

KERALA UNIVERSITY OF HEALTH SCIENCES

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REGULATIONS, CURRICULUM, AND SYLLABUS OF UNDER GRADUATE MEDICAL COURSE (MBBS)

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1. INTRODUCTION

MCI regulations on graduate medical education in 1997 envisage a change in the pattern of medical education. The basic concept is to increase vertical integration of medical curriculum. A reduction of six months is made for the I MBBS course, increasing the training period of the II and III MBBS. The overall course duration is the same, but is reorganized into nine semesters of six months each. The reduction of six months of the I MBBS is meant to reduce the quantum of teaching of preclinical subjects to the medical students and to give time during the later years for revising the preclinical subjects with relevance to the clinical teachings. Organisation of teaching of clinical subjects should be done concentrating on vertical integration, incorporating the teaching staff of preclinical and paraclinical subjects also. A new pattern is designed for the internal assessment and University examinations. Paediatrics is being separated from Medicine and organized as a separate examination in Final MBBS Part II. The calendar for the new batch is made ready on the starting of the course. House surgeons postings are reorganized according to the IMC norms with suitable modifications.

2. GENERAL CONSIDERATIONS AND TEACHING APPROACH

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.

With the wide range of career opportunities available today, a graduate has a wide choice of career opportunities. Training though broad based and flexible should aim to provide an educational experience of the essentials required for health care in our country. Training should be able to meet internationally acceptable standards.

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.

The importance of the community aspects of health care and of rural health care services is to be recognized. This aspect of education and training of graduates should be adequately recognized in the prescribed curriculum. Its importance has been systematically upgraded over the past years and adequate exposure to such experiences should be available through out all the three phases of education and training. This has to be further emphasized and intensified by providing exposure to field practice areas and training during the internship period. The aim of the period of rural training during internship is to enable the fresh graduate to function efficiently under such settings.

The educational experience should emphasize health and community orientation instead of only disease and hospital orientation or being concentrated on curative aspects. As such, all the basic concepts of modern scientific medical education are to be adequately dealt with.

There must be enough experiences to be provided for self-learning. The methods and techniques that would ensure this must become a part of teaching – learning process

The medical graduate of modern scientific medicine shall endeavor to become capable of functioning independently in both urban and rural environment. He/ She endeavor to give emphasis on fundamental aspects of the subjects taught and on common problems of health and diseases avoiding unnecessary details of specialization.

The importance of social factors in relation to the problems of health and diseases should receive proper emphasis throughout the course and to achieve this purpose the educational process should also be community based than only hospital based. The importance of population control and family welfare planning should be emphasized throughout the period of training with the importance of health and development duly emphasized.

Adequate emphasis is to be placed on cultivating logical and scientific habits of thought, clarity of expression, independence of judgement and ability to collect and analyze information and to correlate them.

The educational process should be placed in a historic background as an evolving process and not merely as an acquisition of a large number of disjointed facts without a proper perspective. The history of medicine with reference to the evolution of medical knowledge both in this country and the rest of the world should form a part of this process. Lectures alone are generally not adequate as a method of training and are a poor means of transferring /acquiring information and even less effective at skill development and in generating the appropriate attitudes. Every effort should be made to encourage the use of active methods related to demonstrations and on first-hand experience. Students will be encouraged to learn in small groups through peer interactions, so as to gain maximal experience through contacts with patients and the communities in which they live. While the curriculum objectives often refer to areas of knowledge or science, they are best taught in a setting of clinical relevance and hands on experience for students who assimilate and make this knowledge a part of their own working skills.

The graduate medical education in clinical subjects should be based primarily on outpatient teaching emergency departments and within the community including peripheral health care institutions. The outpatient departments should be suitably planned to provide training to graduates in small groups.

Clinics should be organized in small groups of preferably not more than 10 students so that a teacher can give personal attention to each student with a view to improve his skill and competence in handling of the patient.

Proper records of the work should be maintained which will form the basis of the student's internal assessment and should be available to the inspectors at the time of inspection of the college by the Medical Council of India.

Maximal efforts have to be made to encourage integrated teaching between traditional subject areas using a problem based learning approach starting with clinical or community cases and exploring the relevance of various preclinical disciplines in both understanding and resolution of the problem. Every attempt should be made to de-emphasize

compartmentalization of disciplines so as to achieve both horizontal and vertical integration in different phases.

