination.
Ability to manage money, material and manpower at primary care level.
Ability to do cost effective analysis as per primary care needs. Ability to implement cost containment measures in public health
Community Participation and cooperation skills. Community engagement, community ownership for effective health care – models in India – in preventive health, in self-help healthcare initiatives

10. Basic Laboratory investigation at primary care level

Hemoglobin estimation
Urine examination for normal and abnormal constituents.
Thick and thin blood smear for malaria parasite examination
Peripheral smear for type of anemia
Acid fast staining
Estimation of chlorine demand and residual chlorine.
Identification of life cycle stages of various insects of public health importance

11. **Minor surgical procedures at primary care level**

   All type of injection techniques  
   Universal precautions and safe injection practices (use of AD syringes)  
   Common wound dressings  
   Incision and Drainage of abscess under local anesthesia.  
   Suturing of wounds

12. **First Aid, Initiation of emergency care, Triage and referral**

13. **Transportation of injured and seriously ill patients from site of first contact.**

14. **Participatory Rural appraisal**

   Social Mapping  
   Focus group Discussion  
   Key informant Interview. . Local self governance bodies, Village Health, Sanitation, Nutrition committees, recognizing local resources – dais, elders, ASHA workers, teachers, postman [who knows to read things out]

15. **Health Education**

   Health Education to various groups (individual and group Assignments).

16. **Animal bite Management.**

**E. DETAILS OF INTERACTIVE LECTURES**

**TOPICS**

1. **Introduction**

   Objectives of Medical education need for value based medical education history of medicine with reference to community medicine  
   Concept of Health  
   Concept of Diseases  
   Concept of control & prevention  
   Learning – Type & skills-How to learn effectively  
   Intelligence-IQ, EQ  
   Personality-Type interpersonal relationships  
   Attitude, Behaviour, Habits  
   Emotions, Frustrations, role of emotions in health & coping with emotions - 1hr  
   Conflicts-internal, Interpersonal & conflict resolutions, defence mechanisms - 1hr
Stress & coping skills - Integrated (psychiatry). Burn out and self care
Ethics
Gender Health Including Gender Based Violence
Life Skill Education

2. Epidemiology

Epidemiology - Introduction, tools & Measures of Mortality Standardization Direct & Indirect Measures of Morbidity
Descriptive studies
Case control studies Cohort studies Experimental studies
Association & Causation
Application of epidemiology
Screening for diseases
Infectious Diseases Epidemiology _ concepts
Dynamics of Diseases Transmission & Concepts of prevention & control
Investigation of an epidemic (integrated with Microbiology, Health services)
Introduction to Evidence based medicine/evidence pyramid in day today practice
Use of diagnostic tests

3. Communicable Diseases
Smallpox & Chicken pox
Measles, Mumps, Rubella
Diphtheria, pertussis, Meningococcal meningitis
ARI & ARI control Programme
TB - Epidemiology & Control
Poliomyelitis
Viral hepatitis
Typhoid fever, Cholera & ADD
Food poisoning & Food toxicants
Dengue fever, Chikungunya, Malaria
Filaria
Rabies
JE & KFD
Leptospirosis
Plague and Yellow fever
Leprosy
Trachoma & tetanus
STD - Syndromic approach
AIDS
Emerging & Re-emerging infections
Hospital acquired infections & Health Care Waste Management

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Non Communicable Diseases
Coronary Heart Diseases & Rheumatic Heart Diseases
Hypertension & stroke
Cancers
Prevalence of Advanced cancer in the community and their needs
Diabetes mellitus & obesity
Blindness & control Programme
Accidents (Integrated)
Non-abandonment when disease is progressive

4. Demography & Family Planning

Demographic cycle, Trends & National population Policy
Family Planning Methods Including Non scalpel Vasectomy, Emergency Contraception and MTP Act

5. Maternal and Child Health
Maternal health-ante, intra, postnatal care & problem (Integration with O &G)
Growth & Development/Growth Charts, WHO Growth Chart (Integration with Paediatrics)
Behavioural problems & Juvenile Delinquency
Indicators of MCH Care
Geriatric problems (Size, need for special care, National policy of elderly)
Special presentation of ailments, common issues and integrated care – rather that multi-speciality approach to care

Challenges of Poly pharmacy
Adolescent problems

6. Nutrition
PEM & Childhood obesity
Nutritional requirements-RDA-integrated (Biochemistry)
Nutritional Disorders-integrated (Biochemistry)
National Nutritional Programmes.
Nutritional status assessment & Surveillance
Ecology of malnutrition,
Food adulteration - PFA , FSSAI

7. Social science
Concepts in sociology ,
Family and cultural factors in Health & Diseases
Social problems-overview of Social security measures

8. Development and Health

Development and Health Interface
Poverty and health, poverty alleviation programmes
Health of Marginalized
Sustainable and Inclusive Development

9. Genetics

Epidemiology of Genetic Diseases
Screening of genetic diseases
Prevention and control of genetic disease

10. Mental and Behavioral Problems

Importance of mental health care in primary care settings
Comprehensive Mental Health Care at primary care settings.
Common Mental Health disorders.
Substance use disorder-Tobacco, Alcoholism and Drug addition

11. Gender and Health

Gender Issues and Women Empowerment
Gender Based violence, Domestic Violence -causes, Prevention and Control (Integrated Surgery, O&G, Legal and Police Department)

12. Environmental Health

(1) Pollution- Air, Water and soil
(2) Waste Disposal in urban & rural areas
(3) Recent issues & advances in environmental health policies Eg. Basel Convention
   Stockholm Convention
(4) Emerging environmental health issues-eg: e- wastes

13. Occupational health

1. Occupational health problems
2. Prevention of occupational diseases and ergonomics

14. Communication process

Communication process, Types, barriers & Health Communication

- Reactions to loss and grief
- Respect; Being non-judgmental
- Basic Communication Skills

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- Importance of good communication skills
- Barriers – for the Patient and for the doctor
- Active listening
- Basic Clinical communication skills

Examples of good and poor communication as Role Play - affecting diagnosis and management

Health education-Definition & Principles

15. Health Planning, Health System & Health economics

- Health Planning & Planning Cycle
- Health System & Health Care Delivery system
- (Rural, urban, tribal) Health
- Information system Health committees
- Concepts of health care-primary health care
- Health care for all
- National Health Policy, Millennium development goals
- Seminar on India’s National Health Policy – NPCDCS, elderly health, mental health and on Palliative Care

Universal health status in India

Sustainable Development Goals

- Role of Voluntary agencies in Health, New International Health regulations Panchayati Raj
- Management & Managerial Techniques
- Health economics & cost containment issues health care
- Disaster management, Pandemic preparedness
- Bioterrorism

16. National Health Programmes

- Revised National TB Control Programme
- National Anti-Malaria Programme
- National Filaria Control Programme
  (Mass Drug Administration & Morbidity Management)
- National Vector borne disease control programme
- National AIDS Control Programme
- National Mental Health Programme & District Mental Health Programme
- Evolution of Family Planning Programme & Reproductive & Child Health

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17. Legislation and Public Health

1. Census Act 1948
2. Registration of Birth and Death Act 1969
3. The Epidemic Diseases Act, 1897.
4. The Transplantation of Human Organs Act, 1994
5. The Prevention of Food Adulteration Act 1954 (FSSAI)
6. The International Health Regulations
7. The Cigarettes and Other Tobacco Products Act 2003
8. The Narcotic and Psychotropic Substance Act 1958

Recent Amendment – 2014 – Purpose for the amendment, Current procedure for accessing essential narcotic drugs [ENDs]

9. The Medical Termination of Pregnancy Act 1971 (MTP Act)
10. The Dowry Prohibition Act
11. The Immoral Traffic (Prevention) Act 1956
16. The Factories Act 1948
17. The Employees State Insurance Act 1948
18. The Environment (Protection) Act 1986
20. The Consumer Protection Act 1986

PRACTICALS/FIELD VISITS

Practical should offer first-hand experience in the community through visits, mock sessions and hands-on exercises. Visits may be planned based on public health importance, relevance and feasibility. For each visit objectives may be specified and orientation given prior to the visit. Five minutes may be allotted for presenting report of previous day’s activities, learning experiences and suggestions. Integrated and interactive team teaching may be employed wherever possible.

Phase I 30hrs

Visit to community and families
Following up one family with a patient with chronic disease for 1 year with at least 3 home visits and recorded interaction with family members and submit a structured case reflection at the end of 6th semester - under physical, emotional, socio-economic and
spiritual concerns of that patient/family unit. All this is done with assigned mentorship.

**Reflection and practice points**
- Visit to support and auxiliary health facilities
- Identify a community Health Problem
- Introduction to the Hospital system
- Hands-on exercise on first aid

**Phase II**

170 hrs

**Family studies – Community diagnosis**
- Basic clinical skills training-history taking skills
- Innovative community based problem solving exercises
- Biostatistics-hands-on exercises- central tendency/dispersion/sampling/hypothesis/significance tests
- Community interaction, identification and solving community health problems with community participation
- Entomology including field assignments – vector survey/control measures
- Epidemiological exercises – Mortality, Morbidity, Risk/Screening, including study designs and standardization
- Visit to public health institutions
- Visit to social welfare organizations
- Accompanied by Medical Social Worker team member
- Implementation of National Health Programmes through CHC/PHC and sub centre visits
- Visits to institutions of public Health importance
- Pain & palliative care centre
- Supervised home based care visits with the palliative care team
- Vocational Rehabilitation Centre
  - Water works
  - Anganwadi
  - Analyst lab
  - De addiction centre
  - Food inspector’s Office etc.
- BCC (IEC) Strategies-individual & group assignments
  - Review of current health issues & policies
  - Review of museum specimens, poster presentations
  - Participation in health related activities in the community
- Research methodology – Participation in workshop & Project work, computer skills, Nutrition skills – Diet survey, balanced diet, Nutritional requirements, RDA, Nutritional disorders, Community Nutrition programmes
- Balanced diet and therapeutic diet
- Food Hygiene
PFA act
Universal Precautions & Safe Injection Practices
Health Care Waste Management
Participatory techniques in health
Health Planning & Management exercises
Disinfection
Immunization agents & Immunity---Vaccines, Cold Chain
Hazards of immunization including adverse event reporting
Fertility related statistics and Family Planning methods, Growth charts
Art of Interviewing
Doctor-Patient relationship and Hospital sociology
Concept of therapeutic relationship
Rights and duties
Oath Sanitary well, well Chlorination Procedure
Purification of water – large and small scale
Water Quality Standards and surveillance
Sanitary Survey

METHODS OF ASSESSMENT

Modified essay question
Short answer questions
Problem solving exercises
OSCE, OSPE Epidemiological and statistical exercises
One Case reflection of a home bound patient’s concerns and way forward evaluation
Analysis of ethical dilemmas of hospital based disease management – from clinical cases and approach to solving it

Actor patients – interviewing style, communication skills, Breaking bad news, Handling collusion

Records review
Research, Project Reports
Viva Voce

TEACHING LEARNING METHODS

Structured interactive sessions
Role play – for teaching good/ poor communication skills

Small Group discussion
Focus Group Discussion (FGD)
Participatory learning appraisal (PLA)
Institutional visits
Practicals including demonstrations
Problem based exercises
Video Clips
Written case scenario Self-learning tools. Choose movies with healthcare message
Interactive learning
E-modules

**TIME OF EVALUATION**

University examination of Community Medicine should be at the end of 7th Semester. Formative and summative assessment during internship so that we have a basic doctor, competent to provide comprehensive care.

**LEARNING RESOURCE MATERIALS**

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

**SUGGESTED TOPICS FOR LEARNING THROUGH e-MODULES:**
History of Medicine and Public Health
Environmental Health
Nutrition (Except public Health Nutritional Programme)
Epidemiological methods
Screening
Planning Cycle
Health management techniques
Entomology
Biostatistics
Demography
Disaster management
Biomedical waste management
International health
National Health Organizations

**TOPICS FOR INTEGRATED TEACHING WITH DEPARTMENT OF COMMUNITY MEDICINE AS PARTICIPANT**

Nutrition
Iron deficiency anemia
Communicable diseases with National Health Programmes like

- HIV/AIDS
- Tuberculosis
- Malaria
- Polio
- Diarrheal diseases
- Leprosy
- Zoonotic diseases

Lifestyle related diseases with preventive and palliative aspects like
- Diabetes
- Hypertension
- Stroke
- Obesity
- Cancers
- Jaundice

Alcoholism Death and Dying Geriatric Medicine
Adolescent Health
Rational Drug Use Contraception
Industrial health Ethical issues
Applied Epidemiology and statistics in clinical medicine

**TOPICWISE MARKS DISTRIBUTION IN COMMUNITY MEDICINE**

<table>
<thead>
<tr>
<th>Paper I</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Concept of Community Medicine</td>
<td>5</td>
</tr>
<tr>
<td>2 Sociology &amp; Developmental Health Interface</td>
<td>5</td>
</tr>
<tr>
<td>3 Environment including entomology</td>
<td>10</td>
</tr>
<tr>
<td>4 RCH and Health of Elderly</td>
<td>10</td>
</tr>
<tr>
<td>5 Nutrition &amp; Genetics</td>
<td>10</td>
</tr>
<tr>
<td>6 Basic Epidemiology &amp; Screening</td>
<td>15</td>
</tr>
<tr>
<td>7 Demography, Biostatistics &amp; Health Information System</td>
<td>5</td>
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<td><strong>Total</strong></td>
<td><strong>60</strong></td>
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Paper II

1. Communicable diseases including Emerging & re-emerging diseases 15
2. Non-Communicable diseases, Disability, Rehabilitation, Caring for the chronically Ill – establishing continuity of care 10
3. Biomedical Waste management, Occupational Health 5
4. Health care delivery system & Urban health, Disaster Management Health Planning, management & Financing 10
5. Mental & behavioral health problems, Health Education 5
6. National Health Programs & NRHM 10
7. Health legislation & International Health, Essential Medicines & Counterfeit Medicines, Purpose of NDPS Amendment, implications 5

Total 60

Each Paper should have:
a. Structured essay one question: 10 marks
b. Remaining structured short essay question: 50 divided marks
c. Around 50 % problems based competency testing (Cognitive domain) in theory question paper
d. Each paper shall be of 3 Hours duration

Distribution of Marks

1. Theory

<table>
<thead>
<tr>
<th>Theory</th>
<th>Max. Marks</th>
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<tbody>
<tr>
<td>Theory Paper I</td>
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<tr>
<td>Paper II</td>
<td>60</td>
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<tr>
<td>Internal assessment</td>
<td>20</td>
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<tr>
<td>Oral</td>
<td>10</td>
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<td>Total</td>
<td>150</td>
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2. Practical
Practical and oral should be conducted in one day

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Max. Marks</th>
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<tbody>
<tr>
<td>Epidemiological exercise</td>
<td>3</td>
</tr>
<tr>
<td>Statistics</td>
<td>4</td>
</tr>
<tr>
<td>Clinic social case study OSCE</td>
<td>8</td>
</tr>
<tr>
<td>Spotting &amp; OSPE</td>
<td>6</td>
</tr>
<tr>
<td>Diet prescription</td>
<td>3</td>
</tr>
<tr>
<td>Project</td>
<td>4</td>
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<tr>
<td>Internal assessment</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
</tr>
</tbody>
</table>

Grand Total (Theory & Practical) – 200

E. TEXT BOOKS RECOMMENDED:

Prescribed Books

a. Park’s Text book of preventive and Social Medicine, K. Park (23rd edn.) Banaridas Bhanot
e. Text Book of Social & preventive medicine -Mahajan
g. Syamalan’s Statistics in Medicine (2006); National Health Programme by Jugal Kishore
h. National Health Programme by D K Taneja

☆
I. Goal

The broad goal of the teaching of students in Ophthalmology is to provide such knowledge and skills to the student that shall enable him/her to practice as a clinical and as a primary eye care physician: and also to function effectively as a community health leader to assist in the implementation of National Programme for the prevention of blindness and rehabilitation of the visually impaired.

II. Objectives

At the end of the course, the student shall be able to:
1. Identify common diseases of the eye
2. Diagnose and treat common diseases of the external eye-conjunctivitis, stye, extraocular foreign body, corneal abrasion, Vitamin A deficiency
3. Recognise and initiate treatment (prior to referral) for sight threatening diseases like acute glaucoma, keratomalacia, corneal ulcer, ocular trauma, alkali/chemical injuries.

4. Demonstrate knowledge of blindness and its causation. Be an active participant in the implementation of the National Programme for Control and prevention of Blindness

5. Integration: To provide an integrated approach towards other disciples especially ENT, General Surgery, General Medicine etc.

III. Course Contents

The student should have knowledge on the following topics taken during their course.

IV. Topics

Title

Acute conjunctivitis, Trachoma, Allergic conjunctivitis, Pingencula, Pterygium, Xerosis/bitot spots, Dry eye, Angular conjunctivitis, neonatal conjunctivitis, subconj hemorrhager, D/D of conjunctival and limbal nodule

Chronic conjunctivitis, Dry eye, Membraneous conjunctivitis, Inclusion conjunctivitis Corneal Inflammations: Corneal Ulcers-bacterial, fungal, viral, Mooren’s Ulcer Vitamin A Deficiency and keratomalacia, Exposure keratitis, Neuroparlytic keratitis, Corneal blindness, Eye banking, eye donation, Keratoplasty, Arcus senilis, Corneal oedema

Deep / interstitial keratitis, degenerations and dystrophies, Overview of keratorefractive surgery.