Every attempt is to be made to encourage students to participate in group discussions and seminars to enable them to develop personality, character, expression and other facilities which are necessary for a medical graduate to function either in solo practice or as a team leader when he begins his independent career. A discussion group should not have more than 20 students.

Faculty members should avail of modern educational technology while teaching the students and to attain this objective, Medical Education Units/ Departments should be established in all medical colleges for faculty development and providing learning resource material to teachers.

To derive maximum advantage out of this revised curriculum, the vacation period to students in one calendar year should not exceed one month, during 4 ½ years Bachelor of Medicine and Bachelor of Surgery (MBBS) Course.

In order to implement the revised curriculum in toto, State Governments and Institutional Bodies must ensure that adequate financial and technical inputs are provided.

HISTORY OF MEDICINE - The student will be given an outline on “*HISTORY OF MEDICINE*”: This will be taught in an integrated manner by subject specialists and will be coordinated by the Medical Education Unit of The College.

All medical institutions should have curriculum committee which would plan curricula and instructional method which will be regularly updated

Integration of information and communication technology (ICT) in learning process will be implemented

3.OBJECTIVES OF MEDICAL GRADUATE TRAINING PROGRAMME

3.1 National Goals

At the end of undergraduate programme, the medical student shall endeavor 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.

3.2 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.

4. REGULATIONS

4.1 Eligibility Criteria

No candidate shall be allowed to be admitted to the medical curriculum of first Bachelor of Surgery (MBBS) course until:

- a. He/She has completed the age of 17 years on or before the 31st of December of the year commencing the prescribed academic session of the said course.
- b. He/ She has passed qualifying examination as under:

The higher Secondary Examination or the Indian School Certificate Examination which is equivalent to 10+2 Higher Secondary Examination after a period of 12 years study, the last two years of study comprising of Physics, Chemistry, Biology/Biotechnology with English with 50% marks for physics, chemistry and biology together and 50% in biology separately . In respect of candidates belong to Scheduled Castes, Schedules Tribes or Other Backward Classes the marks obtained in Physics, Chemistry and Biology taken together in qualifying examination be 40% instead of 50% as above.

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

- c. The selection of students for the Under Graduate course shall be made based strictly on merit as decided by the Entrance Examination conducted by the competent authority approved by the Government of Kerala/Kerala University of Health Sciences and as per guidelines of the Medical Council of India (M. C. I.).

4.2 Admission process

The admission shall be completed by each Medical college/Institution as per the statutory time schedule for admissions and in no case any admission will be made in the MBBS course after 30th of September.

The Universities and other authorities concerned shall organize admission process in such a way that teaching in first semester starts by 1st of August each year.

There shall be no admission of students in respect of any academic session beyond 30th September under any circumstance. The University shall not register any students admitted beyond the said date.

The Medical Council of India may direct, that any student identified as having obtained admission after the last date of closure of admission be discharged from the course of study, or any Medical qualification granted to such a student shall not be a recognized qualification for the purpose of the Indian Medical Council Act, 1956. The Institution which grants admission to any students after the last date specified from the same shall also be liable to face such action as may be prescribed by MCI including surrender of seats equivalent to the extent of such admission made from its sanctioned intake capacity for the succeeding academic year.

4.3 Registration

A candidate on admission to the MBBS course shall apply to the University for Registration

By making a formal application in the prescribed format.

Original mark lists of qualifying examination.

Transfer certificate from the previous institution.

Allotment letter from the competent authority who conducted the Entrance Examination/ allotment letter from the Principal in the case of NRI candidates.

Equivalency and migration certificate wherever needed.

Original SSLC/equivalent certificate.

Document for sponsorship of the student, employment certificate and copy of passport of the sponsor in case of NRI candidates.

The fees prescribed for the registration.

4.4 Migration and Transfer

No migration or transfer will be allowed during the entire course of study and internship.

4.5 Attendance

Minimum 80% of attendance separately in clinics/practicals and theory is the criteria for appearing for University examination. Condonation for 10% in the attendance once in the entire course period can be granted by the Head of the Institution.

5 TRAINING

5.1 Training Period and Time Distribution

The admission should be organized in such a way that teaching in first semester starts by August 1 each year.

(1) Every student shall undergo a period of certified study extending over 4 ½ academic years divided into 9 semesters (i.e. of 6 months each) from the date of commencement of his study for the subjects comprising the medical curriculum to the date of completion of examination and followed by one year compulsory rotating internship. Each semester will consist of approximately 120 teaching days of 8 hours each college working time, including one hour of lunch. The nomenclature of semester system will be uniformly followed in place of years as they are nomenclatured now.

(2) 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 Physio-therapy 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.

5.2 Phase Distribution and Timing of Examinations

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

Phase	Semesters		Examination		
Phase I	Semesters	I and II	I MBBS Biochemistry	Anatomy,	Physiology,
Phase II	Semesters	III, IV and V	II MBBS, Pharmacology, Pathology, Microbiology, Forensic Medicine		
Phase III	Semesters	VI and VII	III MBBS Part I Ophthalmology, Otolaryngology, Community Medicine		
	Semesters	VIII and IX	III MBBS Part II General Medicine, General Surgery, Obstetrics and Gynaecology and Paediatrics		

Note:

- Passing the Ist professional examination (I MBBS) is compulsory before proceeding to Phase II training
- A student, who fails in the IInd professional examination, shall not be allowed to appear in IIIrd professional Part I examination unless he passes all subjects of II nd 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.

5.3 Clinical posting schedule in various departments

SUBJECT	SEMESTERS									TOTAL WEEKS
	III	IV	V	EXAM	VI	VII	EXAM	VIII	IX	
***Gen Medicine	6		4	X	4		X	8	4	26
Paediatrics		2		X	4		X		4	10
TB & chest		2		X			X			2
Skin & VD		2	4	X			X			6
Psychiatry		2		X			X			2
*Radiology		2		X			X			2
****Gen. Surgery	6		4	X	4		X	8	4	26
**Orthopaedics		2		X	4		X		4	10
Ophthalmology			4	X		6	X			10
Otolaryngology			4	X		4	X			8
*****O&G		4	4	X	4		X	8	4	24
Com. Medicine	6			X		6	X			12
Casualty		2		X			X			2
Dentistry				X		2	X			2
TOTAL IN WEEKS	18	18	24	8	20	18	8	24	20	142

Clinical methods in Medicine and Surgery for whole class will be for 2 weeks each respectively at the start of 3rd semester.

- * This posting includes training in Radio diagnosis and Radiotherapy where existent.
- ** This posting includes exposure to Rehabilitation and Physiotherapy.
- *** This posting includes exposure to laboratory medicine and infectious diseases.
- **** This posting includes exposure to dressing and Anaesthesia.

******* This includes maternity training and Family medicine and in Family Welfare Planning.**

Note:

To include the clinical pathology and anaesthesia posting in the general clinical posting local adjustments may be done at the level of individual Institutions in accordance with the availability of slots in various departments. E.g. Anaesthesia posting for two weeks may be given from the dept. of surgery during VIth or VIIIth semester in consensus with respective Dept. Heads. 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. Institutions should adhere to the above academic pattern. However, in case of semesters already commenced, internal adjustments may be done by individual Institutions between 3rd, 4th and 5th semesters to ensure compliance to this finalized pattern.

CLINICAL POSTINGS SUBJECT WISE

Semester	Semester	Semester	Semester	Semester	Semester	Semester
III	IV	V	VI	VII	VIII	IX
18 weeks	18 weeks	24 weeks	20 weeks	18 weeks	24 weeks	20 weeks
General Medicine 6 weeks	Paediatrics: 2 weeks	General Medicine 4 weeks	General Medicine 4 weeks	Ophthalmology 6 weeks	General Medicine 8 weeks	General Medicine 4 weeks
	TB and Chest Diseases 2 weeks	Skin & STD 4 weeks	Paediatrics: 4 weeks	ENT : 4 weeks	General Surgery – 8 weeks	
General Surgery – 6 weeks	Skin & STD: 2 weeks	General Surgery 4 weeks	General Surgery 4 weeks	Dentistry 2 weeks		Paediatrics: 4 weeks
				Community Medicine 6 weeks		General Surgery 4 weeks

Community Medicine 6 weeks	Psychiatry 2 weeks	Ophthalmology 4 weeks	Orthopaedics 4 weeks		O&G & FWP – 8 weeks	Orthopaedics 4 weeks
	Radiology- 2 weeks	ENT : 4 weeks	O&G & FWP 4 weeks			
	Orthopaedics 2 weeks	O&G & FWP 4 weeks				
	O&G & FWP 4 weeks					
	Casualty 2 weeks					
		University Exam		University Exam		University Exam