Scleritis, episcleritis

Iridocylitis, Panophthalmitis, Endophthalmitis Systemic associations of uveitis, Choroiditis, Coloboma iris, ocular albinism, Vitreous hemorrhage-causes Synchisis syntillans, Asteroid hyalosis

Angle closure glaucoma, Open angle glaucoma, steroid induced glaucoma, lens induced glaucoma including surgery and management

Cataract and management, cong. Conditions, surgery and complications, lens abnormality Secondary glaucomas, Congenital glaucoma Fundus changes in Diabetes, Hypertension, anaemias, Pregnancy induced hypertension, Hematological disorders, Myopia

Photocoagulation

Retinal vascular diseases-

Central retinal artery occlusion, Central retinal vein occlusion, Retinal detachment Retinopathy of prematurity, Retinitis pigmentosa, retinoblastoma Pappilledema, Optic neuritis, Optic atrophy

Awareness of amblyopia, Types of squint Paralytic, non-paralytic)

Common causes of proptosis, Orbital ellulites, Cavernous sinus thrombosis Dacryocystitis-congenital, Acute, chronic, Epiphora ectropion entropion, trichiasis, ptosis, lagophthalmos, symblepharon, blepharitis, Chalazion, Refractive error, Myopia, hypermetropia, Astigmatism, Presbyopia,
aphakia/pseudophakia, Anisometropia, overview of keratorefractive surgery
Chemical injuries, Open globe injuries, closed globe injuries and first aid treatment including sympathetic injuries.
Siderosis bulbi, Chalcosis, medico legal aspects
Definition and types of blindness.
Causes of blindness
Promotion of eye donation
NPCB, Vision 2020, Eye camps
Symptomatic disturbances of vision, Overview of Recent advances in Ophthalmology
Lasers in Ophthalmology
Enucleation – Indication, technique
Eye & systemic diseases including AIDS
Causes of sudden/partial/painless dimension of vision
Ocular malignancy-retinoblastoma and malignant melanoma of choroid
Pharmacology
Chronic side effects of systemic medication, local anaesthetics, viscoelastics, steroid and NSAIDS

V. Skills

At the end of the course, the student shall be able to:
a. Elicit a history pertinent to general health and ocular status.
b. Assist in diagnostic procedures such as visual acuity testing, examination of eye, Schiotz tonometry, staining for corneal pathology, confrontation perimetry, direct ophthalmoscopy examination, squint examination.
c. Interpreting FFA, Optical Coherence Tomography (OCT), Humphrey Perimetry, Corneal Topography, Gonioscopic findings and observing laser and surgical procedures
d. Diagnose and treat common problems affecting the eye.
e. Interpret ophthalmic signs in relation to common systemic disorders
f. Assist/ observe therapeutic procedures such as subconjunctival injection, corneal conjunctival foreign body removal, nasolacrimal duct syringing and tarsorrhaphy
  g. Provide first aid in ophthalmic emergencies.
h. Assist to organize community survey for visual check up.
i. Assist to organize primary eye care service through primary health centres.
j. Use effective means of communication with the public and individual to motivate for surgery in cataract and for eye donation.
k. Establish rapport with his seniors, colleagues and paramedical workers, so as to effectively function as a member of the eye care team.
l. Assist in speciality clinics – namely, Cornea, Retina, Glaucoma, Squint & Low Vision Aid clinic
m.v Communicate with patients regarding common ophthalmological problems, investigations
VI. Knowledge

At the end of the course, the student shall have knowledge of:

a. Common problems affecting the eye.
b. Principles of management of major ophthalmic emergencies.
c. Main systemic diseases affecting the eye.
d. Effects of local and systemic diseases on patient’s vision and the necessary action required to minimize the sequelae of such diseases.
e. Adverse drug reactions with special reference to ophthalmic manifestations.
f. Magnitude of blindness in India and its main causes.
g. National programme for control of blindness and its implementation at various levels.
h. Eye care education for prevention of eye problems.
i. Role of primary health centre in organization of eye camps.
j. Organisation of primary health centre and the functioning of the ophthalmic assistant.
k. Integration of the national programme for control of blindness with the other national health programmes.
l. Eye bank organization.
m. Caring for the eye and preventing damage in an unconscious patient.

VII. Details of Lectures

Basic Anatomy, Physiology of eye, adnexa, lacrimal apparatus and orbit.
Diseases of eyelids, lacrimal apparatus, orbit, Disease of conjunctiva.
Disease of cornea, Disease of sclera, Disease of uveal tract, Disease of lens.
Glaucoma, Vitreous, Injuries of the eye, Intraocular tumours, Retina, Optic nerve.
Refractive errors/Refraction, Squint, Operations of the eye, Basic of neuro-ophthalmology, Systemic disease and eye, Adverse drug reactions, Ophthalmic emergencies, Magnitude of blindness.

National Programme for control of blindness, Eye bank organization/ Eye donation, Organisation of eye camps, Rehabilitation of the blind.

VIII. Clinical teaching during posting

Clinical posting in batches during 5th & 7th Semester.

Theory Lectures, Tutorials, Group discussions, Integrated teaching, Seminars, Approx. 100 Lectures of one hour each.

IX. Details of practicals

Clinical postings
8.00 am to 9.00 am - Clinical lecture
9.00 am - 12 noon - Case demonstration in outpatient department discussions during clinical postings, case records, seminars, discussions, clinical exam
12.1 pm: Clinical lecture

Minimum one day per week is devoted for live operative surgery demonstration and discussion.
Separate clinical record/log books

**PATTERN OF EXAMINATION**

Theory—
one paper 40 marks

(Should contain one question on pre-clinical and para-clinical aspects, of 10 marks)
Oral (viva)-10 marks

Clinical-30 marks
Internal assessment-20 marks (theory-10; practical-10)

Total-100 marks

**Scheme of Practical Examination**

- One long Case : 1 x 15 = 15 marks
- Two Short Case : 2 x 5 = 10 marks
- OSCE (5 stations) : 5 x 1 = 5 marks
- Total : 30 marks
- Internal Assessment : 10 marks

**Grand Total**: 40 marks

**Textbook recommended**

1. Parson’s disease of eye – Sihota & Tandon
2. Ophthalmology for under graduates – Dr. P.S. GirijaDevi

**Reference books**

- Clinical ophthalmology : Kanski J J

**OTORHINOLARYNGOLOGY**

**A. Goal**

The broad goal of teaching undergraduate students Otorhinolaryngology is to ensure that they
acquire adequate knowledge, skills and attitude for optimum treatment (including emergencies), rehabilitation of common otorhinolaryngologic disorders and assessment of the need for referral to specialised care.

B. Objectives

Objectives are categorised as objectives for

1. Knowledge
2. Skills
3. Attitude

1. Knowledge

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

a. describe the basic physiology of common ear, nose and throat diseases including emergencies.

b. adopt rational use of commonly used drugs, keeping in mind their adverse reactions

c. suggest common investigation procedures and interpret their findings

2. Skills

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

a. examine and diagnose common ear, nose and throat problems including the pre-malignant, malignant disorders of head and neck

b. manage ear, nose and throat problems at the first level of care and be able to refer whenever necessary

c. observe and assist in carrying out minor surgical procedures like ear syringing, ear dressing and nasal packing, tube feeding, managing and care of long term tracheostomy

d. assist in certain procedures such as tracheostomy, endoscopies and removal of foreign bodies

e. communicate effectively with other members of medical profession including nursing, para medical, technical staff and other members of health care teams in a collaborative manner

f. communicate effectively and appropriately with patients and their attendants.

g. communicate with patients regarding common ENT problems, investigations and treatment.

h. address common ethical issues in ENT practice

3. Attitude

At the end of the course the student shall understand the need to have the following attitudes

a. attitudes needed to work as a team member

b. attitudes needed to lead a team

c. attitudes needed to win patient confidence

d. attitudes needed for continuing improvement of clinical knowledge and skills. The
undergraduate training in ear, nose and throat will provide an integrated approach
towards disciplines, especially neurosciences, ophthalmology and general surgery.
e. Attitudes for showing compassion to the hearing impaired, tracheostomised patients
including assisting them in speech, patients with malignancies, including terminal
malignancies

C. Detailed syllabus

1. Overview of course
Duration of the course-2 months (distributed in 2 semesters - first half in 6th semester and
second half in 7th semester)

<table>
<thead>
<tr>
<th>THEORY + INNOVATIVE SESSION</th>
<th>- 110 hrs</th>
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<tbody>
<tr>
<td>PRACTICALS</td>
<td>- 180 hrs</td>
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</tbody>
</table>

2. Details of lectures

2.1 Ear
2.1.1 Relevant anatomy of external middle and inner ears, auditory physiology including
pathway of hearing
2.1.2 Assessment of hearing including types of audiometry. Special mention on pure tone
audiometry, impedance audiometry, speech audiometry, otoacoustic emissions, BERA
2.1.3 Deafness - Classification, causes, investigations, disability calculation, early detection of
default in children and rehabilitation. Special mention of otosclerosis - its clinical features
and management, congenital deafness, cochlear implantation, learning and speech
rehabilitation
2.1.4 Diseases of external ear: Wax, furuncle ear, otomycosis, foreign body, keratosis,
exostosis and malignant otitis externa
2.1.5 Diseases of middle ear: Acute otitis media, otitis media with effusion, chronic
suppurative otitis media - mucosal and squamousal types, clinical features, management,
complications of middle ear infections, mastoidectomy, tympanoplasty
2.1.6 Diseases of inner ear: Vertigo - classification, causes, investigations and management.
Special mention of Meniere's disease, benign paroxysmal positional vertigo and acoustic
neuroma
2.1.7 Miscellaneous conditions like otalgia, tinnitus, facial nerve anatomy and its disorders

2.2 Nose and paranasal sinuses
2.2.1 Relevant anatomy of nose and physiology including pathway of smell
2.2.2 Disorders of external nose and vestibule
2.2.3 Disorders of nasal septum, sub-mucous resection and septoplasty. Mention rhinoplasty
2.2.4 Rhinitis - etiology, classification and management. Special mention of allergic rhinitis,
vasomotor rhinitis, atrophic rhinitis and allergic fungal rhino-sinusitis, CSF rhinorrhoea.
2.2.5 Acute sinusitis (in detail) & chronic sinusitis (in detail). Complications of infections of
2.2.6 Facio-maxillary injuries in detail
2.2.7 Nasal polyposis with emphasis on FESS, Caldwell Luc
2.2.8 Epistaxis – causes & management, granulomatous conditions of nose
2.2.9 Tumours of nose and PNS (special mention of inverted papilloma, nasopharyngeal angiofibroma and malignancy of paranasal sinuses and nasopharynx)

2.3 Throat

2.3.1 Relevant anatomy of pharynx, larynx, oesophagus, physiology of deglutition, phonation
2.3.2 Tonsils and adenoids and their infections in detail. Special mention of quinsy, patches in oral cavity and pharynx, tonsillectomy, adenoidectomy
2.3.3 Neck space infections - Ludwig's angina, retropharyngeal and parapharyngeal abscess, clinical features, management and complications
2.3.4 Acute and chronic infections of larynx, laryngeal paralysis, vocal nodule, vocal polyp
2.3.5 Hoarseness - diagnosis and management, direct laryngoscopy. Mention stroboscopy, micro-laryngeal surgery and video-laryngeal surgery
2.3.6 Stridor - diagnosis and management. Tracheostomy in detail including indications, tubes, procedure and complications
2.3.7 Benign and malignant lesions of larynx and laryngo-pharynx
2.3.8 Dysphagia - causes, investigations and management. Special mention of malignancy
2.3.9 Miscellaneous conditions like dry mouth, mouth care, oral candidiasis - prevalence, prevention, management, reflux diseases (GERD, LPR), Plummer Vinson, HIV in ENT.
2.3.10 Foreign bodies of aero-digestive tract - diagnosis, management and complications, endoscopies in ENT and their complications.
2.3.11 Rehabilitation - swallowing, speech (including assisted speech in tracheostomised patients) respecting and working with paramedical therapists

3. Details of practical

Clinical postings

08:00 am - 09:00 am: Clinical lecture
09:00 am - 12:00 pm: Case demonstration in out-patient department, clinical discussions
12:00 pm - 01:00 pm: Clinical lecture, Minimum one day per week is devoted to live operative surgery, demonstration and discussion

Separate clinical record books should be kept and at least ten cases to be included

4. Text books recommended and other learning resources:

Prescribed text books

1. Diseases of ear, nose and throat - P L Dhingra (Elseviers publications)
2. Text book of ear, nose, throat and head and neck diseases - P Hazarika, D R Nayak, R Balakrishna (CBS publishers)
3. A short Practice of Otorhinolaryngology- Prof K K Ramalingam, Dr B Sriramamurthy,
Prof Ravi Ramalingam- All India Publishers and distributors
4. Essentials of Ear, Nose and Throat- Mohan Bansal- Jaypee Publishers
5. ENT simplified: Batchi Hathiram and D S Grewal. (Bhalani publishers)

Reference Books

7. Logan Turner's text book of Otorhinolaryngology
8. Other resource materials
   9.1.1.1 Skill laboratory
   9.1.1.2 CDs and DVDs
   9.1.1.3 Internet

D. Evaluation

Evaluation must be both formative and summative to achieve the objectives mentioned earlier.
There must be internal evaluation as well as external evaluation. Evaluation will be done through examinations.

1. Internal Examinations
   Theory - 2 numbers
   
   **Exam 1**: After completion of the 6th semester postings in ENT
   Duration: 2 hours Topic: Otology Marks: 40

   **Exam 2**: After completion of the 7th semester postings in ENT
   Duration: 2 hours Topic: Whole subject of ENT Marks: 40

   Practical - 3 numbers
   
   **Exams 1 & 2**: one each at the end of the 1 month posting in semester 6 and 7
   Content: Long case and VIVA Marks: 30 & 10

   **Exam 3**: Final practical
   Content: Same as university examination (Long case, OSCE & VIVA) Marks: 20, 10 & 10

2. University examination
   
   **Theory** Total: 40 Marks
   **VIVA** Total: 10 Marks
   **Practical** Total: 30 Marks (Clinical (long case: 20 marks and OSCE: 10 marks)

3. Final marks
   
   **Theory** University: 40 Marks

☆
University VIVA : 10 Marks
Internal assessment : 10 marks
Total : 60 Marks

Practical
University : 30 Marks
Internal assessment : 10 marks
Total : 40 Marks

Grand total : 100 Marks

MEDICINE AND ITS ALLIED SPECIALITIES

MEDICINE
A. GOAL
The broad goal of teaching of undergraduate students Medicine is to have the knowledge, skills and behavioural attributes to function effectively as the first contact physician/ family doctor.

B. OBJECTIVES (1)
Knowledge
At the end of the course, the student shall be able to:

a. Diagnose common clinical disorders with special reference to infectious diseases, nutritional disorders, tropical and environmental diseases;
b. Outline various modes of management including drug therapeutics especially dosage, side effects, toxicity, interaction, indications and contraindications:
c. Propose diagnostic and investigative procedures and ability to interpret;
d. Provide first level management of acute emergencies promptly and efficiently and decide the timing and level of referral of required.;
e. Recognize geriatric disorders and their management
f. Approach to terminal phase, end of life care, bereavement
g. Current Laws relevant to end of life care decisions – withholding, withdrawing artificial life interventions

2. Skills
At the end of the course, the student shall be able to:

a. Develop clinical skills (history taking, clinical examination and other instruments of examination) in various common medical disorders and emergencies.
b. Refer a patient to secondary and/or tertiary level of health care after having instituted primary care.
c. Perform& interpret simple routine investigation like hemogram, stool, urine, sputum and biological examinations
d. Assist the common bed-side investigate procedures like pleural tap, lumbar puncture, bone marrow aspiration/biopsy and liver biopsy.

e. Learn to Communicate with patients regarding common Medical problems, investigations and treatment.

f. Learn to address Common ethical issues in medical ward and OPD.

g. * Student should be aware of the rights of the patient, issues like autonomy, consent etc

- Integrated Care for chronic diseases—Assess, advice, agree, arrange, assist

- Principles of managing symptoms of advanced progressive diseases

- Palliative Care for advanced cardiac failure, renal failure

- Palliative Care for breathlessness, Nausea/Vomiting, Delirium

Palliative care for neurological disorders

3. Integration

a. With community medicine and physical medicine and rehabilitation to have the knowledge and be able to manage important current national health programs, also to be able to view the patient in his/her total physical, social and economic milieu:

b. With other relevant academic input which provide scientific basis of clinical medicine eg: anatomy, physiology, biochemistry, microbiology, pathology and pharmacology.

C. DETAILED SYLLABUS

DETAILS OF THE COURSE

<table>
<thead>
<tr>
<th>Duration of the course</th>
<th>: 5 semesters – III, V, VI, VIII &amp; IX</th>
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<tbody>
<tr>
<td>Total number of theory</td>
<td>: 300</td>
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<tr>
<td>Lectures</td>
<td>: 100</td>
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<tr>
<td>Innovative sessions</td>
<td>: 200</td>
</tr>
<tr>
<td>Practicals</td>
<td>: Clinical posting as per schedule attached</td>
</tr>
<tr>
<td>(Project work, Seminars, Structured)</td>
<td>Integrated teaching, Formative evaluation, Revision</td>
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</table>

LECTURES

1. Molecular and Genetic factors in disease
a. Basics of cell and molecular biology; DNA, RNA, Genes, mitochondria, cell membrane, receptors; protein production and degradation
b. Cell division, cell death
c. Patterns of inheritance and common disorders, investigations, counseling
d. Stem cell therapy, gene therapy, new horizons

**Exercises:** Eg. The cell; a family tree for various common inherited diseases

2. Nutrition and nutritional disorders
   a. Macronutrients, dietary recommendations
   b. Micronutrients-vitamins, minerals, deficiencies & excess
   c. Energy balance- body fat distribution, regulation, needs, responses to over nutrition and under nutrition, assessment of nutritional status
   d. Assessment & Management of Obesity & under nutrition
   e. Nutritional support in hospital, in pregnancy & lactation

**Exercises:** eg western vs Indian (also different parts of India) meals; role of fiber in diet

3. Environmental and Occupational problems
   a. Environmental effects on health, alcohol, smoking, air pollution, radiation hazards, Temperature regulation and extremes of temperature, high altitude, under water, problems of air travel, epidemics- Triage & Resuscitation
   b. Hanging, drowning, electrical injuries; lightning injury
   c. Fluorosis
   d. Food hygiene and poisoning

**Exercises:** eg how to plan an epidemiological study; Minamata disease, others

4. Poisoning
   a. Evaluation of a patient with suspected poisoning,
   b. Sedatives, antidepressants, antipsychotics;
   c. Insecticides, pesticides, rodenticides- organophosphorus, organochlorides, Rat poison, Paraquat
   d. Odollum
   e. Acid & alkali, Ethyl & Methyl alcohol
   f. Bites of venomous animals, including snakes, spiders, scorpion, wasps
   g. Evaluation of a patient with suspected envenomation, general principles of management

**Exercises:** Eg. Common poisons in the region, presentations, management; Composition of common Tablets/ capsules/ household remedies/ chemicals around the house and workplace- with measures to eliminate the poison

5. Immunological factors
   a. Anatomy, physiology of the immune system; B & T lymphocytes, immunoglobulin, immune reaction
b. The inflammatory response- physiology, pathology, presentations, assessment
c. Autoimmune diseases- pathology, susceptibility, assessment
d. Immune deficiency- presentation, syndromes
e. Anaphylaxis, urticaria, angioedema, transplantation immunology

6. Infectious disease
   a. Viral infections-
      i. with exanthem: measles, chicken pox, herpes zoster, herpes simplex 1 & 2, dengue, hand foot and mouth disease
      ii. Without exanthem- influenza, mumps
      iii. With rheumatological involvement- Chikungunya
      iv. With GI, Respiratory, Neurological involvement
   b. Bacterial infections-
      i. Common gram positive infections- overview, then specifics- skin, soft tissue, bone infections, cellulitis,
      ii. Common gram negative infections- overview, then specifics
      iii. Enteric infections. Salmonella including typhoid, paratyphoid, bacillary dysentery- *shigella*, different causes of food poisoning, cholera, *C. Difficile*,
      iv. Respiratory infections- Sinusitis, bronchitis, diphtheria, pneumonias, pneumocystis carinii, chlamydia
   v. Mycobacterial infections- tuberculosis, Hansen’s; atypical Mycobacteria
   vi. HIV infection, AIDS
      1. Clinical presentations, investigations, diagnosis of HIV infections
      2. The importance of pre-test & post-test counseling, breaking bad news
      3. Natural history and Staging of HIV
      4. Antiretroviral therapy, Preventing opportunistic infections
   vii. CNS-
      1. Meningitis -viral, bacterial, tuberculous, fungal, how to differentiate, management principles; Chemoprophylaxis for purulent meningitis
      2. Parenchymal -viral encephalitis, Rabies, Poliomyelitis, H. zoster, SSPE
      3. Cerebral abscess, neurosyphilis
   viii. Diseases caused by bacterial toxins- tetanus, botulism
   ix. Rickettsial fevers- typhus
   x. Protozoa infections. Malaria, Leishmaniosis, Amoebiasis, Giardiasis
   xi. Helminthic infestations Ancylostomiasis, filariasis (Luminal & tissue nematodes)
   xii. Tape worms
   xiii. Fungal infections.
1. Superficial- candidiasis
2. Subcutaneous- mycetoma
3. Systemic- aspergillosis, cryptococcosis, histoplasmosis, coccioidiomyctosis
   
c. General principles of use of antimicrobial agents, abuse of antimicrobials; antimicrobial resistance; antiviral, antifungal agents

   d. Approach to a patient with suspected infection, sepsis, eosinophilia, PUO
   e. Adult immunisation

7. Fluid and Electrolytes
   a. Water & Electrolyte balance, hypovolemia, dehydration- assessment, correction
   b. disorders of Sodium, Potassium balance, acidosis, alkalosis

   Exercises:

8. Renal medicine
   a. Functional anatomy, Structure & function of the Nephron, Clinical assessment of the Kidney & Urinary tract; significance of examining the urine, assessing GFR, proteinuria, investigating for renal vascular disease, infections of the urinary tract
   b. Glomerular vs tubular disease, Nephrotic syndrome, acute kidney injury- causes, complications, management; Chronic kidney disease- causes, complications, including anemia, bone disease, management- conservative, preventing deterioration; renal replacement therapy, renal transplantation- indications, problems, costs
   c. Pregnancy and renal disease, drugs and the kidney

   Exercises:

9. CVS
   a. Functional anatomy & physiology, cardiac Cycle, Ventricular function, Biomarkers, Clinical assessment of the heart and circulation- ECG, chest Xray, basics of angiography
   b. Coronary circulation, coronary artery disease, its complications, angina, myocardial infarction, management
   c. Conducting system of the heart, abnormalities of cardiac rate and rhythm, principles of identification & basic management
   d. Acute Rheumatic fever, rheumatic heart disease, assessment, complications, management options, infective endocarditis
   e. Congenital heart disease, assessment, complications, management options
   f. Myocardial disease. Myocarditis, cardiomyopathy
   g. Acute & Chronic pericarditis
   h. Deep vein thrombosis, pulmonary embolism, management

   Exercises: Cardiac cycle, normal ECG, ECG in Myocardial infarction, atrial fibrillation, complete heart block
10. Respiratory System
   a. Functional anatomy & physiology, Bronchopulmonary segments, Clinical assessment of the lungs, control of breathing, investigations - pulmonary function tests, imaging
   b. Bronchial Asthma, bronchitis, bronchiectasis, Lung abscess, bronchogenic Ca, obstructive sleep apnoea
   c. COPD, cor pulmonale
   d. Pleural diseases
   e. Interstitial Lung disease
   f. Respiratory failure - assessment, management
      **Exercises: Bronchopulmonary segments, PFTs, clinical importance**

11. GIT
   a. Functional anatomy & physiology, Digestion, absorption, gut hormones, Clinical assessment & investigations of the GIT,
   b. Functional anatomy & physiology, Clinical assessment & investigations of the hepatobiliary system; interpreting Liver Function tests
   c. Dysphagia, Gastroesophageal reflux, peptic ulcer disease, gastric Ca, upper GI Bleeding,
   d. Symptoms and signs, investigations of Diseases of the small & large gut - diarrhea, malabsorption, lactose intolerance, infections of the small gut, irritable bowel syndrome, ischemic of the gut
   e. Inflammatory bowel disorders, diverticulosis of the large gut, tumors of the large gut, constipation
   f. Acute & chronic pancreatitis, gallstones, other GB diseases
   g. Acute and chronic Hepatitis
   h. Chronic liver disease
   i. Assessment of a patient with jaundice, ascites, Acute liver failure, hepatic encephalopathy, portal hypertension, portal vein thrombosis, chronic liver disease
   j. Alcoholic, non-alcoholic liver disease, autoimmune liver disease, primary & secondary malignancy of the liver
   k. Drug-induced liver disease
   l. Inherited liver diseases- Wilson’s, haemochromatosis, Gilbert’s
   m. Pregnancy & the liver
   n. Liver transplantation
      **Exercises: Liver function tests- various abnormalities; abnormalities in ascitic fluid**
12. Hematology
   a. Functional anatomy & physiology, Haemopoiesis, Clinical assessment & investigations of the haemopoietic system; Iron, B12, Folate absorption, abnormalities
   b. Interpreting a haemogram
   c. Bleeding & Clotting disorders, Tests of coagulation, Bleeding & clotting disorders, Thrombotic disorders
   d. Anemia - presenting features, assessment, investigations, management
   e. Different types of anemia, Fe deficiency, B12, Folate, Hemolytic, anemia of chronic disease
   f. Haemoglobinopathies - assessment, sickle cell disease, thalassemias
   g. Polycythemia - Primary & Secondary, presenting features, assessment, management
   h. High and low White cell counts - clinical assessment, investigations, management
   i. High and low platelet counts - clinical assessment, investigations, management
   j. Hematological malignancies, lymphoma, Lymphadenopathy, splenomegaly
   k. Paraproteinemias
   l. Blood products, transfusions, adverse effects, safe transfusions, stem cell transplantation

   Exercises: Abnormalities in a Haemogram, blood smear

13. Rheumatology
   a. Presenting problems, Clinical examination, assessment, investigations of rheumatological disease: Osteoarthritis, Rheumatoid arthritis, crystal arthropathy, SLE, systemic sclerosis, seronegative spondyloarthropathies, reactive arthritis, connective tissue diseases, vasculitis
   b. Non-Pharmacological & pharmacological therapy of rheumatological disease - principles, problems, side effects
   c. Osteoporosis, vitamin D deficiency

   Exercises: abnormalities in the joint fluid

14. Endocrinology
   a. Organization of the endocrine system, functional anatomy & physiology, clinical presentations, overview of investigations
   b. Disorders of Pituitary function
   c. Thyroid gland-anatomy, physiology, abnormalities (hyper & Hypo function, thyroiditis)

150
d. Adrenal glands – functional anatomy, physiology, assessment, Cushing’s, Addison’s, Hyperaldosteronism, Phaochromocytoma

e. Calcium metabolism, hyperparathyroidism, hypercalcemia, hypocalcemia, tetany

f. Diabetes mellitus
   i. Clinical presentations, examination; diabetes mellitus Types 1&2, other forms
   ii. Diagnosis of diabetes mellitus, complications
   iii. Managing diabetes: Life style management, Diet and Drugs in the management of diabetes mellitus, oral medications, insulin, incretin based therapy
   iv. Hypoglycemia, diabetes in special situations
   v. Managing the complications of diabetes mellitus

Exercises: Inter-relation of the Pituitary with other endocrine organs; Thyroid function tests; diagnosing diabetes mellitus; identification & management of the complications of Diabetes; differences in management of type 1 and Type 2 diabetes

15. Nervous system

   a. Overview of the nervous system, basic anatomy & blood supply of the Brain, csf production& circulation, abnormalities, the need for localization; the value of history and physical examination, overview of tests available
   b. Headache syndromes, migraine, seizures, anticonvulsant therapy
   c. Clinical features of Meningitis –how to differentiate & manage the various types,
   d. Intracranial space occupying lesions- including subdural haemorrhage, the need to identify and treat early
   e. Delirium, Coma, brain death
   f. Strokes : infarction vs hemorrhage, assessment, broad principles of localization , the need for urgent intervention when possible
   g. Amnesia, dementias, neurodegenerative disorders
   h. Demyelinating disorders, paraneoplastic neurological disorders
   i. Parkinson’s disease, Motor neurons disease, CNS Tuberculosis
   j. Anatomy & Overview of diseases of the spinal cord, transverse myelitis, Syringomyelia, tumors,
   k. Polyneuropathy, Guillain Barré syndrome, Peripheral neuropathy
   l. Myasthenia gravis, other myasthenia syndromes, disorders of muscle

Exercises: The structure of the Neuron; clinical differences between upper motor and lower motor neurone lesions; differentiating hemispheric from brainstem lesions; differentiating spinal cord, peripheral nerve and muscle disease
16. Medical disorders of Pregnancy
   a. Prenatal genetic testing, infections in the antenatal period, prescribing in pregnancy, air travel
   b. Gestational diabetes mellitus
   c. Endocrine disorders - pituitary, thyroid, adrenal,
   d. Liver, kidney, cardiac, respiratory, neurologic disease, venous thromboembolism in pregnancy

17. Critical care
   a. Severe sepsis, shock, Multi-organ failure
   b. Management of acute LVF, acute severe asthma, acute coronary syndrome
   c. Cardiopulmonary resuscitation, BLS, ACLS, when / whether to resuscitate
   d. Disseminated intravascular coagulation
   e. Coma, hepatic encephalopathy
   f. Bioterrorism, disaster management, mass casualty, the concept of triage.

18. Ageing
   a. Biology of ageing, comprehensive assessment, Fraility, problems in old age-falls,
delirium, dizziness, urinary incontinence, cardiac, GI, neurological problems
   b. How much to investigate? How aggressive must one be?
   c. Prescribing in the elderly
   d. Rehabilitation

19. Pain and Palliative care
   a. Assessment and measurement of pain, psychological aspects of chronic pain
   b. Management of pain, breathlessness, cough, nausea, vomiting, dehydration, GI obstruction, weight loss, lassitude, anxiety, depression
   c. How to break bad news, how to prepare a person to face terminal disease, dying

20. Clinical Pharmacy and Therapeutics
   a. General principles of prescribing, rational use of drugs, monitoring drug therapy
   b. Drug interactions, Adverse drug reactions,

TEXT BOOKS RECOMMENDED

1. Principles and practice of Medicine by Davidson
2. Davidsons clinical cases by Mark W Stratchan and S.K.Sharma
3. Text Book of Medicine by Kumar and Clark
4. Text Book of Medicine by Dr.K.V.Krishnadas
5. Clinical Medicine by Dr.K.V.Krishnadas
6. Macleod’s clinical examination
7. Hutchison’s textbook of clinical methods
8. Hari’s Essentials of Clinical Medicine by Dr. P.Baburaj
9. Introduction to clinical methods in medicine – 2nd edition edited by Dr. V.K Lakshmanakumar
REFERENCE TEXT BOOKS

1. Harrison’s Principles of Internal Medicine
2. Text Book of Medicine Cecil & Loeb
3. API textbook of Medicine
4. Oxford Textbook of Medicine
5. Clinical Medicine-Vakil and Golwala
6.

Psychiatry 20Hrs

- Classification and aetiological factors in psychiatric disorder
- Delirium and Dementia
- Schizophrenia
- Bipolar affective disorders
- Depressive disorders
- Anxiety disorders and OCD
- Stress and adjustment disorders
- Psychiatric presentations in general practice
- Personality disorders
- Substance use disorders
- Attempted suicide and suicide risk
- Mental retardation and learning disability
- Autism spectrum disorder and ADHD
- Sexual disorders
- Breaking bad news and crisis intervention
- Treatment of psychiatric disorders
- Basic communication and counseling skills
- Rehabilitation
- Legal aspects of psychiatry

DERMATOLOGY LECTURES -30 HOURS

- Structure and function of skin
- Infections of Skin
- Care of skin, preventing and managing bed sore in a bed ridden patient
- Eczematous diseases
- Bullous skin diseases
- Connective Tissue Diseases
- Pigmentary diseases
- Papulo squamous diseases
- Neoplastic diseases of skin
- Lesions of skin appendages
- Adverse drug reactions
- Veneral diseases
• Leprosy
• Stigma in medicine and its management in diseases like HIV, STD, Leprosy
Communicating with dermatology/STD/Leprosy patients

RADIOLOGY LECTURES (INCLUDING RADIOTHERAPY)-20 HOURS

Production of X-rays
Biological changes Skeletal
Radiology Chest &
Mediastinum
Gastrointestinal system
Hepatobiliary system
Genitourinary system
Neuroimaging modalities
Emergency Radiology

Respiratory Medicine Lectures 20 hrs
Evaluation of cough
Evaluation of dyspnoea
Investigations in pulmonary medicine
Bronchial Asthma
COPD
Pneumonia
Lung abscess
Tuberculosis pathogenesis
Diagnosis & management
Control program
Pleural effusion
Empyema
Neoplasms of lung
Environmental & occupational lung diseases
Sleep disordered breathing
Pulmonary hypertension
Pulmonary embolism
Interstitial lung diseases
Basic procedures
Conservative management of irreversible breathlessness in terminally ill patients.

Home Oxygen therapy – Pros and cons; considerations before prescribing ambulatory oxygen

INNOVATIVE SESSIONS
(Project work, Seminars, Structured discussion, integrated teaching, Formative evaluation, Revision and Morning sessions)

A seminar on Pain – acute, chronic, classification, management, concept of total pain Controlled substances – essential analgesics Pain relief as Human Right

I. Common symptoms of disease/clinical approach to

a) Pain
b) Fever
c) Respiratory symptoms
d) Pallor, Jaundice, Oedema
e) GI symptoms(Chronic constipation as a seminar – practical skills on high up enema)
f) Haematemesis, Melaena, Bleeding PR/ Haematochezia
g) Urinary symptoms
h) Neurological symptoms : headache, dizziness, vertigo, weakness, sensory loss
i) Musculoskeletal symptoms : joint swelling,
j) Weight loss and gain

Applied Basic Sciences topics with relevance to Medicine

Cardiac cycle and ventricular functions
Cardiac biomarkers, (LFT/RFT/PFT) Normal CSF
Blood supply of brain
Lobar function of brain
Functional anatomy of spinal cord Functional anatomy of cranial nerves Bronchopulmonary segments Pulmonary circulative
Lympatic drainage of Lung Structure and functions of Nephrons Digestion and absorption Haemopoesis and Iron metabolism

Thyroid functions and hormones Calcium metabolism

Physiology of pain (&Pathophysiology) Chronic pain as a disease
Survey of pain score in every In-patient of a chosen ward)

III. Project work IV.
Seminars
V. Structured discussion
VI. Formative evaluation
VII. Morning sessions
VIII. Revision

EXAMINATION
At the end of the course the student should have sufficient
a) Knowledge to diagnose clinical disorders with special reference to Infectious Diseases,
nutritional diseases, outline various modes of management including drug therapy.
b) Skills in history taking, clinical examination and diagnosis.  c) 
d) Perform simple routine investigations  
e) Assist the common bed side investigative procedures like pleural tap, lumbar puncture

<table>
<thead>
<tr>
<th>Part – II</th>
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<tbody>
<tr>
<td>a) Medicine</td>
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<tr>
<td>Theory – two papers 60 marks each</td>
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<tr>
<td>Paper I – General Medicine</td>
</tr>
<tr>
<td>Paper II – General Medicine (including psychiatry, dermatology and STD)</td>
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<td>(Shall contain one question on basic sciences and allied Subjects)</td>
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<tr>
<td>Oral (Viva) interpretation of Xray , ECG etc.</td>
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<tr>
<td>Clinical (bedside)</td>
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<tr>
<td>Internal Assessment</td>
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<tr>
<td>(Theory – 30: Practical – 30)</td>
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<tr>
<td>Total</td>
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<td>Paper -I</td>
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**General Medicine – Section – A**

| I. (problem oriented question) | 10 marks x 1 = 10 marks |
| II. (short answers) | 2 marks x 10 = 20 marks |
| Section -B |
| III. structured question | 10 marks x 1 = 10 marks |
| IV. short question | 2 marks x 10 = 20 marks |
| Paper – II |

General Medicine including Psychiatry, Dermatology and Radio diagnosis
Section – A

1. Problem oriented question 10 marks x 1 = 10 marks

II. Short answer question 2 marks x 10 = 20 marks

Section – B

II. Structured question 10 marks x 1 = 10 marks

III. Short answer question 2 marks x 10 = 20 marks

Problem oriented and structured questions must be from General Medicine. There should not be more than one question each from radiology, dermatology and psychiatry.

Ensure questions include Pain, ethical concerns, whole person concerns, symptom management questions are assessed along with management of the disease.

Role of multi-disciplinary teamwork is assessed.

**SCHEME OF Practical Examination**

**Long case** = 40 Marks Time (60 minutes)

(Marks to be allotted for History - 10 marks, Physical examination - 10 marks, Case sheet writing - 10 marks; Discussion - arriving at a diagnosis + simple beside investigations + basics of EBM - 10 marks)

**Assessment of Long case should be based on**

1. Case sheet writing Methodology, Symptoms Signs Diagnosis
2. Elicitation of findings
3. Differential diagnosis
4. Suggested investigation for diagnosis
5. Treatment of the situation

**OSCE** (4 stations - 2.5 marks each, total 10 the objective shall be to assess the candidate on his knowledge, psychomotor skills and communication skills.

Time for each OSCE station 2 minutes

Total = Long Case (40) + OSCE (10) : 50 marks

Short Cases (2x 25= 50 marks) (15 minutes each)
(Questions for the Long Case, OSCE, Short Cases shall be on the basis of 60% 'must know', 30% 'good to know' and 10% 'nice to know')

**Viva voce:** 4 stations, 5 marks each (Total 20 marks)

# Details of the Course

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<table>
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<tr>
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<tbody>
<tr>
<td><strong>Duration of course</strong></td>
<td>10 weeks in 3 VI, VIII &amp; IX semesters</td>
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<tr>
<td><strong>Total number of hours theory</strong></td>
<td>: 100</td>
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<tr>
<td><strong>Lectures</strong></td>
<td>: 34 (including pediatric surgery)</td>
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<tr>
<td><strong>Clinical</strong></td>
<td>8-9 AM Tutorials</td>
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<td></td>
<td>9 AM 1 PM Case discussions &amp;</td>
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<td>Innovative sessions</td>
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Exposure of students to newborns and emergency management is inadequate during ten weeks of undergraduate postings. During evening hours they should be posted in causality, ICU and newborn nursery.

**General guidelines**

Apart from bedside discussion there should be 66 hours of Innovative sessions during clinical sessions in the forenoon session. This comprises of project work, seminars, structured discussion, and integrated teaching.

Simple day to day problems should be given more importance.

Sessions which will improve communication skills and attitude should be given more importance.

Pediatric casualty posting is compulsory during the final year posting. They should be posted in Intensive care unit and new born nurseries during evening hours with due care to prevent infections in nurseries.

There should be enough pediatric surgery case exposure during clinical sessions.

The training in pediatrics should prepare the student to deliver preventive, promotive, curative and rehabilitative services for care of children both in the community and rehabilitative services.
and at hospital as part of a team in an integrated form with other subjects. For integrated teaching the topics should be planned in advance by discussion with different specialties.

**GOALS**

Students should have knowledge and skill to diagnose common problems in newborn and child, identify life threatening situations and to decide when to refer to higher centers.

**OBJECTIVES**

1. **Knowledge**

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

a) Describe the normal growth and development during fetal life, neonatal period, childhood and adolescence and outline deviations thereof.

b) Know age related requirements of calories, nutrients, fluids, in health and disease.

c) Know the common pediatric disorders and emergencies in terms of epidemiology, etiology, pathogenesis, clinical manifestations, diagnosis, rational therapy and rehabilitation.

d) Know preventive strategies for common infectious diseases, malnutrition, genetic and metabolic disorders, poisonings, accidents and child abuse.

e) Know national programs relating to child health including immunization.

f) Basic knowledge about special situations like newborn and adolescents.