CLINICAL POSTINGS OF MBBS STUDENTS

Semester	Semester	Semester	Semester	Semester	Semester	Semester
III	IV	V	VI	VII	VIII	IX
18 weeks	18 weeks	24 weeks	20 weeks	18 weeks	24 weeks	20 weeks
General Medicine 6 weeks	Paediatrics 2 weeks	General Medicine 4 weeks	General Medicine 4 weeks	Ophthalmology 6 weeks	General Medicine 8 weeks	General Medicine 4 weeks
	TB and Chest D – 2 weeks	Skin & STD 4 weeks:	Paediatrics 4 weeks	Otorhinolaryn gology 4 weeks	General Surgery 8 weeks	Paediatrics 4 weeks
			General Surgery	Dentistry		

			4 weeks	2 weeks		
	Skin & STD: 2 weeks	General Surgery 4 weeks	Orthopaedics 4 weeks	Community Medicine 6 weeks		General Surgery 4 weeks
General Surgery 6 weeks	Psychiatry 2 weeks	Ophthalmology 4 weeks				Orthopaedics 4 weeks
Community Medicine 6 weeks	Radiology 2 weeks	OtorhinoLaryngology 4 weeks	O&G & FP 4 weeks		O&G & FWP 8 weeks	O&G & FWP 4 weeks
	Orthopaedics 2 weeks	O&G & FWP 4 weeks				
	O&G & F 4 weeks					
	Casualty 2 weeks					
		Final Internal Assessment Examination		Final Internal Assessment Examination		Final Internal Assessment Examination
		University Examination II MBBS		University Examination Final MBBS Part-I		University Examination Final MBBS Part-II

6 EXAMINATION REGULATIONS

6.1 Essentialities for qualifying to appear in professional examinations.

The performance in essential components of training are to be assessed, based on:

6.2 Internal Assessment

It shall be based on periodical assessment, evaluation of student assignment, preparation for seminar, clinical case presentation etc. Regular examinations shall be conducted throughout the course. The question of number of examinations is left to the institution. Day to day assessment should be given importance during internal assessment, Weightage for internal assessment shall be 20% of the total marks in each subject. The candidate must secure at least 35% marks of the total marks fixed for internal assessment in a particular subject in order to be eligible to appear in the final University examination of that subject. Internal Assessment should be a continuous evaluation and *CLASS AVERAGE* marks should not exceed 75% of maximum marks. Marks of minimum of three exams in the subject should be taken for calculation of internal assessment.

6.3 Eligibility to appear for the University Examination

A student who has secured 35% marks for internal assessment is qualified to appear for University examination provided he/she satisfies that percentage of attendance requirement as said already.

6.4 University Examinations.

The examinations are to be designed with a view to ascertain whether the candidate has acquired the necessary knowledge, minimum skills, as detailed in Appendix A along with clear concepts of the fundamentals which are necessary for him to carry out his 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 Institutional Curriculum Committee every year. (Pattern given as Appendix D)

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 give 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 Evaluation) should be incorporated in the practical examinations. Viva/ oral includes evaluation of management approach and handling of emergencies.

Candidate's skill in interpretation of common investigative data, x-rays, identification of specimens, ECG, etc. also is to be evaluated.

6.5 Criteria for Pass

In each of the subjects, a candidate must obtain 50% in aggregate for a pass. This 50% in aggregate includes:-

A separate minimum of 50% in aggregate for theory including viva. (University theory** + Viva + Internal Assessment) & a separate minimum of 50% in aggregate for Practicals /clinics (University Practicals /clinics+ Internal assessment)

**** However, a separate minimum of 50% marks in University theory is mandatory for a pass. (This regulation will be effective for all students admitted from the academic year 2012-2013 onwards.)**

(See Table for the distribution of marks in various disciplines)

Example: Anatomy

Total 200 marks				
Theory	Paper I	50 Marks	120	140
	Paper II	50 Marks		
	Int. Asses	20 Marks		
Viva			20	
Practicals	Uni. Exam	40 Marks	60	
	Int. Asses	20 Marks		
Total				200

Out of a total of 140 marks for theory, a student should secure a minimum of 70 marks in aggregate (with 50 marks in University theory alone) and out of 60 marks for practicals, a separate minimum of 30 is essential for a pass.

Grace marks up to a maximum of five in total may be awarded for an examination at the discretion of the passing board for a student to pass one subject (theory only) provided the student has passed in all other subjects. Grace marks will not be awarded to change internal assessment marks.

A candidate who fails in any one subject but obtains pass marks in another subject of the same examination shall be exempted from re-examination in the subject, which the candidate has passed.