2. **Skills**

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

a) Take a detailed pediatric history; conduct an appropriate physical examination of children including neonates. Make clinical diagnosis, do common bedside investigative procedures, interpret common lab results and plan and institute therapy.

b) Take anthropometric measurements, Casualty posting may be utilized to train or procedures like resuscitation of newborn infants at birth, prepare Oral Rehydration Solution performs tuberculosis test, administer vaccines available under current national immunization program, IV canulation, start an intravenous saline and provide naso-gastric feeding. Learning from residents should be encouraged. Evening hours apart they may get familiar with common drugs and equipment from casualty and intensive care units.

c) Observing or video demonstration of diagnostic procedures such as lumbar puncture, liver and kidney biopsy, bone marrow aspirations, pleural tap and ascitis tap is desirable.

d) Distinguish between normal newborn babies and those requiring special care and institute early care to all new born babies. Provide correct guidance and counseling in breast
feeding.

e) Provide ambulatory care to all sick children, identify indications for specialized inpatient care and ensure timely referral of those who require hospitalization.
f) Know how to write a proper prescription & referral letter. How to interpret investigations to be stressed. They may be assigned specific tasks which will improve skills in the management, communication and attitude towards patients.

g) To develop basic communication skills to communicate with pediatric patients and parents.
h) Sensitive to the ethical issues while dealing with children and adolescents.
i) To take consent for procedures

j) Learn to address Common ethical issues in pediatrics ward and OPD.

k) Application of child rights in the background of medical practice

Methods

Seminars
Videos and simulation
Bedside clinics
Hands own procedures
Integrated sessions
Participation in procedures.

DETAILS OF LECTURES

INFECTIONIOUS DISEASES

Poliomyelitis, measles, diphtheria, tetanus, Childhood tuberculosis, typhoid fever, HIV infection, Dengue and chikungunya, viral haemorrhagic fevers and malaria. Pertussis, Mumps, Rubella, Influenza, H1N1, seasonal epidemics.

GIT AND LIVER

Diarrhoeal diseases, hepatitis and hepatic failure, Cirrhosis liver and portal hypertension. helminthic infestations.

CARDIO VASCULAR SYSTEM

Congenital heart diseases, Rheumatic fever and RHD, CCF, Hypertension, Infective endocarditis

RESPIRATORY SYSTEM
Childhood asthma, Acute Bronchiolitis, Pneumonias in children, Suppurative Lung disease, smoking and environmental pollution, Croup syndromes

C.N.S

Cerebral palsy, Mental retardation, Meningitis and Encephalitis, Seizure disorders & Febrile Seizures.

Haemo poetic system

Anemia in children, bleeding disorders

Nephrology

Disorders of kidney acute nephritis, Nephrotic syndrome, Renal failure, Urinary tract infection

Endocrine disorders

Diabetes mellitus, Thyroid disorders, short stature

Connective Tissue disorders

JRA & vasculitis (SLE and HSP, Kawasaki disease)

Malignancies in children

Leukemia, Lymphomas, Neuroblastoma, Solid tumors, CNS tumors

National programs

Others

Rational use of antibiotics

Common poisonings

Pediatric Palliative Care

New Born

Respiratory distress in new born
Neonatal seizures  
Congenital malformations  
Antenatal diagnosis and treatment  
Sepsis in new born.

**Behavioral problems in children**

**Common poisoning and accidents in children**

**Nutrition**  
BFHI, IYCF, Nutritional assessment, SAM, Specific Vitamin deficiency disorders

**Other National programs**

**Genetics**  
Common chromosomal disorders like Down’s syndrome, Turner syndrome.

*Avoid repetitions of topics already covered in morning sessions. Newer teaching methods may be utilized which will improve the student participation and interest*

**TUTORIALS**

*Stress should be given on the clinical approach of common problems*

1. Introduction to pediatrics, History taking and general Examination

2. Examination of all the major systems

3. Growth and development, demonstrate how to do. Common disorders of growth and development may be demonstrated. Charting and Interpretation of growth charts

4. Nutrition, including the assessment. Common disorders of nutrition may be demonstrated  
Avoid detailed theory of nutritional disorders in morning session

5. Immunization –National immunization schedule & Newer vaccines  
(The above topics may be covered during the initial clinical posting)

**New born:**

Resuscitation newborn  
Assessment of gestation
Low birth weight babies
Convulsions in newborn
Jaundice in newborn

(Videos may be used here)

(Approach to common problems)

a) Dyspnea, wheezing and strider

b) Edema
c) Jaundice
d) Pallor
e) Bleeding
f) Loose stools
g) Vomiting
h) Convulsions

i) Coma

i) j) Shock

k) Weakness, limping, Excessive
cry
l) Child with rash

m) Prolonged fever (demonstrate how to take, record temperature, how to interpret temperature chart

ADOLESCENCE
Adequate coverage of common problems for adolescents to be included

Pediatric surgery classes. They should report to the parent department after pediatric surgery clinical sessions
Chronic conditions in Pediatrics

Instruments and procedures,
X-rays

Vaccines, Growth charts, drugs, IV fluids should be shown. Common equipments should be shown during initial postings. In final year they should get chance to use and practice them. Eg nebulizers

★
They should be involved in simple procedures like nasogastric tube insertion, rectal drug administration etc.

Students should be involved in the social activities of department eg ORS day, Immunization week; Breast feeding week. They should be given specific tasks in the conduction of the programs. If possible they may be given specific task to address a community problem eg low vaccine coverage, how to solve?

**Case Record**

Separate clinical record book should be kept and at least 5 pediatric cases one newborn and one pediatric surgery cases to be written. Better to have a uniform format for case record.

**Log Book**

In addition to record book, a separate log book should be maintained by students to record daily activities, supervised by concerned Unit chief or Assistants. Both the case record and Log book should be compulsory.

**Formative assessment.**

End posting examination should be conducted at the end of clinical postings.

Three theory examinations should be conducted.

University model clinical examinations should be conducted apart from the end posting examinations and is compulsory.

**Text Books Recommended**

**Prescribed Books**
1. Essentials of Pediatrics by O.P. Ghai
2. Clinical Examination in Pediatrics by Meharban Singh
3. Hutchison’s Clinical Methods
4. Clinical evaluation of new born, infants and children by Dr. Sushama Bai
5. Care of Newborn by Meharban Singh
6. Nutrition & Child development by Dr. K. E. Elizabeth

**Reference Books**

Nelson Text Book of Pediatrics
IAP Text Book of Pediatrics
Social and Preventive Medicine by Park

**EVALUATION**
Theory examination

- **Total marks**: 100
- **Theory**
  - University: 40
  - Viva: 10
  - Int. Asst: 10
  - **Total**: 60
- **Practicals**
  - University exam: 30
  - Int. Asst: 10
  - **Total**: 40

Theory question papers (see model question paper)

1. Structured essay should be based on a clinical scenario. The question should be structured in such a way there should not be any ambiguity.

2. This section short notes mainly on management (From Major systems and Pediatric surgery)

3. This section short notes (2 marks each, 5 questions) Mainly on growth, development, nutrition, social pediatrics, National programs

4. This section short notes (2 marks, 4 questions) Neonatology, breast feeding, immunization.

Clinical examination

Two cases: 20 minutes each

First case: 12.5 Marks
(System case. Common problems should be given importance)

Assessment to view child along with family, care giver concerns as a whole in discussing management

**Second case - 12.5 Marks**

(Assessment of nutrition, Growth, Development and Immunization.

Children without illness may also be kept for assessment).

**OSCE 5 Marks**

There should be three stations. Clinical scenario analysis or skill assessment stations are desirable. Out of three stations one newborn scenario is compulsory. Better avoid newborn babies as cases.

- **Marks**
  - 2 mark for newborn scenario
  - 1.5 marks each for other 2 stations making total 5

- **Time**
  - 3 minutes for each station.

New born session may be made performance station e.g. demonstration of use of AMBU bag on a manikin or performance of initial stage of resuscitation.

**SURGERY AND ITS ALLIED SPECIALITIES**

(SURGERY including Paediatric Surgery)

**A. GOAL**

The broad goal of teaching the undergraduate medical students in Surgery is to produce graduates capable of delivering efficient first contact surgical care.

**B. OBJECTIVES**

1. **Knowledge**
   
   At the end of the course, the student shall be able to:
   
   a. Describe aetiology, Pathophysiology, principles of diagnosis and management of common surgical problems including emergencies, in adult and children
   
   b. Define indications and methods for fluid and replacement therapy including blood transfusion
   
   c. Define asepsis, disinfection and sterilization and recommended judicious use of
antibiotics
d. Describe common malignancies in the country and their management including prevention
e. Enumerate different types of anaesthetic agents, their indications, mode of administration, contraindications and side effects

2. Skills
At the end of the course, the student should be able to:
a. Diagnose common surgical conditions both acute and chronic, in adult and children;
   b. Plan various laboratory tests for surgical conditions and interpret the results;
c. Identify and manage patients of haemorrhagic, septicaemic and other types of shock;
d. Be able to maintain patients air-way and resuscitate; i. a critically injured patient, ii. patient with cardiorespiratory failure, iii.a drowning case.
e. Monitor patient of head, chest, spinal and abdominal injuries, both in adult and children.f. Provide primary care for a patient of burns
g. Acquire principles of operative surgery, including pre-operative, operative and post-operative care and monitoring
h. Treat open wounds including preventing measures against tetanus and gas gangrene
i. Diagnose neonatal and paediatric surgical emergencies and provide sound primary care before referring patient to secondary / tertiary centres
j. Identify congenital anomalies and refer them for appropriate management
k. To leran to Commuicate with patients regarding common suirgical problems,investigations and treatment.
l. Learn to address Common ethical issues in surgical ward and OPD.

In addition to the skills referred above in items (a) to (j), he shall have observed / assisted the following:
a. Incision and drainage of abscess
b. Debridement and suturing open wound
c. Venesection
d. Excision of simple cyst and tumours e. Biopsy of surface malignancy
f. Catheterisation and nasogastric intubation
g. Circumcision
h. Meатotomy
i. Vasectomy
J. Pertoneal and pleural aspirations
k. Diagnostic proctoscopy
l. Hydrocele operation
m. Endotracheal intubation n. Tracheostomy
o. Chest tube insertion

C. DETAILED SYLLABUS
Duration of the course: semesters -III, V, VI, VIII & IX Total
number of hours: 300
Lectures: 100.
Innovative sessions: 200
Practicals: Clinical posting as shown in the table
(Project work, Seminars, Structured discussion, integrated teaching, Formative evaluation, Revision)

DETAILS OF LECTURES
Principles of Surgery; Genetics, History of Surgery, Surgical ethics
Trauma:
a. Metabolic Response to Trauma,
b. Wound healing and complications,
c. Critically injured patient including Triage
d. ATLS, Poly Trauma, Disaster Management,
e. Different types of wounds and their management.
Shock: Types, pathogenesis and management, Haemorrhage, Haemostasis, Blood transfusion, Burns
Fluid and Electrolyte Balance, Nutritional Support Pre-operative and post-operative care - Emphasis on Intensive care & high dependency Sterilization
Surgical sepsis -Specific infection, Nososomial infection, Antibiotic policy
Immunology and organ transplantation, HIV and Surgeon, Hepatitis B
Principles of imaging techniques
Suture materials and Anastomosis
Skin and Soft tissues
Normal structure -Ulcers, sinus and fistula, Cysts and Benign tumours Pre malignant conditions, Malignanat Tumours, Skin cover Arteries
Applied Anatomy and physiology, Investigation, Trauma, Acute ischaemia, chronic ischaemia, Arterial aneurysms and A. V. fistula, Amputations Veins
Applied Anatomy and physiology, Varicose veins and venous ulcers, DVT and superficial thrombphlebitis
Lymphatics and Lymph nodes
Applied Anatomy and Physiology, Lymphodema-primary, Secondary, Lymph cyst -Cystic Hygroma
Inflammations - Lymphangitis, lymphadentis, Malignant Neoplasms –lymphomas
Head and Neck
Head injuries, Facio maxillary injuries, Salivary glands, Mouth and Face ,-Cleft lip, Cleft
palate, Oral cancers and premalignant conditions, Jaw tumors, ranula, Misc - Branchial cysts and fistula, Carotid body tumours.
Thyroid and Parathyroid Thyroglossal cyst and fistula Breast

Applied Anatomy and physiology, Investigation, Fibrocystic Diseases, Inflammation, Tumours

Chest
Diaphragm, Mediastinum, Chest Injuries; Thoracic outlet compression syndrome Heart and pericardium, Pleura and Lungs

Gastro Intestinal Tract

Oesophagus
Anatomy and physiology, Congenital anomalies, Dysphagia, Achalasia and other motility disorders,
Oesophageal perforation, Gastro oesophageal Reflux Diseases, Tumours Stomach and Duodenum
Anatomy, physiology, embryology, Congenital, Peptic ulcer Disease (APD), Upper GI
Haemorrhage,
Tumours, pyloric stenosis

Liver
Applied Anatomy and Physiology, Trauma, Liver Abscess, Cysts of the Liver, Portal Hypertension,
Tumours, principles and management of obstructive jaundice

Biliary system
Congenital disorders, Gall stone, Cholecystitis, Cholango carcinoma

Spleen
Anatomy and physiology, Trauma - Splenic conservation, Indication for splenectomy

Pancreas
Anatomy, Development and Physiology, Congenital Anomalies, Acute pancreatitis, Chronic pancreatitis including calcific pancreatitis, Tumours, Surgical jaundice

Vermiform Appendix
Anatomy, Appendicitis, Neoplasm

Small and Large Intestine
Anatomy, Physiology, Embryology, Congenital disorders, Inflammatory Bowel disease including typhoid, tuberculosis, tumors, intestinal obstruction
conservative management of malignant bowel obstruction without RT aspiration and IV fluids – where surgery is not feasible. Chronic constipation

Rectum and anal canal
Ano-rectal anomalies, Prolapse, Haemorrhoids, Ano-rectal sepsis, fissure, fistula, Tumour

Miscellaneous
Abdominal trauma, Minimally invasive Surgery, Peritoneum and retroperitoneum, Hernia and abdominal wall, Mesentery, surgical audit and day care surgery

Genito urinary System
Congenital conditions, Trauma, Infection, Stones, Hydronephrosis, Tumours of kidney; Tumours

DETAILS OF PRACTICALS – Clinical Postings -Ward work

Clinical Postings
8.00 -9.00 am &12-1 PM
Theory in clinical subjects
9.00-12 noon
Case demonstration in wards/ out patient department/ Theatre

Separate clinical record book should be kept and at least twenty cases to be included. During the
24 weeks of posting in the surgical wards including OP, casualty and operating theatre during the
three and a half years of posting, the students should receive instructions in principles and
practice of surgery, study surgical diseases system wise and region wise including surgical
anatomy, surgical pathology applied physiology, applied biochemistry, applied pharmacology and
microbiology, investigations and management of surgical diseases and operative surgery. They
should do physical examination and necessary investigation; maintain a record of their work, the
treatment given to the patient and follow up, a minimum of 20 cases should be studied by a
student during their posting each year. This should be included as part of the documents to be
presented before the examination and should be valued. During their posting in eighth semester,
they should attend to casualty work and observe minor operative procedures and emergency
surgical procedures, management of the acute abdomen, resuscitation of the critically ill and
resuscitative procedures including endotracheal intubation. Clinical teaching should include bed
side clinics, demonstrations ctc. of common surgical conditions found in the hospital. At the end
of each posting there should be an examination conducted by the unit and these marks should
be taken into account for the average examination and final assessment.

Each candidate must have at least three clinical examinations by the time he appears for the
final examination.

The student should have seen the common surgical procedures and be able to identify all the
commonly used instruments.

How to do an Enema, High up enema in chronic constipation, care of colostomy, rehabilitation
for a patient in colostomy – a class by the colostomy care trained nurse
Student should be aware of the rights of the patient , issues like autonomy, consent etc leran
to Commuicate with patients regarding common suirgical problems,investigations and
treatment.

Learn to address Common ethical issues in surgical ward and OPD.

Operative Surgery
Tracheostomy, gastrostomy, colostomy, suprapubiccystostomy, nephrostomy,
AK amputation, BK amputation, Trendelenburg operation, Lumbar sympathectomy,
Laparotomy, GJ and Vagotomy, Mastectomy, thyroidectomy, Eversion
TV sac, herniorrhaphy, haemorrhoidectom, Gastrojejinostemy.

Surgical instruments, suture materials and disposables

☆
TEXT BOOKS RECOMMENDED

Prescribed Books

1. Short practice of Surgery by Bailey and Love
2. Clinical Methods in Surgery by Das
3. Operative Surgery by Das

Reference Books

1. Physical signs in Clinical Surgery by Hamilton Bailey
2. Pye's Surgical Handicraft
3. Sabiston's Text Book of Surgery
4. Text book of Surgery, Cusheri
5. Synopsis of surgical Anatomy by Le Mc Gregre

SURGICAL SPECIALITIES

Lecture demonstration in surgical specialities should include Orthopaedics, Radiotherapy, Aneasthesiology, Thoracic Surgery, Plastic Surgery, Neurosurgery, Urology and Casualty.

1. Physical medicine and rehabilitation by Randall

ORTHOPAEDICS

A. GOAL

The broad goal of teaching the undergraduate medical students in the field of Orthopaedics is to make the students understand the basics of fractures and dislocations commonly encountered and the essential treatment needed for emergency management. The common congenital, inflammatory, metabolic, developmental, degenerative and neoplastic diseases occurring in the bones and joints should also be familiarised.

B. OBJECTIVES

1. Knowledge

a. Explain the principles of diagnosis, first aid, management and complications of recognised bone and joint injuries.
b. Apply suitable methods to detect and manage common infections of bones and joint
c. Identify congenital skeletal anomalies and their referral for appropriate correction and rehabilitation
d. Recognize metabolic bone diseases as seen in this country

e. Explain aetiopathogenesis, manifestations, diagnosis and principles of management of neoplasms affecting bones

2. Skills

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

a. Detect sprains and deliver first aid measures for common fractures and sprains and manage uncomplicated fractures of clavicle, Colle’s fracture, phalanges etc

b. Master techniques of splinting, plastering, immobilization etc

c. Manage common bone infections, learn indications for amputations and corrective measures for bone deformities

d. Advise aspects of rehabilitation for amputation, polio and Cerebral palsy

3. Application:

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

4. Integration

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

5. Student should be aware of the rights of the patient, issues like autonomy, consent etc

6. To learn to Commuicate with patients regarding common Orthopaedic problems, investigations and treatment

7. Learn to address Common ethical issues in orthopedic ward and OPD

C. DETAILED SYLLABUS DETAILS OF THE COURSE

<table>
<thead>
<tr>
<th>Duration of the course</th>
<th>:</th>
<th>3semesters –IV, VI, &amp; IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of hours of theory</td>
<td>:</td>
<td>100</td>
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<tr>
<td>Lectures</td>
<td>:</td>
<td>35</td>
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<tr>
<td>Innovative sessions</td>
<td>:</td>
<td>Part of clinical work</td>
</tr>
<tr>
<td>Practicals</td>
<td>:</td>
<td>Clinical postings as per schedule</td>
</tr>
</tbody>
</table>

(Project work, Seminars, Structured discussion, Formative evaluation, Revision)

☆
DETAILS OF LECTURES

Traumatology
Definition of a fracture, types of fractures and general Principles of management of fractures
Complications of fractures
Open fractures and pathological fracture
Fracture clavicle
Fracture neck of humerus and shoulder dislocations
Fracture humerus (shaft) and Supracondylar fracture
Intercondylar fracture and Olecranon fracture
Elbow dislocation and forearm fracture
Monteggia fracture and Galeazzi’s fracture
Colle’s fracture and fracture scaphoid
Fracture spine and traumatic Paraplegia
Fracture pelvis and Hip fractures
Fracture of femur Hip dislocation and fracture shaft of femur
Meniscus tear and fracture patella
Leg fractures
Ankle injuries, (types, classification, management, complication, named fractures) Hand injuries
Extensor mechanism injuries of knee
Fracture of tarsal bones

Cold Orthopaedics
C.T.E.V and flat foot
D.D.H
Torticollis,
Congenital Pseudoarthrosis of Tibia and Arthrgryphosis multiplex congenita, Osteomyelitis, Septic arthritis
Tuberculosis –Spine, Hip, Knee, Elbow, Wrist and other sites
Perthe’s disease and slipped upper femoral epiphysis Rickets and Osteomalacia
Rheumatoid arthritis and Ankylosing spondylitis
Intervertebral disc prolapse.
Scoliosis and Spondylolisthesis

Bone Tumours
Osteochondroma, Simple bone cyst, Aneurysmal bone cyst, Enchondroma, Giant cell tumour, Osteosarcoma, chondrosarcoma, Ewing’s sarcoma,
Multiple myeloma, Metastatic bone diseases,
Osteogenesis Imperfecta, Nerve injuries –Radial nerve, ulnar nerve, sciatic nerve,
Amputations, Osteoarthrosis Hip, Knee, Cerebral palsy.