The Supplementary examination for First Professional MBBS Examination may be conducted within 6 months 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

6.6 Declaration of Class

Candidates who pass the whole examination shall be ranked in the order of proficiency as determined by the total marks obtained by each in both parts and shall be arranged in three classes .

- i. Distinction - 75% and above
- ii First Class - 65% and above, less than 75%
- iii Second Class - 50% and above, less than 65%

All candidates who fail in the first attempt in any subject and pass subsequently shall not be ranked in distinction or first class.

6.7 Distribution of Marks

Sl. No.	Subject	Theory Paper I	Theory Paper II	IA	Oral	Total T+IA+O	Practical	IA	Total	Subject total
1.	Anatomy	50	50	20	20	140	40	20	60	200
2.	Physiology	50	50	20	20	140	40	20	60	200
3	Biochemistry	50	50	20	20	140	40	20	60	200
4.	Pharmacology	40	40	15	15	110	25	15	40	150
5.	Pathology	40	40	15	15	110	25	15	40	150
6	Microbiology	40	40	15	15	110	25	15	40	150
7.	Forensic Medicine	40		10	10	60	30	10	40	100
8.	Ophthalmology	40		10	10	60	30	10	40	100
9.	Otorhinolaryngology	40		10	10	60	30	10	40	100
10	CommunityMedicine	60	60	20	10	150	30	20	50	200
11	General Medicine	60	60	30	20	170	100	30	130	300
12	General Surgery	60	60	30	20	170	100	30	130	300
13	Obstetrics & Gynaecology	40	40	20	30	130	50	20	70	200
14	Pediatrics	40		10	10	60	30	10	40	100

Note:

Internal Assessment examinations may be conducted as per the discretion of the departments (Minimum of one examination per semester) without violating MCI norms.

Internal assessment in Medicine and surgery will include sub specialities

7 INTERNSHIP

7.1 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.

7.2 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, 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.

7.3 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.

7.4 Compulsory and elective postings

Community Medicine	2 months
Medicine including 15 days of Psychiatry	2 months
Surgery including 15 days Anaesthesia	2 months
Obst./Gynae. including Family Welfare Planning	2 months
Paediatrics	1 month
Orthopaedics including PMR	1 month
ENT	15 days
Ophthalmology	15 days
Casualty	15 days
Elective Posting (1x15 days)	15 days

Subjects for Elective posting will be as follows:

- i. Dermatology and Sexually Transmitted Diseases
- ii. Tuberculosis and Respiratory Diseases
- iii. Radio-Diagnosis
- iv. Forensic Medicine
- v. Blood Bank
- vi. Psychiatry

Note: Structure internship with college assessment at the end of the internship.

Foot Note : The Principal Regulations namely, “Regulations on Graduate Medical Education, 1997” were published in Part – III, Section (4) of the Gazette of India vide Medical Council of India Notification dated the 4th March, 1997 and amended vide Council notification dated 29.05.1999, 02.07.2002, 30.09.2003, 16.10.2003 & 01.03.2004

7.5 Other details

(a) 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.

(c) The University shall issue a provisional MBBS pass certificate on passing the final examination.

(d) 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.

(e) The intern shall be entrusted with clinical responsibilities under direct supervision of a senior medical officer. They shall not be working independently.

(f) Interns will not issue a medical certificate or a death certificate or a medicolegal document under their signature.

(g) 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.

(h) Adjustment to enable a candidate to obtain training in elective clinical subjects may be made.

(i) 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;

(j) 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.

(k) One year's approved service in the Armed Forces Medical Services, after passing the final MBBS examination shall be considered as equivalent to the pre-registration training detailed above; such training shall, as far as possible, be at the Base/General Hospital.

7.6 Assessment for internship

(a) 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.

- (b) 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

- i. 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 paramedicals)
- v. Initiative, participation in discussions, research aptitude.

A score of less than 3 any of above items will represent unsatisfactory completion of internship.

7.7 Full registration

Full registration shall only be given by the State Medical Council/Medical Council of India on the award of the MBBS degree by the University or its declaration that the candidate is eligible for it.

8. APPENDIX

8.1 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) To do skin smear for lepra bacilli;
- (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 tap, 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 paraphimosis, 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 advise 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.