**Seminars/symposia**

Symposia with clinical cases – Trauma
Fat embolism, compartment syndrome VIC
Physical Medicine and Rehabilitation,
Ankylosis,
Back pain, Commonest complaint for which patient seeks medical help

Deserves a detailed seminar – etiology, approach, management – nonpharmacological, pharmacological, restraint to order further investigations e.g. MRI scan.

Unindicated / or Investigating just for curiosity, records etc. as an important contributor to healthcare related poverty

Bone tumours (benign), Bone tumours (malignant)

**DETAILS OF PRACTICALS** – Clinical Posting

Nerve injuries, Deformities, Malunions, Nonunions, CTEV, Bone tumours, Traction, Splints and POP

Neuropathic pain, central and peripheral pains, phantom limb pain

Care and Management

**TEXT BOOKS OF RECOMMENDED**

Prescribed Books
1. Graham Apley – System of Orthopaedics
2. Fracture and Joint injuries – Watson Jones
4. Natarajan’s Text Book of Orthopaedics and Traumatology
5. Outline of orthopaedics – Adam’s
6. Clinical Surgery – Das – Chapter on Orthopaedics
7. Crawford Adam’s – Operative techniques (Orthopaedics)

Reference Books

1. Campbell’s operative orthopaedics
2. Rockwood and Green’s Fractures in adult and children
3. Turek’s Orthopaedics – Principles and applications
5. Mercer’s Orthopaedic Surgery

**PHYSICAL MEDICINE AND REHABILITATION**

One week’s posting of MBBS students to Physical Medicine and Rehabilitation had been suggested during Orthopaedics / Radiology posting
1. Introduction to Physical medicine and Rehabilitation disability process and progression of disabilities concept of Impairment / Disability and handicap.
2. Principles of Physical therapy –various modalities and therapeutic exercises
3. Principles of occupational therapy its application in the rehabilitation of various disabilities
4. Principles of prosthesis, orthosis and rehabilitation aids
5. Pain management principle
6. To get oriented to basic principles of community based rehabilitation of people with disabilities
7. Learning to respect and work with paramedical professionals
8. Principles of electrodiagnosis,
9. PRINCIPLES OF REHABILITATION IN COMMON CONDITIONS LIKE PARAPLEGIA,STROKE, ARTHRITIS, PRESSURE SORE MANAGEMENT.

Text books Recommended

Text book of Rehabilitation Medicine by Howard
1. Physical medicine and rehabilitation by Randall L BRADDOM

RADIOTherapy

A. GOAL
The broad goal of teaching 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

B. OBJECTIVES
1. Knowledge
The student shall be able to:

a. Identity symptoms and signs of various cancers and their steps of investigations and management
b. Explain the effect of radiation therapy on human beings and the basic principles involved in it
c. Know about radio-active isotopes and their physical properties  
d. Be aware of the advances made in radiotherapy in cancer management and knowledge of various radio therapeutic equipment while treating a patient

2. Skills

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

a. Take a detailed clinical history of the case suspected of having a malignant disease
b. Assist various specialists in administration of anticancer drugs and in application and use (If various radiotherapeutic equipment, while creating a patient)

C. DETAILED SYLLABUS

Duration of the course: 2 semesters -1V  
Total number of hours: 20  
Lectures: 7  
Innovative sessions: 13  
Practicals: As per schedule  
(Project work, Seminars, Structured discussion, integrated teaching, Formative evaluation, Revision)

DETAILS OF LECTURES - 7 hrs
Cancer epidemiology and possible etiological factors, screening for cancer
Principles of cancer chemotherapy and chemotherapeutic agents used in the management of cancer
Hormone treatment in cancer
Principles of Radiation oncology, Radioactive Sources –Teletherapy, Brachytherapy and Nuclear Medicine
Methods of Radiotherapy and Recent Advances
Common malignancies, Diagnosis and Treatment
Impact of radiotherapy
Understanding Symptoms and their efficient management during and after radiotherapy as prerequisite to improved compliance to complete the course

TEXT BOOKS RECOMMENDED
Prescribed Books
1. Text book of Radiotherapy by Walter and Miller
2. Flecher’s Text book of Radiotherapy
Reference Books Cancer –Text book of Oncology by Devitta
ANAESTHESIOLOGY

SYLLABUS

DETAILS OF THE COURSE

Duration of the course: semester III–VIII
Total number of hours, theory: 20

Lectures: 7
Practicals: As per schedule attached
Innovative sessions: 13 Part of clinical posting
(Project work, Seminars, Structured discussion, Formative evaluation, Revision)

DETAILS OF LECTURES 20 hrs

Introduction – Scope of Anaesthesiology
Pre-anaesthetic check-up premedication
General anaesthesia –Basal Anaesthesia triads of anaesthesia Inhalational agents Intravenous Anaesthetic agents
Regional analgesia –Subarachnoid and Epidural analgesia, other techniques of regional analgesia and agents used
Equipments in anaesthesia and Methods of oxygen therapy
Intravenous fluid therapy, Intra operative monitoring
Complication in anaesthesia and post-operative period
Cardio-pulmonary & cerebral resuscitation, basic cardiac life support (BCLS), Advanced cardiac life support (ACLS)
Methods of Pain Relief
Critical care
Acute & Chronic pain therapy
Trauma care
Palliative care

DETAILS OF PRACTICALS

Practical Demonstrations: inside the theatre

1. Premedication,
2. Anaesthetic equipments,
3. IV cannulation,
4. Nonivasie & Invasive monitoring,
5. Different anaesthetic techniques,
6. Laryngoscopy, intubation,
7. Spinal and Epidural anaesthesia,
8. Regional anaesthesia,
9. Management of patient in the recovery room,
10. Resuscitation techniques,

BLS, ACLS along with when to reconsider CPR in a patient with multisystem failure

Pronging life Vs. Prolonging Death

End of Life Care Law in the country

11. Equipments – Monitoring equipments, Ventilators,
    Knowing how to use an Oxygen cylinder – calculating duration of oxygen therapy based on size of the cylinder and the flow per minute Hazards of oxygen cylinder

12. Anaesthesia Machines & Workstations
13. Care of patients on ventilator,
14. Intra venous fluid therapy,
    A seminar on Pain – acute, chronic, classification, management, concept of total pain
    Controlled substances – essential analgesics Pain relief as Human Right

    Pharmacological, non-pharmacological management
    Brief introduction to choosing invasive interventions

15. Acute & Chronic Pain management
16. Trauma care
17. Palliative care
18. Critical care

**TEXT BOOK RECOMMENDED**

Synopsis of Anaesthesia by Alfred Lee
Basics of Anaesthesia: Stoelting & Miller
Morgan’s Textbook of Anaesthesia
Indian Primer on Palliative Care

**EVALUATION – SURGERY AND SPECIALITIES**

**General Surgery**
Two papers of three hours duration with 60 marks each
Surgery paper I
Topics included
GIT, Orthopedics

**Section A(General Surgery)**

* Structured questions : 1+1+1+2= 5 marks
* Structured question (clinical situation)  \( 1 \times 3 = 3 \) marks

* Short essays \( 2 \times 6 = 12 \) marks

* Short notes \( 5 \times 2 = 10 \) marks

Total \( 30 \) marks

**Section B (Orthopaedics)**

| 1. Essay - Structured clinical question | \( 1 \times 6 = 6 \) marks |
| 2. Short essays | \( 4 \times 3 = 12 \) marks |
| 3. Short notes | \( 6 \times 2 = 12 \) marks |
| 4. Total | \( 30 \) marks |

Grand total \( 60 \) marks

**Paper II – Whole of general surgery (except GIT), Anaesthesia, Radiotherapy, Dental**

**Surgery paper II**
Topics included

General Surgery (except GIT), Anaesthesia, **Radiotherapy**, Dental

* Structured questions \( : 3 \times 5 = 15 \) marks

* Essay \( : 1 \times 5 = 5 \) marks

* Short Essays \( : 2 \times 4 = 8 \) marks

* Short Notes \( : 4 \times 3 = 12 \) marks

* Answer briefly \( : 10 \times 2 = 20 \) marks

*Total \( 60 \) marks

Total marks - 120 marks

Internal assessment - 30 Marks Viva

Voce - 20 marks

🌟
Total for theory - 170 marks

Practical - 100 Marks

Internal assessment - 30 marks Total

for Practical - 130 Marks Total for the

subject - 300 marks

**University examination**

**Theory**
Two papers of three hours duration with 60 marks each
Surgery paper I
Topics included - GIT, -30 marks
Orthopaedics -30 marks

**Surgery paper II**
Topics included - Whole of general surgery (except GIT), anaesthesia, Radiotherapy, Dental- 60 marks

Total - 120 marks

Scheme of Practical Examination

General Surgery: Maximum Marks: 100 Long case (Surgery) 1 x 50 = 50 marks (45 minutes)
Short case
* Surgery 1 x 20 + 5 (OSCE) = 25 marks
* Ortho 1 x 20 + 5 (OSEC) = 25 marks (10 minutes each)

**Viva 20 marks (5x4 stations)**

History taking - 10 marks
Clinical examination & Interpretation - 10 marks
Presentation - 5 marks
Demonstration - 5 marks
Discussion - 20 marks
(Above aspects should be strictly evaluated. Total average time for assessment of a candidate should be 10 minutes)

OSCE –is a clinical demonstration in a patient.

Points to be noted

- Introduction
- Consent
- Position of patient
- Interpretation

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**Oral Examination - 4 examiners**

Topics to be divided and all examiners to examine each student X-rays/Histopathology slides, Instruments, Specirriens and operative surgery Data analysis & Management.

**OBSTETRICS & GYNAECOLOGY**

**Goal**

The broad goal of teaching of the undergraduate student in Obstetrics & Gynaecology is to empower the student with the necessary knowledge in anatomy, physiology and pathophysiology of the reproductive system and to acquire the necessary skill to manage normal pregnancy and delivery and related problems and to diagnose and treat the common gynaecological diseases.

**Objectives:**

The following knowledge and theoretical skills have to be acquired by the student at the end of the course.

1. Outline the anatomy, physiology and pathophysiology of reproductive system and the common conditions affecting it, including the preventive aspects.
2. To diagnose and manage normal pregnancy including pre-pregnancycare, labour, puerperium and the problems related to these conditions.
3. To list the common causes leading to maternal and perinatal morbidity and mortality and to be aware of the remedial measures for the same.
4. Identify the use and side effects of drugs during pregnancy and to be aware of indiscriminate use of antibiotics and other drugs during obstetric & gynaecological practice.
5. To be aware of the common indications, technique and complications of usually performed operations like caesarean section, hysterectomy etc.
6. Learn the principles of contraception, and the various methods and complications of contraception, methods of medical termination of pregnancy, etc.
7. To be familiar with the various National Programmes in relation to maternal and child health. Apart from the above theoretical knowledge, the following practical skills have to be acquired at the end of the course of studies:
8. To learn to Communicate with patients regarding common gynecological problems, investigations and treatment.
9. Learn to address Common ethical issues in surgical ward and OPD.
10. To be aware of legal and ethical issues specially important for the women.
11. To be sensitive to the rights and special requirements of women in the health care scenario.
12. Learn the basics of evidence based gynecology.
Apart from the above theoretical knowledge, the following practical skills have to be acquired at the end of the course of studies:

- Examine a pregnant woman and diagnose abnormalities like preeclampsia, anaemia, GDM, abnormal presentations and to make appropriate referrals if necessary.
- Conduct a normal labour and to provide postnatal care.
- Resuscitation of newborn babies.
- Perform a pelvic examination and to diagnose common gynaecological diseases.
- Examine a vaginal smear for trichomonas and fungus, and to take a pap smear.
- To offer appropriate contraceptive advice to a couple, and to assist in insertion of IUCD.
- Interpret common investigation results (biochemical, histopathological, ultrasound etc)

**Integration:**
At the end of the training period the student must be able to provide preventive, promotive, curative and appropriate rehabilitative care of women and new born with a life cycle approach integrate activities with other departments like community medicine and paediatrics, in programmes like newborn care, immunization, nutrition, and other maternal & child health and adolescent activities

**General Guidelines for training:**
1. Training in the department of Obstetrics & Gynaecology with facilities prescribed by MCI, for a period of 24 weeks with due exposure to antenatal, intranatal and postnatal care and family planning and general gynaecological care
2. The student should maintain a log book for clinical postings from 3rd semester till 9th semester and frequently verified by the faculty members.
3. Of this period of clinical instruction, not less than 4 weeks be spend as resident pupil in the department.
4. During this period, the student shall conduct at least 10 normal deliveries under supervision, and assist in 10 cases including abnormal deliveries and obstetric emergencies. These cases include postnatal follow up also.
5. The student shall maintain a record of the work done in the department, get it certified from the department and submit for the Final University examination

**Syllabus – Details:**

<table>
<thead>
<tr>
<th>Summary:</th>
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<tbody>
<tr>
<td><strong>Duration of course</strong></td>
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<tr>
<td><strong>Total number of hours:</strong></td>
</tr>
<tr>
<td><strong>Theory</strong></td>
</tr>
<tr>
<td><strong>Lectures</strong></td>
</tr>
<tr>
<td><strong>Innovative sessions</strong></td>
</tr>
<tr>
<td><strong>Clinical Work</strong></td>
</tr>
</tbody>
</table>

**Innovative sessions** :: must include problem based learning, seminars, structured discussions, drills eg: PPH drill, shoulder dystocia drill, eclampsia drill, emergency resuscitation in
acute collapse, Newborn resuscitation, Preventive Health – Education for early detection of breast lumps, Ca cervix

**Video sessions** – eg; presentations of mechanism of labor, conduct of labor, common surgeries, common procedures etc

**SESSIONS** which will improve communication skills and attitude should be given more importance.

Details of lectures:

**Pregnancy:**
Diagnosis, clinical features, differential diagnosis, relevant tests and the principles underlying the tests
Antenatal care: Objectives of antenatal care routine antenatal check up, pre pregnancy care and counseling
Assessment of period of gestation, Obstetric examination, General examination, other system examination
Clinical monitoring of maternal and fetal well being, detect abnormality
Common Problems in Pregnancy:
Oedema, Pruritis, heart burn, piles, varicose veins, clothing and footwear, Exercise, sex, hygiene
Nutrition, Rest, drug in pregnancy
Drugs: Immunization, Drug prescription relevant blood examination, urine examination and interpretation of the results & physiological changes in pregnancy Ultrasound examination

Foetal surveillance
Normal Labour
Physiology of onset of labor, fetal skull & pelvis
Mechanism of labour
Labour monitoring Partogram, CTG Labour analgesia
Induction of labor (various methods of induction – merits and demerits)
Acceleration of labor and drugs used in labor
Delivery:
Stages of labour, management of first of labour
Management of second stage of labour (vaginal delivery) use of restricted episiotomy
Management of third stage of labor:
Active management of third stage of labor
Prevention of PPH, Management of PPH
Other complications of third stage of labor and management immediate postpartum care, care during fourth stage of labor
Abnormal labor:
Partogram, labor abnormalities, prolonged labor, dystocia
Hypertonic contractions, hypotonic contractions and Incoordinate uterine action
CPD, obstructed labour and Rupture uterus
Caesarean section (indications, complications)
Vaginal delivery after caesarean
Abnormal presentations and management: Occipito posterior position, Breech presentation, transverse lie, brow/face presentation
 Abortions: Types, etiopathology, investigations and management
Recurrent pregnancy loss: causes, investigations and management
Ectopic pregnancy: etiopathology, early diagnosis, late diagnosis, clinical features, differential diagnosis and principles of management (conservative, medical and surgical)
Trophoblastic diseases: aetiology, classification, clinical features, Diagnosis, management, long term follow up and complications
Hyperemesis gravidarum: definition, aetiology, clinical features advice and drug therapy
Abnormal puerperium: Cause clinical presentation investigations and management
Abnormal pregnancy, Medical Complicationss like hypertension, anaemia, Diabetes, Heart disease, Liver disease, Antepartum haemorrhage, abnormalities of placenta and cord, HIV in pregnancy
Multiple pregnancies
Intra uterine death
PROM (premature rupture of membranes)
Preterm labor
Post datism
IUGR
Elderly primi, Grand multipara, Rh negative, Gynaecological disorders complicating pregnancy
Fetus and new born:
Fetal distress: definition, diagnosis and management neonatal resuscitation
Care of new born, examination of new born and identifying congenital abnormalities
Jaundice in new born
Breast feeding
Contraception:
Various methods and devices, selection of patients, counselling of the Couples, follow up, side effects, complications, and failure rates, guidelines on male and female sterilisation
Medical termination of pregnancy:
MTP Act, Legal and ethical aspects, POSCO act, methods, complications and management
Operative obstetrics
Indication and steps of the procedure of episiotomy, perineal tears
Vacuum extraction, forceps delivery
Dilatation and Evacuation
Caesarean section,
Assisted breech delivery, breech extraction External cephalic version, internal podalic version Cervical encirclage extra amniotic instillation & Manual
removal of placenta
Ultrasound MRI in obstetrics: diagnostic and interventional
Fetomaternal medicine: Screening for congenital abnormalities,
Blood tests (maternal and fetal) Amniotic fluid analysis,
Foetal tissue biopsy
Medical disorders in pregnancy:
Hypertensive disorders of pregnancy
Heart diseases complicating pregnancy
Anemia in pregnancy
Diabetes in pregnancy
UTI, Hepatitis, TB, respiratory diseases, Chest disease complicating pregnancy
sexually transmitted diseases, Veneral disease, infections, HIV complicating pregnancy
Thyroid disorders, Immunological disorders, like SLE, APLA, and Thrombophilia complicating pregnancy
Jaundice in pregnancy Haemorrhage and coagulation disorders in Obstetrics & Immunology in Pregnancy
Dummy pelvis, Mannequins Resuscitation of new born

GYNAECOLOGY:

Abnormal menstruation:
Normal menstrual cycle – physiology of ovulation and menstruation
Abnormal menstruation Definition, classification, clinical features and principles of investigations, diagnosis and management
Amenorrhea: Definition, classification, causes, investigations and management.
Abnormal uterine bleeding and Postmenopausal bleeding:
Definition, causes, investigations, and management
Hormonal therapy: when to give, when not to give, type of hormones with dosage, duration of hormonal therapy, complications and contraindications for hormonal therapy Infertility: Types, definition, causes, counselling, examination of couple and essential investigations, ART: Various methods of assisted reproductive techniques, Setting up of ART lab including legal and ethical issues

Genital injuries including fistulae: Causes, diagnosis, Clinical features, and principles of management and prevention.
Genital infections: STDs, PID, HIV infection and AIDS, genital TB- etiopathology, diagnosis and principles of management
Vaginal hygiene, common infections,
Neoplasms of Genital tract – Benign and Malignant. Aetiopathology, Clinical features, diagnosis, principles of management, and cancer screening and preventive aspects
Abnormal vaginal discharge: Causes clinical examination, diagnosis, Investigation and
management. Counselling regarding prevention of STD’s
Correction of enterocele, diagnosis and operation for vault prolapse

Endometriosis: aetiology, classification, clinical features, diagnosis and management of pelvic floor dysfunction
Contraception
Operative Gynaecology:
Indications, complications of D&C, fractional curettage, Pippelle sampling, cervical biopsy
Medical termination of pregnancy Evacuation of incomplete
Abortion Tubal Ligation, IUCD insertion
Abdominal hysterectomy
Vaginal hysterectomy, Sling procedures
Ovarian tumours
Radical procedure for malignancy
Common symptoms of advanced gynec malignancy, diagnosis and management
UTI in women of different age groups, prevention and management
Endoscopy in gynaecological practice
Laparoscopy: principles, indications, instrumentation, procedure, complication, scope of laparoscopy: in gynaecological practices
Hysteroscopy: Principles, indications, instrumentation, procedure, Steps in present gynaecological practices and complications Colposcopy: Principles, instrument, procedure
Endocrinology
Post operative management:
Routine management of postoperative patient like IV fluids, drugs, antibiotics, ambulation, nutrition
Management of fever, skin wound complications, Complications like burst abdomen, intra peritoneal bleeding, and intra peritoneal collections Instruments, Specimens etc.