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

8.2 Time tables for various semesters**First and second semesters -240 working teaching days****Semester 1 Time table**

Day	8am - 9 am	9 am -10 am	10 am - 1 p.m	1p.m- to 2 p.m	2 p.m - 4 p.m.
Monday	Biochemistry	Physiology (9-11 a.m)	Anatomy dissection	Lunch	Practicals – PHY/BIO/HIST
Tuesday	Physiology	Biochemistry	Anatomy dissection		Practicals – PHY/BIO/HIST
Wednesday	Anatomy	Physiology	Anatomy dissection		Practicals – PHY/BIO/HIST
Thursday	Physiology	Biochemistry	Anatomy dissection		Practicals – PHY/BIO/HIST
Friday	Biochemistry	Anatomy	Anatomy dissection (10a.m-12p.m)		Physiology
Saturday	Anatomy	Physiology	Community medicine		ANA/BIO/PHY

Semester II Time table

Day	8am - 9 am	9 am -10 am	10 am - 12 noon	12 noon - to 1 p.m	1 p.m - 4 p.m.
Monday	Anatomy	Biochemistry	Practicals PHY/BIO/HIST	Lunch	Anatomy dissection
Tuesday	Physiology	Anatomy	Practicals PHY/BIO/HIST		Anatomy dissection
Wednesday	Biochemistry	Physiology	Practicals PHY/BIO/HIST		Anatomy dissection
Thursday	Physiology	Biochemistry	Practicals PHY/BIO/HIST		Anatomy dissection
Friday	Anatomy	Biochemistry	Physiology		Anatomy dissection(2-4p.m)
Saturday	Biochemistry	Anatomy	Physiology		PHY/ANA/BIO/PHY

Third Semester classes: 18 weeks

Day	8am - 9 am	9 am -12 noon	12 noon - 1 p.m	1- 2 p.m	2 p.m - 4 p.m.
Monday	Paraclinical lectures	Clinical posting	Paraclinical lectures	Lunch	Practicals Para clinical
Tuesday	Paraclinical lectures	Clinical posting	Paraclinical lectures		Practicals Para clinical
Wednesday	Paraclinical lectures	Clinical posting	Paraclinical lectures		Practicals Para clinical
Thursday	Paraclinical lectures	Clinical posting	Paraclinical lectures		Practicals Para clinical
Friday	Paraclinical lectures	Clinical posting	Paraclinical lectures		Practicals Para clinical
Saturday	Paraclinical lectures	Clinical posting	Paraclinical lectures		Practicals Para clinical

Fourth and fifth Semester classes: 42 weeks

Day	8am - 9 am	9 am -12 noon	12 noon - 1 p.m	1- 2 p.m	2 p.m - 4 p.m.
Monday	Lectures in clinical subjects	Clinical posting	Lectures in Paraclinical subjects	Lunch	Practicals Para clinical
Tuesday	Lectures in clinical subjects	Clinical posting	Lectures in Paraclinical subjects		Practicals Para clinical
Wednesday	Lectures in clinical subjects	Clinical posting	Lectures in Paraclinical subjects		Practicals Para clinical
Thursday	Lectures in clinical subjects	Clinical posting	Lectures in Paraclinical subjects		Practicals Para clinical
Friday	Lectures in clinical subjects	Clinical posting	Lectures in Paraclinical subjects		Practicals Para clinical
Saturday	Lectures in clinical subjects	Clinical posting	Lectures in Paraclinical subjects		Practicals Para clinical

Sixth, Seventh, Eighth & Ninth Semester classes 82 weeks

Day	8am - 9 am	9 am -12 noon	12 noon - 1 p.m	1- 2 p.m	2 p.m - 4 p.m.
Monday	Lectures in clinical subjects	Clinical posting	Lectures in Clinical subjects	Lunch	Practicals/Demonstrations in Clinical Subjects
Tuesday	Lectures in clinical subjects	Clinical posting	Lectures in Clinical subjects		Practicals/Demonstrations in Clinical Subjects
Wednesday	Lectures in clinical subjects	Clinical posting	Lectures in Clinical subjects		Practicals/Demonstrations in Clinical Subjects

Thursday	Lectures in clinical subjects	Clinical posting	Lectures in Clinical subjects		Practicals/Demonstrations in Clinical Subjects
Friday	Lectures in clinical subjects	Clinical posting	Lectures in Clinical subjects		Practicals/Demonstrations in Clinical Subjects
Saturday	Lectures in clinical subjects	Clinical posting	Lectures in Clinical subjects		Practicals/Demonstrations in Clinical Subjects

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

8.3 Assessment of internship

Name:

Date of Posting: From _____ To _____

Grading:

(0 – Poor, 1 – Average, 2 – Satisfactory, 3 – Good, 4 – Very Good, 5 – Excellent)

Sl no	CRITERIA	GRADING					
General							
1.	Knowledge	0	1	2	3	4	5
2.	Competency and skill (Self competence, observing procedures) assisting procedures,	0	1	2	3	4	5
3.	Responsibility, punctuality, work involvement in treatment, follow up	0	1	2	3	4	5
4.	Capability to work in a team	0	1	2	3	4	5
5.	Initiative, research participation in discussion,	0	1	2	3	4	5
6.	Number of topics presented	0	1	2	3	4	5
7.	Number of seminars attended	0	1	2	3	4	5
8.	Proficiency score (Points given outstanding during the posting) performance	0	1	2	3	4	5

Specific							
1.	Diagnosis	0	1	2	3	4	5
2.	Resuscitation of critically ill	0	1	2	3	4	5
3.	Monitoring patients with serious illness	0	1	2	3	4	5
4.	First line management of acute illness	0	1	2	3	4	5
5.	Performing Procedures (venisection, tracheostomy, intubation, catheterisation, LP, liver biopsy, pleural aspiration etc)	0	1	2	3	4	5

FINAL GRADE:

Sl no	Grading obtained	Grade awarded
1.	0-10	Poor
2.	11-21	Average
3.	22-32	Satisfactory
4.	33-43	Good
5.	44-54	Very Good
6.	55-65	Excellent

APPENDIX E**TIME SCHEDULE FOR COMPLETION OF THE ADMISSION PROCESS FOR FIRST MBBS COURSE**

Schedule for Admission	Seats filled up by Central Government through all India Entrance Examination	Seats filled up by the State Govts/Instt.
Conduct of Entrance Examination	Month of May	Month of May
Declaration of Result of Qualifying Exam./Entrance Exam.	By 5th June	By 15th June
Ist round of counselling/admission	To be over by 30th June	To be over by 25th July

Last date for joining the allotted college and course	Within 15 days from the date of allotment of seats @@	31st July
2nd round of counselling for allotment of seats from waiting list	To be over by 8th August	Upto 28th August
Last date for joining for candidates allotted seats in 2nd round of counselling from the waiting list	Within 15 days from the date of allotment of seats. (seats vacant after 22nd August will be surrendered back to the States / Colleges)	
Commencement of academic session	1st of August	
Last date upto which students can be admitted against vacancies arising due to any reason	30th September	

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.

9 COURSE - SYLLABUS

9.1 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) OBEJECTIVE

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

(A) *Knowledge*

- a) Comprehend the normal disposition, clinically relevant interrelationships, functional and cross sectional anatomy of the various structures in the body.
- b) 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.

- c) 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.
- d) 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 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:

- (a) Identify and locate all the structures of the body and mark the topography of the living anatomy
- (b) Identify the organs and tissues under the microscope
- (c) Understand the principles of Karyotyping and identify the gross congenital anomalies.
- (d) Understand principles of newer imaging techniques and interpretation of Computerized Tomography (CT) Scan sonogram etc.
- (e) Understand clinical basis of some common clinical procedures i.e. intramuscular and intravenous injection, lumbar puncture and kidney biopsy etc.

(C) Integration

From the integrated teaching of other basic sciences, 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	: 89
Seminars	: 42
Practicals	: 519

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

DETAILS OF LECTURES

1. General Anatomy

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 (Details of joints-to be taught in Orthopaedics) : 1hr

Vascular tissue: Elastic artery, medium sized artery, large vein, medium sized vein: 1hr

Lymphatic tissue: Gen. features, lymph node- structure and function, spleen, structure and circulation, Tonsil, Thymus	: 1hr
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

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	: 2hr
Formation and circulation of placenta	: 1hr
Foetal membranes	: 1hr
Twining and teratology (Structure of Umbilical cord and placenta to be taught along with General Embryology)	:1hr
(X-rays and surface marking of each region to be taken after the dissection of the corresponding region is completed)	:4hr

Upper Limb

Brachial plexus	: 1hr
Mammary gland	: 1hr
Shoulder joint	: 1hr
Palmar space	: 1hr

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

Lower Limb	: 4hrs
Hip joint	: 1hr
Arches of foot	
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
Sub talar joint, inversion and eversion	: 1hr
Femoral triangle, Adductor canal	: 1hr