Acute abdomen
Adolescent Gynaecology
Urological problems
- Pelvic Floor exercises

DETAILS OF PRACTICALS-Clinical postings-Ward/OP/OT/Labour room

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>8.00 – 9.00 am</td>
<td>Lecture in clinical subjects</td>
</tr>
<tr>
<td>9.00 – 12 am</td>
<td>Case demonstration, Clinical discussions</td>
</tr>
<tr>
<td>12.00 – 1.00 pm</td>
<td>Lecture in clinical subjects</td>
</tr>
</tbody>
</table>
Minimum one day per week is devoted for live operative Surgery demonstration and discussion

Separate clinical record should be kept and at least twenty cases to be included.

During the clinical posting in Obstetrics the student should learn History taking, Diagnosis of Normal pregnancy, physical changes in pregnancy, presentation, position, and lie etc., early pregnancy complications. Abortion, Normal labour in the labour room.

Puerperium with stress on lactation, BFHI, common ailments of pregnancy like hyperemesis, UTI, abnormal presentation, medical complications, III stage complications and abnormal puerperium

During the clinical posting in gynaecology. The student should learn History taking, examination, common symptoms, applied anatomy of genital organs, physiology of menstruation and ovulation, fibroid, Ovarian tumour, prolapse, Endometriosis, Malignancies of genital tract and Abnormal uterine bleeding. Students should be exposed to operative procedures and diagnostic procedures like ultrasound endoscopy etc..

During internment, the student should conduct at least 10 normal case and assist 10 normal cases, assist abnormal labour and attend all emergencies. The classes to be taken are palpation (review), mechanism of labour and mannequin demonstration, obstetric operations and obstetric emergencies and various obstetric drills. This period should also be used to develop proper communication skills and attitude towards female patients

Keeping records and Log books

- Each students must maintain a log book carried over from 3rd semester to 9th semester
- Structure of records to include concerns of the whole person with the disease and not just the organ

- The record book should be submitted at the time of final average practical examination. Only if the record book is submitted the candidate becomes eligible to appear for the clinical examination

Partogram should be included in the record while printing the records

FAMILY WELFARE

Applied anatomy of mechanical methods for prevention of conception
a. In female – Barrier contraception, female condom, IUCD, tubectomy laproscopic sterilization.
b. In male – condom, vasectomy (NSV)

Physiology, Endocrine and regulation of reproduction in the female. The safe period-rhythm method of contraception, principle of use of oral contraceptives.
Pharmacology:
Mode of action and administration of hormonal contraceptives
Contraindications for administration of contraceptives. Side effects of contraceptives.
Community Medicine: The need for Family Welfare Planning, Organization of Family Planning service, Health Education in relating to Family Planning, counselling and consent for various contraceptives, Nutrition, Physiological need of the mother, the child and the family
Demography and the vital statistics
Details of Practical
Demonstration of use of IUCD, condoms and technique of NSV

TEXT BOOKS RECOMMENDED

Prescribed Books
1. Mudaliar and Menons Clinical Obstetrics 12th edition
6. Test Book of Gynaecology by Sheila Balakrishnan

Reference books
8. Essentials of Gynaecology by Dr Lekshmy Sheshadri 1st edition (Published by Lippincott, Williams & Wilkins)

Evaluation
Theory-two papers of 2hr duration 40 marks each

Paper 1-(obstetrics & social obstetrics)

Section - A
Draw & label - 2 marks
SAQ (1marks x4) - 4 marks
SAQ (2marks x3) - 6 marks
Short essays (4marks x2) - 8 marks

Section – B
Essay (problem solving) - 10 marks
SAQ (1markx4) - 4 marks
SAQ (3marksx2) - 6marks

Total - 40 marks
Paper 2 - (Gynaecology, Family Welfare & Demography)

Section - A

- Draw & Label: 2 marks
- SAQ (1 mark X 4): 4 marks
- SAQ (2 marks X 3): 6 marks
- Short essays (4 marks x 2): 8 marks

Section - B

- Essay (Problem Solving): 10 marks
- SAQ (1 mark X 4): 4 marks
- SAQ (3 marks X 2): 6 marks
- Total: 40 marks

Total (Paper I + II) 40+40: 80 marks

- Internal Assessment: 20 marks
- Viva Voce: 30 marks
- Total for Theory: 130 marks
- Practical: 50 marks
- Internal Assessment: 20 marks

Total for Practical: 70 marks

Total for Subject: 200 marks

Practicals

Scheme of Practical Examination

Maximum Marks: 50

One obstetrics case - 25 marks

One Gynaecology case - 25 marks
Viva including record - 30 marks (5x4 stations) + 10 Record

Clinical 1: Long Case: 1 Case Obstetrics = 30 Min - 25 marks
(Including Writing of the Case Sheet) Clinical
2: Short Case- Gynaecology = 25 marks

Oral Exam
USG, CTG Partogram, Instruments, Family planning &
Operative surgery - 20 marks
Record of delivery cases - 10 marks

Note: These are suggested time tables. Adjustments where required, depending
upon the availability of time and facility, are made. (Institutional adjustments)

2.12 Practical training

List of comprehensive skills

I. Clinical Evaluation:
(a) To be able to take a proper and detailed history. Comprehensive
(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), Erythrocyte Sedimentation Rate
(ESR), Blood smear for parasites, Urine examination – albumin/ sugar/ ketone/ microscopic;
(b) Stool exam for ova and cysts;
(c) Gram staining and Ziehl-Nielsen staining for AFB; (d)
(e) To do and examine a wet film vaginal smear for trichomonas;
(f) To do skin scraping and Potassium Hydroxide (KOH) stain for fungus infections; (g)
To perform and read Mantoux 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 lavage;
(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, ascitic tap & lumbar puncture;
(i) Insert intercostals tube to relieve tension pneumothorax; (j) To relieve cardiac tamponade;
(k) To control external haemorrhage.

IV. Anaesthetic Procedures:
(a) Administer local anaesthesia and nerve block;
(b) Be able to secure airway patency and 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 paraphimisis, debridement of wounds etc;
(e) To perform vasectomy;
(f) To manage anal fissures and give injections for piles.

VI. Mechanical Procedures:
(a) To perform thorough antenatal examination and identify high risk pregnancies;
(b) To conduct normal delivery;
(c) To apply low forceps and perform and suture episiotomies;
(d) To insert and remove IUDs and perform tubectomy.

VII. Paediatrics:
(a) To assess new born and recognize abnormalities and intra uterine retardation;
(b) To conduct 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 acute respiratory infection clinically.

VII. ENT Procedures:
(a) To perform nasal packing of epistaxis; (b) To perform tracheostomy;

IX. Ophthalmic Procedures.
(a) To evert eye-lids;
(b) To give Subconjunctival injection; (c) to perform epilation of eye-lashes;
(d) To measure the refractive error and advice correctional glasses;
(e) to perform nasolacrimal duct syringing for patency.

X. Dental Procedures.
(a) To perform dental extraction.

XI. Community Health.
(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 and chlorination of drinking water;
(f) To identify and institute control measures for epidemics including its proper data collecting and reporting.

g) Understand the local social capital in communities and their role in community health – Local Self Governance bodies, Village Health Committees, ASHA workers, Women, School teachers, elders, local leaders.

**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 intoxications;
(c) To be able to preserve relevant ancillary materials for medicolegal examination; (d) To be able to identify important post-mortem findings in common un-natural deaths;

**XIII. Management of Emergencies.**

(a) To manage acute anaphylactic shock;
(b) To manage peripheral vascular failure and shock;
(c) To manage acute pulmonary oedema and left ventricular failure; (d) Emergency management of drowning, poisoning and seizures;
(e) Emergency management of bronchial asthma and status asthmatics; (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

**XIV Communication skills**

(1) To take the history and do examinations addressing the patients basic rights and sensitivities.
(2) To document the findings properly
(3) To communicate patients problems and findings to the seniors and colleges
(4) Communicate well with the patient and the relatives/LAR
(5) Develop empathy and therapeutic relationship to the patient
(6) To address situations like counselling grief, angry patient, disclosure of bad news, managing crowd etc

**XV Bio ethics**
1. To list basic principles of medical ethics

2. To identify and relate these principles to real life scenarios

2.13 Records

Present in clause 2.10.

2.14 Dissertation: As per Dissertation Regulations of KUHS

Not applicable.

2.15 Speciality training if any

Clinical posting schedule in various departments

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<th>SUBJECT</th>
<th>SEMESTERS</th>
<th>TOTAL WEEKS</th>
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<td><strong>Total in Weeks</strong></td>
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* This posting includes training in Radiodiagnosis and Radiotherapy where existent.
** This posting includes exposure to Rehabilitation and Physiotherapy.
*** The clinical pathology posting will from 8 A.M. To 12 noon.

The rest of the day, excluding afternoon theory classes will be casualty posting.
The Casuality/clinical pathology posting includes exposure to laboratory medicine and infectious diseases.

**** This posting includes exposure to wound dressing and Anaesthesia.

2.16 Project work to be done if any

As stipulated by HoD

2.17 Any other requirements [CME, Paper Publishing etc.]

Not applicable

2.18 prescribed/recommended textbooks for each subject

Present in clause 2.10.

2.19 Reference books

☆
Present in clause 2. 10 content of each subject in each year.

2.20 Journals

Present in clause 2.10 content of each subject in each year.

2.21 Logbook

Not applicable.

3.EXAMINATIONS

3.1 Eligibility to appear for exams

A student who has secured 35% marks for internal assessment in theory, practical/clinical separately is qualified to appear for university examination provided he/she satisfies that percentage of attendance requirement as said already.

3.2 Schedule of Regular/Supplementary exams

The Supplementary examination for First Professional MBBS Examination may be conducted within 6months after publication of result so that the students who pass will continue as an additional batch of students and the failed students will have to appear in the subsequent year.

3.3 Scheme of examination showing maximum marks and minimum marks

<table>
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<th>Theory Paper</th>
<th>Theory Paper II</th>
<th>IA</th>
<th>Oral</th>
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<th>Practical IA</th>
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3.4 Papers in each year

First year
1. Anatomy Paper I
2. Anatomy Paper II
3. Physiology Paper I
4. Physiology Paper II
5. Biochemistry Paper I
6. Biochemistry Paper II

Second year
1. PHARMACOLOGY - Paper I
2. PHARMACOLOGY - Paper II
3. PATHOLOGY Paper I CLINICAL PATHOLOGY AND GENERAL PATHOLOGY-
4. PATHOLOGY Paper II HAEMATOLOGY AND SYSTEMIC PATHOLOGY
5. MICROBIOLOGY- Paper I – General Bacteriology, Immunology, Systematic Bacteriology
6. MICROBIOLOGY Paper II – Clinical Microbiology, Parasitology, Mycology & Virology
7. FORENSIC MEDICINE & TOXICOLOGY

Third year Part I
1. Ophthalmology
2. Otorhinolaryngology
3. Community Medicine- Paper I
4. Community Medicine- Paper II

Third year Part II
1. Gynaecology (Family Welfare and Demography – II
2. Pediatrics and Neonatology
3. Obstetrics & Social Obstetrics - I
4. General Surgery – I
5. General Surgery – II
6. General Medicine – I
7. General Medicine – Paper II

3.5 Details of theory exams

The medical colleges under the University will be divided into 6 zones. The distribution of Zone are as follows: -
1. Zone A: All medical colleges in Thiruvananthapuram and Kollam districts.
2. Zone B: All medical colleges in Kottayam, Idukki and Pathanamthitta districts.
111. Zone C: All medical colleges in Ernakulam and Alappuzha districts.
110. Zone D: All medical colleges in Thrissur and Palakkad districts.
109. Zone E: All medical colleges in Kozhikode, Wayanad and Malappuram districts.
108. Zone F: All medical colleges in Kannur and Kasaragod districts.

The examinations are to be designed with a view to ascertain whether the candidate has acquired the necessary knowledge, minimum skills, along with clear concepts of the fundamentals which are necessary for him/her to carry out his/her day to day work competently. Evaluation will be carried out on an objective basis. An examination calendar should be prepared with designated dates for all internal and University Examinations by the University/Institutional Curriculum Committee every year.

The theory question papers will be designed in such a way that the questions include structured essays, short answer questions. The theory papers in pre and paraclinical subjects will be given due weightage to the applied aspects and clinical subjects will include questions based on basic sciences also. The present pattern of question papers is provided along with subject wise syllabus given in part II.

The Practical / clinical examination will be conducted in the laboratories or hospital wards. Objective will be to assess proficiency in skills, conduct of experiment, interpretation of data and logical conclusion. Clinical cases should preferably include common diseases the student is likely to come across in practice. Rare cases/obscure syndromes, long cases of neurology etc. shall not be kept for the final examination. Emphasis should be on candidate’s capability in eliciting physical signs and their interpretation. Practical examination should be objective and should test skills and ability to interpret the results.

Structured evaluation should be done. OSCE (Objective Structured Clinical Examination) should be incorporated in the practical examinations. Viva/ oral include 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.

3.6 Model question paper for each subject with question paper pattern

BIOCHEMISTRY: MODEL QUESTION PAPER

PAPER 1

Answer to all questions; Draw diagrams wherever necessary

Essay (10 Marks)

197
1. Explain the hormonal regulation of plasma glucose. Enumerate the major metabolic abnormalities in diabetes mellitus. Indicate the criteria for diagnosing a case of Diabetes mellitus. What are the common clinical features of diabetes mellitus? (4 + 3 + 2 + 1 = 10 marks)

2. Short essay

(2 x 5 = 10)

2. Disposal of ammonia from body. Add a note on disorders of Hyperammonemia

3. Beta oxidation fatty acids

Short notes (5 x 3 = 15)

4. Phenylketonuria

5. Depict electron transport chain

6. Secondary structure of proteins

7. Competitive enzyme inhibition

8. Anaplerotic reactions of TCA cycle

Give Biochemical basis of (5 x 2 = 10)

9. Flouride as a blood preservative for glucose estimation

10. Darkening of voided urine in cases of alkaptonuria

11. Congenital cataract in galactosemia

12. Carbohydrates cannot be formed from fat

13. LDL is considered as “bad” cholesterol fraction.

Answer to the point (5 x 1 = 5)

14. Enzyme defect in MSUD

15. Insulin dependent glucose transporter

16. Two examples for mucopolysaccharidosis

17. Precursor amino acid of NO in the body

18. Two essential fatty acids

***************
PAPER 2
Answer to all questions; Draw diagrams wherever necessary (Total marks = 50)

Essay (10 Marks)

1. Explain the renal regulation of pH. What are the laboratory data required for assessing acid base status of a patient? Give two causes of high anion gap metabolic acidosi (5 + 3 + 2=10 Marks.)

Short essay (2 x5 =10)

2. PCR technique and its applications in clinical medicine

3. Dietary sources, RDA, absorption, transport & storage of iron. Add a note on causes of iron deficiency

Short notes (5 x3 = 15)

4. Missense mutation with an example

5. Manifestations of vitamin D deficiency

6. Types of Jaundice and differential diagnosis by laboratory tests

7. Outline the pathway of purine degradation

8. Outline transcription in prokaryotes

Give Biochemical basis of (5x2 =10)

9. Chronic lead exposure causes anaemia

10. Reversal of AG ratio in severe cases of cirrhosis liver

11. The apolipoproteins apo B\textsubscript{48} & apo B\textsubscript{100} formed from a common gene

12. High serum TSH in secondary hypothyroidism

13. Night blindness in vitamin A deficiency

Answer to the point (5x1 =5)

14. Two oncogenic viruses

15. Two causes of hyponatremia

16. Serum creatinine level in healthy adults

17. Defect in Wilson’s disease

18. Active form of methionine

☆
MODEL QUESTION PAPER
First Professional MBBS Degree Examination
PHYSIOLOGY
Paper - I

Time: 3 hrs

Instructions:
- Draw diagrams wherever necessary
- Answer all questions.

1. A 40 years old obese women, complained of repeated attacks of right hypochondrial pain and yellow coloration of eyes. Her serum bilirubin -15mg/dl Vanderberg test was direct positive and serum alkaline phosphatase was 50 IU.
   I. Give the most appropriate name of this clinical condition.
   II. What is the life span of RBC and how do you measure it?
   III. List the steps of breakdown of Hemoglobin

(1+3+6=10 marks)

Short Essay:

2. Discuss the factors affecting Glomerular Filtration Rate. Mention one abnormal condition when GFR is decreased

(4+1=5 marks)

3. Explain the transport of Carbon dioxide in blood

(5 marks)

Write briefly on:

4. Function of Large intestine
5. Gastric emptying
6. Formation and functions of Lymph
7. Micturition Reflex
8. Role of Hypothalamus in Temperature regulation

(5x3=15 marks)

Draw and label:

9. Normal E C G in Lead II
10. Juxtaglomerular apparatus

(2x2½ =5 marks)
Explain the physiological basis of the following:

11. Post prandial alkaline tide
12. Clotting of blood does not occur In-vivo normally
13. Coronary arteries are perfused during diastole
14. Hypersmolarity of renal medullary interstium
15. Lung alveoli are kept dry normally

(5x2=10 marks)

MODEL QUESTION PAPER
First Professional MBBS Degree Examination
PHYSIOLOGY
Paper - II

Time: 3 hrs
Max marks: 50

Instructions:
- Draw diagrams wherever necessary
- Answer all questions.

1. A 60 year old man was brought to the casualty with the complaints of sudden onset of inability to move his right upper limb and lower limb. He gave a history of treatment for hypertension since 10 years. On examination he presented with-
   I. Hemiplegia with UMN facial nerve palsy of the right side
   II. Name the tract affected in this patient
   2. Mention the most probable site of lesion
   V. State the differentiating features of Upper Motor Neurons and Lower Motor Neuron lesions
   VI. Comment on the tone of the muscles of the affected side

(1+1+4+2+2=10 marks)

Short Essay:

2. Give an account of visual pathway. What is the effect of a lesion of right optic tract?
3. Discuss the hormonal regulation of blood calcium level

(2x5=10 marks)

Write briefly on:
4. Pathway of pain from the face
5. Theories of hearing
6. Role of nigrostriatal pathway in regulating cortical activity
7. Hormonal control of lactation
8. Second Messengers

Draw and label:

9. Organ of Corti

Explain the physiological basis of the following:

11. Babinski’s sign in newborn
12. Polyuria in diabetes mellitus
13. Phantom limb
14. Dark adaptation
15. Presbyopia

Instructions:
- Draw diagrams wherever necessary
- Answer all questions.

1. A 70-year-old man on walking uphill feels sudden onset of severe chest pain radiating to the medial side of left arm associated with tiredness and sweating. He gives a history of similar attacks and was on treatment. With your knowledge in Anatomy answer the following questions.

   Name the organ affected

   Give a brief account of its arterial supply.

   Mention the reason for the radiation of pain.

   Name the covering of the organ and give their nerve supply.

Write briefly on:
2. Inversion and eversion of foot
3. Bronchopulmonary segments of right lung
4. Radioulnar joints

Write notes on:
5. Decidua
6. Medial longitudinal arch of foot
7. Clavipectoral fascia
8. Coronary sinus
9. Rotator cuff

Write short answers on:
10. Enumerate the derivatives of neural crest
11. Down’s Syndrome
12. Microscopic structure of lymph node

Draw neat labelled diagram of the following:
13. Sagittal section through the shoulder joint
14. Sternocostal surface of heart
MODEL QUESTION PAPER
First Professional MBBS Degree Examination

Paper -II ANATOMY

Time: 3 hrs  Max marks: 50

Instructions:
Draw diagrams wherever necessary
Answer all questions.

1. A 10 year old boy was brought to the O.P with fever and difficulty in opening his mouth and chewing. On examination there was a swelling in front of his left ear associated with tenderness. Based on your knowledge in Anatomy answer the following questions.
   Name the structure affected in this case
   Describe the coverings, surfaces and borders of the structure Mention the structure traversing it
   Give the nerve supply of the structure

(1+5+2+2=10 marks)

Write briefly on:
3. Ischiorectal fossa
4. Constituent fibres and arterial supply of internal capsule
5. Development and congenital anomalies of palate.

(3x5=15 marks)

Write notes on:
5. Superior constrictor muscle
6. Auditory tube
7. Lateral geniculate body
8. Microscopic structure of retina
9. Superior mesenteric artery

(5x3=15 marks)

Write short answers on:
10. Enumerate the arteries and nerves supplying anterior quadrant of scalp
11. Meckel's diverticulum
12. Coverings of prostate gland

(3x2=6 marks)
Draw neat labelled diagram of the following:
13. Structures seen posterior to the stomach
14. Transverse section through upper part of midbrain (2x2=4 marks)

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QP Code: ........................................
Reg. Number: ...................................

Second Professional MBBS Degree Examination
(MODEL QUESTION PAPER)
FORENSIC MEDICINE & TOXICOLOGY
Time: 2 hrs Max marks: 40
Answer all questions.
Draw diagrams wherever necessary

Essay: (7)
1. A 23 year old girl was brought to casualty with history of vomiting after consuming a fruit which looked like an unripe mango with fibrous covering enclosing a kernel. Pulse was irregular and weak. She died soon after. Answer the following questions.
   What was she suffering from .
   What are the ingredients of the poisonous fruit consumed . How will you confirm the diagnosis .
   What is the likely cause of death in such cases . (2+2+2+1=7)

Short notes: (5x3=15)
2. External autopsy findings in death due to hanging
3. Cardiovascular causes of sudden death
4. Causes of impotence in men
5. Age estimation from single tooth
6. Battered baby syndrome

Answer briefly (5x2=10)
7. Dying declaration
8. Algor mortis
9. Ingredients required for proof of negligence
10. Disputed paternity
11. Privileged communication

Differentiate between (2x2=4)
12. True and feigned insanity
13. Entrance and exit wounds of firearm discharge

Draw & Label (2x2=4)
14. Human spermatozoa
15. Gastric lavage tube

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Second Professional MBBS Degree Examination

(MODEL QUESTION PAPER)

MICROBIOLOGY- Paper I

Time: 2 hrs  
Max marks: 40

Answer all questions.

Draw diagrams wherever necessary

Essay: (10)

1. Read the clinical history and answer the following questions:

A 30 year old male comes to the Medical O.P with complaints of fever of 2 weeks duration. He has dry cough & weight loss. X-Ray reveals area of consolidation in the apex of the right lung.

Mention the probable diagnosis and source of infection.

List the specimens to be sent for laboratory diagnosis in this case.

How will you proceed with laboratory diagnosis in this case.

How can the disease be prevented.

Mention the skin test done routinely for the diagnosis. Discuss the interpretation.

(1+1+4+2+2=10)

Short essays:

(2x5=10)

2. Pathogenesis and lab diagnosis of cholera

3. Type I hyper sensitivity reaction

Short notes:

(10x2=20)

4. Clostridium difficile

5. Inspissation

6. Bacterial growth curve

7. Null cells

8. Transport medium

9. Legionella pneumophila

10. TRIC agents

11. Scrub typhus

12. Methicillin-resistant staphylococcus aureus (MRSA)

13. Coliform count

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Essay: (10)
1. Read the clinical history and answer the following questions:

A 50-year-old male presented with low-grade fever of one month duration. He had fatigue and loss of appetite. O/E there was hepatomegaly and yellowish discolouration of sclera. He gives a history of blood transfusion three months back.

What is the probable diagnosis and causative agent.

What is the pathogenesis.

Which are the serological markers which will help in the diagnosis and assessment of severity of the disease.

What is the prophylaxis.

How do you treat this patient.

Name four viruses transmitted through blood transfusion. (1+2+3+2+1+1=10)

Short essays:
2. Kala azar
3. Entamoeba histolytica

Short notes:
4. Rhinosporidiosis
5. Prions
6. Cryptococcus neoformans
7. Tzanck smear
8. Hydatid cyst
9. Highly active anti retroviral therapy (HAART)
10. Pneumocystis jiroveci
11. Occult filariasis
12. Pathogenesis of dengue virus infection
13. Trichomonas vaginalis

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Second Professional MBBS Degree Examination

(CLINICAL PATHOLOGY AND GENERAL PATHOLOGY - Paper I)

Time: 2 hrs
Max marks: 40

Answer all questions.
Draw diagrams wherever necessary

Essay: (8)
1. Define inflammation. Describe briefly the cellular and humoral mediators of inflammation. Mention the different morphological patterns of acute inflammation with examples. (1+4+3=8)

Short essay: (6)
2. A 50 year old man developed sudden chest pain with vomiting. He was dyspnoic. O/E he was febrile. ECG showed ST elevation and T wave inversion. TC-15,200/cmm, ESR: 40mm/hr. The patient died 12 hours later.
   • What is your diagnosis and mention the reason
   • What are the lab. investigations to be done at the time of admission.
   • Describe the gross and microscopic features of the organ primarily involved.
   • List four major complications. (1+2+2+1=6)

Short notes: (4x4=16)
5. Routes of metastasis.
6. CSF examination.

Answer briefly (4x2=8)
7. Ghons complex.
8. Ketonuria
9. Scurvy
10. Fat embolism

Answer in single sentence (4x½ =2)
11. Define metaplasia.
12. List two infective ulcers of the intestine
13. Define Type II hypersensitivity reaction.
14. Mention two tests for proteinuria

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Essay: (8)
1. Classify tumors of the lung. Briefly discuss the etiopathogenesis of carcinoma of lung. Describe the gross and microscopy of the most common malignant tumour of lung. (2+3+3=8)

Short essay: (6)
   • What is your diagnosis.
   • Describe the characteristic peripheral smear findings.
   • Mention the etiology of this condition.
   • Mention the test to confirm the diagnosis. (1+2+1+1= 6)
   • Name two organs involved in this condition (4x4=16)

Short notes:
3. Etiopathogenesis of peptic ulcer.
4. Lab. Investigations in multiple myeloma
5. Medullary carcinoma of thyroid.
6. Paget’s disease of bone. (4x2=8)

Answer briefly
7. Peripheral smear findings in megaloblastic anaemia
8. List the hepatocyte changes in acute viral hepatitis.
9. Classification of renal cell carcinoma
10. Sideroblasts in bone marrow (4x½ =2)

Answer in single sentence
11. MEN type-I
12. Mott cell.
14. Schiller-Duval body
MODEL QUESTION PAPERS

Second Professional M B B S Examination

Pharmacology - Paper I

Time : 2 hrs  Marks : 40

1. A 30-yr-old man developed the following manifestations a minute after he received an injection of a radiocontrast media – wheezing, urticarial rashes with severe itching, angioedema and vascular collapse. It was obviously a case of acute anaphylaxis, and the management included adrenaline (i.m), hydrocortisone (i.v) and intravenous fluids:
   a. What was the reason for giving adrenaline intramuscularly, and not subcutaneously? Can the drug be given intravenous, and if so, what precaution will you take and why?
   b. Explain the rationale for the use of adrenaline.
   c. Is there any role for antihistamines in this situation? Explain.
   d. Name two other drugs associated with the risk of anaphylaxis. (1½+1½+1+1=5)

2. Classify drugs used in the management of congestive cardiac failure, based on their mechanisms – give suitable examples.
   a. Specify the basis for the use of enalapril in cardiac failure.
   b. What are the clinical benefits (short term/long term) seen with the use of enalapril in this situation.
   c. What are the other indications for the use of enalapril? (2+1+1+1=5)

3. Short notes:
   a. Ketamine : CNS actions, indications, merits
   b. Valproate sodium – uses, mechanism & adverse effects
   c. Inhaled steroids – examples, rationale for use and adverse effects
   d. Selegiline : mechanism, indications, merits (4×3=12)
4. Give reasons for the following:
   a. Morphine is to be avoided in persons with head injury.
   b. Propranolol could be dangerous for prophylaxis in variant angina.
   c. Daily dose of aspirin should never exceed 325 mg for prophylaxis in myocardial infarction.
   d. Monitoring of plasma drug levels is required during therapy with lithium.

   (1½×4=6)

5. Give one indication for each drug and explain the rationale (basis) for its use:
   a. Acetylcysteine c. Sublingual nitroglycerine b. Alteplase
d. Probenecid

   (1½×4=6)

6. Choose the appropriate drug and justify:
   a. Tropicamide or phenylephrine for fundoscopy in an elderly person.
   b. Dopamine or noradrenaline for circulatory failure.
   c. Diclofenac or Etoricoxib for arthritis in woman with history of peptic ulcer.
   d. Haloperidol or Risperidone for schizophrenia.

   (1½×4=6)

Pharmacology - Paper II

Time: 2 hrs  Marks: 40

1. Joseph, 36 years, presents with symptoms and signs of fatigue, loss of weight, polyuria and polydypsia. The fasting blood sugar was 190 mg%. A diagnosis of type 2 diabetes mellitus was made. He was prescribed Metformin 200 mg (tab) to be taken twice daily after food:
   a. Name the two important advantages of metformin over sulfonylureas?
b. Specify the mechanisms by which metformin restores blood sugar level to normal?

c. Name two oral agents useful in lowering post-prandial rise in blood sugar.

d. Which are the two situations warranting the use of insulins in this patient? (1+2+1+1=5)

2. Classify drugs useful in the management of malaria, based on their effects on the lifecycle of the parasite. Give suitable examples for each group.

   a. Outline the regimen for the treatment of an acute attack of falciparum malaria in adult. Give reasons for choosing the drugs specified.

   b. Name two drugs useful for malarial prophylaxis. Specify the situation which requires prophylaxis. (2+2+1=5)

3. Give reasons for:

   a. Benzathine penicillin is not suitable for treatment of lobar pneumonia.

   b. The dose of prednisolone should be sufficiently increased in a patient undergoing a major surgical procedure.

   c. Doxycycline is preferred to oxytetracycline in chlamydial infections.

   d. Ergometrine, a uterine stimulant, is not used for induction of labour. (4×1½=6)

4. Specify the salient spectrum (highly susceptible bacteria) for the following agents. Also specify one important indication for its use.

   a. cefotaxime

   b. ampicillin

   b. ciprofloxacin

   d. clindamycin (4×1½=6)

5. Explain the rationale for the use of the following:

   a. Combined use of estrogen and progestin in contraceptive pills.

   b. Ticarcillin-Clavulanate combination in severe bacterial infections.

   c. Metronidazole as part of triple-drug therapy in peptic ulcer.

   d. Letrozole in management of carcinoma breast. ((4×1½=6)
6. Short notes:
   b. Propyl thiouracil: Mechanisms, uses & adverse effects.
   c. Methotrexate: Mechanism, Uses, & toxic effects
   d. Imatinib (4 x 3 = 12)

Q.P.Code:

Reg. no.: .................

Third Professional MBBS Part I Degree Examinations
(Model Question Paper)
Community Medicine- Paper I

Time: 3 Hours
Total Marks: 60

• Answer all questions
• Draw diagrams wherever necessary

Essay: (10)
1. Rahul 7th semester MBBS student while doing his community medicine stay posting in a rural CHC, observed that there are around 25% low birth weight among newborns during 1st quarter of 2013. He decided to find out risk factors of low birthweight. Answer the following:
   · What is the type of study design he should use if study has to be completed during the posting and mention reasons
   · State the objectives of study
   · Mention the methodology of study
   · How will you analyze the data

Problem:
2. As a MO of PHC, what are the strategies you will plan to prevent and control malnutrition among children under five years in your area.
3. List down therapeutic diet for 35 years old male with stage I hypertension whose height is 170cm, weight is 90kg and total cholesterol is 350 mg/dL

Short answer Question: (5x4=20)
4. Social security measures
5. Categories of bio medical waste management and color code used for disposal
6. Surveillance of drinking water quality
7. Emergency contraception
8. Occupational cancer and its control

**Differentiate between:**  
(3x2=6)
11. Point source epidemic and common source multiple exposure epidemic

**Substantiate your answer with reasons:**  
(2x2=4)
12. Primary prevention is a “holistic approach” in prevention of disease.
13. Integrated vector management is the most effective method of vector control

**List the following:** (5x2=10)
14. Uses of epidemiology.
15. Importance of incubation period.
16. Steps in randomized controlled trial.
17. Control of reservoir.
18. Levels of prevention and mode of intervention in each

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**Essay:** (10)
1. Raju 12 years old boy, bitten by a stray dog and was brought to you. On examination there were 2 lacerated wound on the right leg and small abrasions on left leg. Dog was killed. Answer the following:
   - Which category the exposure belongs
   - List the classification of animal bite exposure
   - Mention the management of this case
   - Explain the strategies of prevention of rabies in India  
   (1+2+3+4=10)

**Problem:** (2x5=10)
2. Riya 3 years old girl who is attending nearby anganwadi was brought to your PHC with H/o fever for 5 days and rashes all over the body for 1 day. She is partially immunized. As MO how will you manage the situation.

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**Third Professional MBBS Part I Degree Examinations**  
(Model Question Paper)  
**Community Medicine - Paper II**  
**Time:** 3 Hours  
**Total Marks:** 60  
• Answer all questions  
• Draw diagrams wherever necessary
3. As MO of the PHC you are asked to prepare a project for implementing geriatric care (both IP & OP services) in your hospital by the panchayat. Describe the project.

**Short answer Question:**

4. Malaria treatment policy 2010
5. Dots plus
6. Nutritional rehabilitation centre’s
7. Green hospital concept
8. District mental health programme

**Differentiate between:**

9. Stable & unstable malaria
10. Cost benefit and cost effective analysis
11. Type I & type II reaction in leprosy

**Substantiate your answer with reasons:**

12. Targeted interventions are important components of HIV prevention.
13. Integrated approach for prevention of non communicable disease - need of the hour

**List the following:**

14. Legislations related to occupational health
15. Phases in disaster management
16. Steps in planning cycle
17. Challenges to urban health
18. Emerging diseases causing threat to global health

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1. A 60 years old short statured female presented in the casualty with history of sudden onset of very severe pain in the right eye with redness and marked impairment of vision in the same eye. She is also having systemic symptoms of headache and vomiting. She gives history of seeing colored haloes in the past. Answer the following:
   - What is your more probable diagnosis
   - What is the differential diagnosis
   - What are the clinical features of the condition
   - How will you confirm the diagnosis
   - How will you manage the case

(1+2+2+3=10)

2. Congenital cataract
3. Management of uveitis
4. Myopia
5. Vitamin A deficiency

(4x3=12)

6. Section through the upper lid
7. Fundus picture in diabetic retinopathy

(2x2=4)

8. Spring catarrh
9. Keratoplasty
10. NPCB
11. Hypersensitive retinopathy
12. Scleritis

(5x2=10)

13. Mention four causes of dry eye
14. Mention two types of lasers used in ophthalmology
15. Mention four causes of retinal haemorrhage
16. Mention two absolute indications of dacryocystectomy

(4x1=4)
Essay: (10)
1. A 16 years old male, presented with progressive nasal obstruction and sudden onset, unprovoked, painless and profuse bleeding from nose, nasal examination showed a pinkish smooth surfaced mass filling the nose and nasopharynx – presently as a bulge in the oral cavity and palsy of the soft palate. Answer the following:

· What is the most probable diagnosis
· Describe the clinical features of this condition
· How will you diagnose this condition
· Describe the route of spread
· How will you manage this condition

Short notes: (4x3=12)
2. Malignant otitis externa
3. Retropharyngeal abscess
4. Complications of FESS
5. Atrophic rhinitis

Draw and label: (2x2=4)
6. Diagram showing the structures seen through indirect laryngoscopy
7. Picture showing the constituents of nasal septum

Answer briefly: (5x2=10)
8. Vocal nodule
9. Osteomeatal complex
10. MC Even’s triangle
11. Grommet
12. Laryngomalacia

Give precise answers: (4x1=4)
13. Name two major vessels in little area
14. Surgical treatment of choice for attico antral type of CSOM
15. Two complications of stapedectomy
16. Name two conditions where you get Hennebertz sign.
Q.P.Code: 
Reg. no.: .................

Third Professional MBBS Part II Degree Examinations
(Model Question Paper)

General Medicine – I
(CVS.CNS,GIT, Renal, Fluid & Electrolyte Balance, Genetics and Nutrition)

Time: 3 Hours  Total Marks: 60

• Answer all questions
• Draw diagrams wherever necessary

Essays:  (2x10=20)
1. 52 years old male was admitted to the casualty with one hour history of central chest pain, nausea and sweating. ECG showed ST segment elevation in leads II, III and AVF. Answer the following:
   _ What is your diagnosis. _ What are the complications
   _ Discuss the management. _ What are the life threatening causes for acute chest pain
   (1+3+4+3=10)

2. 45 years old male with polyuria and polydypsia came with fasting and post prandial sugar reports of 140 and 240 mg/dl, respectively. Answer the following:
   _ What is your diagnosis _ Describe the diagnostic criteria for this condition
   _ What dietary and exercise advice you will give him _ Discuss the management
   (1+2+3+4=10)

Short Notes.  (2x20=40)
3. Management of Guillain-Barre syndrome (GBS)
4. Amoebic liver abscess
5. Management of status epilepticus
6. Non alcoholic fatty liver disease
7. Bell’s palsy.
8. The cardiac conduction system.
9. Clinical assessment of cerebellar function
10. Thrombolysis in stroke
11. Symptoms of Crohn’s disease
12. Treatment of acute bacterial menigitis
13. Management of hyperkalemia
14. Pharmacotherapy of H. pylori infection
15. Osteoporosis
16. Insulin analogues
17. Clinical features of Cushing's syndrome
18. Wilson’s disease
19. Hyperparathyroidism
20. Treatment of hepatic encephalopathy
21. Enumerate the causes for massive splenomegaly
22. Graves’ ophthalmpathy

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Third Professional MBBS Part II Degree Examinations
(Model Question Paper)

General Medicine - II

(General Medicine Including Dermatology, Psychiatry and Radio Diagnosis)

Time: 3 Hours Total Marks: 60

- Answer all questions
- Draw diagrams wherever necessary

Essays:  

1. 28 years old male found in a drowsy state, was brought to casualty. On examination, pulse was 48 per minute, blood pressure 112/68 mm of Hg, respiratory rate 28/ minute, pin-pointed pupils, wide spread fasciculations, and bilateral rales on chest auscultation. Answer the following
   _ What is your diagnosis _ Discuss the patho-physiology of this condition _ What are the complications that may occur _ Discuss the management  
   (1+2+3+4=10)

2. 32 years old multi-para came to out patient department with exertional breathlessness and fatigability. She had been experiencing marked craving for ‘raw rice’. On examination, had pallor and spoon-shaped nails. Answer the following:
   _ What is the most likely diagnosis _ What is the patho-physiology of this disease _ How will you investigate this lady _ Discuss the management  
   (1+2+3+4=10)

Short Notes.

3. Management of bronchial asthma.
4. Toxic epidermal necrolysis (TEN)
5. Prophylaxis of venous thrombosis
6. The WHO analgesic ladder
7. Methicillin resistant staph. aureus (MRSA)
8. Peripheral smear and bone marrow in megaloblastic anemia
9. Complications of leptospirosis
10. Treatment of cerebral malaria
11. Peritoneal dialysis
12. Reactive arthritis
14. Drug treatment of depression
15. Aminoglycosides
16. Initiation of anti retroviral therapy.
17. CSF findings in tuberculous meningitis
18. Clinical features and management of Russell’s viper bite
19. Anaphylaxis
20. DOTS therapy for tuberculosis
22. Dengue fever.

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Third Professional MBBS Part II Degree Examinations  
(Model Question Paper)  
General Surgery - I  

Time: 3 Hours  
Total Marks: 60  
• Answer all questions  
• Draw diagrams wherever necessary  

Write Section A and Section B in separate answer books (32 Pages). Do not mix up questions from Section A and Section B  
QP Code: Section A – Surgery GIT Marks: 30  
Structured Essay: (5)  
1. A 60 years old male attends the surgery outpatient department with complaints of loss of appetite, loss of weight, and early satiety of two months duration. Answer the following:  
   a. What is the most probable diagnosis.  
   b. What are the investigations done to diagnose this disease.  
   c. What are the investigations done to stage the disease.  
   d. What is the role of surgery in treating this patient.  
(1+1+1+2=5)  

Short essays:  
2. Cholelithiasis.  
3. Dynamic Intestinal obstruction  
Clinical Situation (3)  
4. A 32 years old male is brought to the casualty with c/o severe epigastric pain radiating to the back, along with vomiting, following a bout of alcoholism. Discuss briefly the management of this clinical condition.  

Short Notes.  
5. Acute appendicitis.  
8. Colostomy.  
QP Code: Section B – Orthopaedics Marks: 30  
Essay: (6)  
1. A 70 years old female attends the orthopaedics casualty with history of fall and complains of pain right hip, inability to walk and inability to bear weight since 2 days duration. Answer the following:  
   a. What is the most probable diagnosis  
   b. What is the position of the lower limb in this case  
   c. What is the immediate management  
   d. What happens to Shenton’s line  
   e. Describe the surgical management for this patient  
(4x3=12)  

Short essays:  
2. Spina ventosa  
3. compound palmar ganglion  
4. GCT  
5. Fibrous dysplasia
Third Professional MBBS Part II Degree Examinations
(Model Question Paper)

General Surgery - II

Time: 3 Hours
Total Marks: 60

• Answer all questions
• Draw diagrams wherever necessary

Structured Essay: (15)
1. A thirty five years old female attends the surgery out patient department with complaints of a swelling in the front of neck along, with palpitation, increased appetite, & loss of weight. Answer the following:
_ Discuss the specific investigations that are helpful in the diagnosis. _ Discuss the specific treatment options available for this condition.
_ Discuss the specific complications and their treatment, following surgery for this patient.
(5+5+5=15)

Essay: (5)
2. Discuss the types, the pathophysiology, and management of Shock.

Short essays: (2x4=8)
3. Flail chest.
4. Acute scrotum in a child

Short Notes. (4x3=12)
5. Tuberculous lymphadenitis.
6. Urolithiasis.
7. Phaeochromocytoma.
8. Epidural anaesthesia.

Answer briefly (10x2=20)
9. Extradural haematoma.
10. FAST.
13. Incisional hernias.
14. Lymphoedema.
18. Submandibular sialadenitis.

**Model question paper**

**Final MBBS Part II- Theory (Pediatrics including Neonatology)**

Time 2 hours

Total marks 40

1. **Essay**

(1+2+4+2+1=10 marks)

A 3 year old boy admitted with skin bleeds and epistaxis for the last one week. No history of fever, fatigue, joint pain or swelling. No similar symptoms in the past or among family members.

(a) What is the most probable diagnosis?

(b) Name four important differential diagnosis

(c) Describe, how to differentiate these from your initial diagnosis clinically and from investigations (4 points for each)

(d)

(e) How will you manage this child

(f) What is the prognosis?

2. **Write Short notes**

(4X3=12 marks)

(a) Management of severe pneumonia as per national ARI control program

(b) Clinical features of Kawasaki disease

(c) Febrile convulsions – management

(d) Investigations to diagnose nephrotic syndrome

3. **Write Short notes**

(5X2=10 marks)

(a) Constitutional delay in growth

(b) Vitamin A prophylaxis program

(c) Bivalent OPV
(d) Clinical features of marasmus
(e) Breath Holding spell

4 Write short notes on (4X2=8 marks)

(a) Tracheo esophageal fistula
(b) Initial steps in neonatal resuscitation
(c) Management of hypoglycemia in newborn
(d) Kangaroo Mother care

Model Question paper

PAPER I - OBSTETRICS & SOCIAL OBSTETRICS

Time 2 hours Marks 40

Section A

I. Draw and Label
Friedman’s curve of cervical dilatation

II. Short answer Questions
1x4
1. Moulding
2. Misoprostol
3. Variable deceleration
4. Plane of least pelvic dimension

III. Short answer Questions
2x3
1. Cardiovascular changes in pregnancy
2. Asynclitism
3. Follow up of gestational trophoblastic disease

IV. Short Essays
4x2
1. How do you manage unruptured tubal pregnancy
2. Antepartum management of multiple pregnancy
I. Essay
A 25 year old primi gravida presents with bleeding per vaginum at 36 weeks gestation. On examination uterus tense and tender FHS absent.a) What is the diagnosis?
b) What is the differential diagnosis?
c) Describe the management?
d) What are the complications?

II. Short Answer Questions
1. Causes of polyhydramnios
2. Diagnosis of GDM
3. Cord prolapse
4. Bandl’s Ring

III. Short Answer questions
1. External Version
2. Management of Primary Post partum haemorrhage

PAPER II - Gynaecology (Family Welfare & Demography)

Time 2 hours
Section A
I. Draw and Label
Ligamentous supports of uterus

II. Short Answer Questions
1. Haematocolpos
2. Cystocele
3. Adenomyosis
4. LNG-IUS 199

III. Short Answer Questions
1. Emergency contraception
2. Irregular ripening
3. Bartholin’s Cyst

IV. Short Essays
1. Management of postmenopausal symptoms
2. Technique of vaginal hysterectomy with pelvic floor repair
Section B
I Essay

A 19 year old unmarried girl presents with 3 months amenorrhea. O/E Obese and hirsuite.

a) What is the most probable diagnosis?
b) What is the first step in management?
c) What are the different management options?
d) What are the long term consequences?

II. Short Answer questions

1. Tests for tubal patency
2. Diagnosis of Bacterial Vaginosus
3. Danazol
4. Metorrhagia

III. Short Answer Questions

1. Post menopausal bleeding
2. Microinvasive carcinoma

3.7 Internal assessment component

Present in clause 1.15

3.8 Details of practical/clinical practicum exams

Present in clause “content of each subject in each year.”

3.9 Number of examiners needed (Internal & External) and their qualifications Appointment of examiners/Evaluators

1. No person shall be appointed as an examiner in any of the subject ts of the professional examination leading to and including the final Professional examination for the award of the MBBS degree unless he has taken at least five years previously, a medical post graduate degree of a recognized university or an equivalent qualification in the particular subject as per recommendations of the council on teachers eligibility qualification and has had at least five years teaching experience after acquiring P.G. qualification in the subject concerned in a recognized medical college affiliated to a

★
University as teaching faculty.

2. Non medical teachers engaged in the teaching of medical students as full 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 Doctorate qualifications. 50% of the examiners (internal & external) must be with medical qualification.

3. There shall be at least four examiners for 100 students, out of whom not less than 50% must be external examiners. Out of the 2 external examiners one should be from outside the state and one from outside zone under the University. Where candidates appearing are more than 100, one additional examiner, for every additional 50 or part thereof candidates appearing, be appointed.

4. In an extra ordinary situation the University can conduct the examination with three examiners with at least one external examiner subject to ratification of the concerned pass board.

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. There should be separate set 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 – seters who shall be an internal examiner and shall moderate the questions.

9. Except Head of the Department of the 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 may be considered for appointment as examiner.

10. The upper age limit of a person to be appointed as an examiner is 70 years.

11. After retirement from a recognized medical college the qualified examiners can be appointed as internal examiner (provided he/she is below 70 years of age ) in the college from where he has retired upto six months after the date of retirement if there is shortage of qualified examiners in the department.

3.10 Details of viva: division of marks

Present in clause 2. 10.

4 INTERNSHIP

4.1 Eligibility for internship

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 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.
4.2 Details of internship

4.2.1 General

Internship is a phase of training wherein a graduate is expected to learn methods/modalities for actual practice of medical and health care and acquire skills under supervision so that he/she may become capable of functioning independently.

4.2.2 Specific objectives

At the end of the internship training, the student shall be able to:

a) diagnose clinically common disease conditions encountered in practice and make timely decision for referral to higher level;

b) Use discreetly the essential drugs, infusions, blood or its substitutes and laboratory services;

c) Manage all type of emergencies – medical, surgical, obstetric, and neonatal and paediatric, by rendering first level care;

d) Demonstrate skills in monitoring of the National Health Programmes and schemes, oriented to provide preventive and promotive health care services to the community;

e) Develop leadership qualities to function effectively as a leader of the health team organized to deliver the health and family welfare service in the existing socio-economic, political and cultural environment;

f) Render services to chronically sick and disabled (both physical and mental) and to communicate effectively with patient and the community

g) Computer knowledge, data entry in connection with admission and discharge of patients.

4.2.3 Time allocation

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 skills 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’s opportunities to practice skills in patient care in rough approximation of the time allocation suggested.

4.2.4 Compulsory and elective postings

<table>
<thead>
<tr>
<th>Community Medicine</th>
<th>2 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine including 15 days of Psychiatry</td>
<td>2 months</td>
</tr>
<tr>
<td>Surgery including 15 days Anaesthesia</td>
<td>2 months</td>
</tr>
<tr>
<td>Obst./Gynae. including Family Welfare Planning</td>
<td>2 months</td>
</tr>
<tr>
<td>Paediatrics</td>
<td>1 month</td>
</tr>
<tr>
<td>Orthopaedics including PMR</td>
<td>1 month</td>
</tr>
<tr>
<td>ENT</td>
<td>15 days</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>15 days</td>
</tr>
<tr>
<td>Casualty</td>
<td>15 days</td>
</tr>
<tr>
<td>Elective Posting (1x15 days)</td>
<td>15 days</td>
</tr>
</tbody>
</table>

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

Note: Structure internship with college assessment at the end of the internship.


The University shall issue a provisional MBBS pass certificate on passing the final examination.

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 shortage or unsatisfactory work, the period of provisional registration and the compulsory rotating internship may be suitably extended by the appropriate authorities.

The intern shall be entrusted with clinical responsibilities under direct supervision of a senior medical officer. They shall not be working independently.

Interns will not issue a medical certificate or a death certificate or a medicolegal document under their signature.

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 specific experiences and skills 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 the College.

Adjustment to enable a candidate to obtain training in elective clinical subjects may be made.

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.

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 Taluk Hospital/ Community Health Centre and 3 months in Primary Health care out of which 2 months should be in Primary Health Centre with full attention to the implementation of National Health Programme at the community level. One month of primary care training maybe in the form of perceptorship with a practicing family physician or voluntary agency or other primary health care provider.

2.2.5. Assessment for internship

- The intern shall maintain a record of work in the form of a log book, which is to be verified and certified by the medical officer under whom he works. This shall cover all aspects including the essential skills - covering all Taxonomic Domains, Ethical skills, Communication skills and computer skills in connection with data entry regarding admissions and discharges - that would have to be learned during Internship training. An assessment and grading of these skills would be made by the concerned authorities in each department periodically. Assessment and grading of the computer skills should be made by the HODs and entered in the log book. Performance of the skills should be taught, supervised and certified by a member of the teaching staff.

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 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.

- Satisfactory completion shall be determined on the basis of the following score ranging from 0 to 5.
  0 – Poor, 1 – Average, 2 – Satisfactory, 3 – Good, 4 – Very Good and 5 – Excellent

Proficiency of knowledge required for each case.

ii. The Competency in skills expected to manage each case: namely
   a. Competency for performance of self-performance
   b. Of having assisted in procedures
   c. Of having observed procedures.

iii. Responsibility, punctuality, work up of case, involvement in treatment, follow-up reports iv. Capacity to work in a team (behaviour with colleagues, nursing staff and relationship with
v. Initiative, participation in discussions, research aptitude.

A score of less than 3 any of above items will represent unsatisfactory completion of internship.

**4.2.6 Rules for granting transfer during internship**

8. As far as possible C.R.I should be done in the same college where the student has studied.

9. Transfer of C.R.I is not a right. But it is granted in situations where the student has difficulty in completing the C.R.I in the college of study. A maximum number of 5% of the permitted yearly admission of students of the college shall be allowed for transfer.

10. The Principal/ Head of the Institution will submit a Declaration to the above effect in each case of request for transfer of CRI.

11. The posting in Community Medicine [3 months] should be done in the college of study under department of Community Medicine in all cases. Only the rest of the 9 months of the C.R.I is allowed to be transferred.

12. For the transfer of C.R.I from one institution to another institution, NOC of college of study and institution where C.R.I is to be completed must be obtained. The permission of Travancore Cochin Medical Council also has to be obtained before applying to KUHS.

13. C.R.I can be done in any of the MCI recognized Medical College or recognized non teaching hospitals in the list published by MCI from time to time.

14. The number of candidates doing C.R.I in one institution should not be more than the maximum number approved by MCI.

15. The Government decision regarding, who can do C.R.I in a Govt. Medical College is to be followed strictly. [currently Government permits only the students from Govt. Colleges alone to do C.R.I in Govt. Colleges]

16. For the students doing C.R.I in Medical Colleges, the certificate should be issued by the Principal / Dean of the college.

17. MCI regulations on Graduate Medical Education 1997 section 5vii says “provided that where an intern is posted to District / Sub-divisional Hospital for training, this should 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 authority which shall be counter signed by the Principal / Dean of the college”. In view of the above regulations, all non teaching hospitals recognized for C.R.I training should have a Regulation Committee consisting of [1] The Medical Superintendent of the concerned institutions [convener], [2] Nominee of the nearest Govt. Medical College Principal not below the rank of Professor from a clinical department, [3] District Medical Officer or Deputy DMO nominated by DMO.

18. In the non teaching institutions the regulating committee should verify that internship was done in each department as specified by MCI regulations.
19 The C.R.I certificate from non teaching institutions should be approved and signed by all the three members of the regulating committee. This certificate must be authenticated by Principal / Dean of the Medical College study of the student before submitting to the University.

4.3 Model of Internship Mark lists
Not applicable

4.4 Extension rules

Extension of internship: Internship shall be extended by the number of days the student remains absent. These extended days of internship should be completed in the respective external/internal institution.

4.5 Training given
As per clause 4.2

5. ANNEXURES

5.1 Check Lists for Monitoring: Log Book, Seminar Assessment etc.
Provided in the University website

APPRAISAL FORM

Name of the trainee : 
Posting duration : From ...............To ..........20
Number of days attended / allotted :
Name of Supervisor :
Date :
Type of work done : Yes / No
Speech Diagnosis :
Speech Therapy :
Audiological Evaluation : 

Survey / Field work : 

Grade awarded (Circle the appropriate) : A / B / C / D / E

Professional and Technical Skills

1. Interest shown by the student in planning, organizing and implementing therapeutic goals and activities.
2. Efficiency in providing a clear and relevant information and feedback to the client and supervisors.
3. Involvement in case presentations and clinical.
4. Interaction with the patient.

Assessment and Reporting

5. Efficiency in suing formal and informal tests appropriate analysis, interpretation, counselling and recommendations.
6. Submission of lesson plans and therapy reports on time.

Personal Quality

7. Punctual
8. Inform to the supervisors regarding any change in their schedule
9. Discipline

Remarks if any:

Signature with seal
Office seal

5.2 Any details which are not mentioned in the above will be decided by the KUHS after considering the KUHS Act and Statues, Governing Council decisions, Guidelines of the respective Councils, the Government and directives of the Hon'ble Courts.

APPENDIX E

TIME SCHEDULE FOR COMPLETION OF THE ADMISSION PROCESS FOR FIRST MBBS COURSE

<table>
<thead>
<tr>
<th>Schedule for Admission</th>
<th>Seats filled up by Central Government through all India Entrance</th>
<th>Seats filled up by the State Govts/Instt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduct of Entrance Examination</td>
<td>Month of May</td>
<td>Month of May</td>
</tr>
<tr>
<td>Declaration of Result of Qualifying Exam./Entrance</td>
<td>By 5th June</td>
<td>By 15th June</td>
</tr>
<tr>
<td>1st round of counselling/admission</td>
<td>To be over by 30th June</td>
<td>To be over by 25th July</td>
</tr>
<tr>
<td>Last date for joining the allotted college and course</td>
<td>Within 15 days from the date of allotment of seats</td>
<td>31st July</td>
</tr>
<tr>
<td>2nd round of counselling for allotment of seats from waiting list</td>
<td>To be over by 8th August</td>
<td>Upto 28th August</td>
</tr>
<tr>
<td>Last date for joining for candidates allotted seats in 2nd round of counselling from the waiting list</td>
<td>Within 15 days from the date of allotment of seats. (seats vacant after 22nd August will be surrendered back to the States/Colleges)</td>
<td></td>
</tr>
<tr>
<td>Commencement of academic</td>
<td>Ist of August</td>
<td></td>
</tr>
<tr>
<td>Last date upto which students can be admitted against vacancies arising due to any reason</td>
<td>30th September</td>
<td></td>
</tr>
</tbody>
</table>

Note: @ Head of the College should intimate the vacancies existing after the last date of joining the course by the candidate concerned in respect of the All India Quota of seats to the DGHS within seven days and latest by 23rd of July.