Obturator nerve	: 1hr
Femoral artery and nerve	: 1hr
Ankle joint, Popliteal fossa	: 1hr
Thorax	: 9hr
Thoracic wall (including movements)	:1hr
Pleura	: 1hr
Lungs including development of lung	: 1hr
Pericardium	: 1hr
Blood supply of heart	: 1hr
Arterial arches	: 1hr
Foetal circulation	: 1hr
Development of heart	: 2hr
Seminars (Give more importance to applied Anatomy)	: 5hr
Mediastinum-Boundaries and contents	: 1hr
Thoracic duct, Esophagus, Thoracic A	: 1hr
Veins of Thorax	: 1hr
Chambers of heart-All chambers	: 1hr
Splanchnic nerves, sympathetic trunk	: 1hr
Genetics	: 4hr
Classification of chromosomes, karyotyping, sex chromosomes, Barr body	: 1hr
Normal male, normal female, Chromosomal aberrations-in brief	: 1hr
Turner's syndrome, Klienfelter's syndrome and Down's syndromes (Charts to be shown	
Genetic Counseling, Pedigree Chart, Genetic Engineering and inheritance	: 1hr
Head& Neck	: 17hr
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
Tongue	: 1hr
Facial Nerve	: 1hr
Middle Ear	: 1hr
Seminars (Give more importance to applied Anatomy)	: 13hr
Suboccipital triangle	: 1hr
Eyelid and lacrimal apparatus	: 1hr
Nasal cavity, PNS	: 1hr
Soft palate	: 1hr
Muscles of facial expression	: 1hr
Vessels and nerves of the face	: 1hr

Posterior triangle of neck	: 1hr
Anterior triangle of neck	: 1hr
Mandibular nerve, oculomotor nerve	: 1hr
Submandibular and sublingual gland	: 1hr
Palatine tonsil	: 1hr
Lymph nodes of head and neck	: 1hr
Hyoglossus muscle	: 1hr
Brain and Spinal Cord	: 14hr
Spinal cord- external features and blood supply	: 1hr
Blood supply of brain- Superficial and deep, meninges	: 1hr
Medulla oblongata	: 1hr
Pons	: 1hr
Cerebellum	: 1hr
4th Ventricle	: 1hr
3rd Ventricle, Lateral ventricles	: 1hr
Midbrain	: 1hr
Sulci, gyri and functional areas of cortex	: 1hr
Internal capsule	: 1hr
Visual pathway	: 1hr
Basal ganglia	: 1hr
Thalamus	: 1hr
Development of CNS IN BRIEF including functional Column	: 1hr
Abdomen, Pelvis, and Perineum	: 16hrs
Anterior abdominal wall and Rectus	: 1hr
Inguinal canal, Spermatic cord and descent of testis	: 1hr
Peritoneum in brief	: 1hr
Development of GIT, derivatives and anomalies	: 1hr
Stomach including development	: 1hr
Portal vein	: 1hr
Liver	: 1hr
Kidney -gross features, development and anomalies	: 1hr
Prostate and male urethra	: 1hr
Rectum and Anal canal	: 1hr
Urinary bladder	: 1hr
Perineal Pouches	: 1hr
Ischioanal fossa	: 1hr
Pelvic floor	: 1hr
Seminars (Give more importance to applied Anatomy Lymphatic drainage and blood supply of all organs should be given importance)	: 6hr
Duodenum and development	: 1hr
Pancreas	: 1hr
Extra hepatic biliary apparatus	: 1hr
Supra renal gland	: 1hr
Ureter	: 1hr
Pudendal nerve	: 1hr

Diagrams

- I Cross Section Diagrams
- a Upper limb

	Name	Fig. No	Page No	Book
1.	Section through middle of arm	68	68	Cunningham's manual of practical Anatomy 15th Edn
2.	Oblique section through the hand	88	90	Cunningham's manual of practical Anatomy 15th Edn
B	Lower limb			
1.	Transverse section through middle of right thigh	124	872	Gray's Anatomy 38 th Edn
2.	Transverse section through middle of leg	182	196	Cunningham's manual of practical Anatomy 15th Edn
3.	Transverse section through knee joint	202	218	Cunningham's manual of practical Anatomy 15th Edn vol.1
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	Vol-2 Cunningham's manual of practical Anatomy 15th Edn
E	Abdomen			
1	Horizontal section through the abdomen at the level of epiploic foramen-T12 vertebra	139	124	"
2	Horizontal section through the abdomen at the level pylorus - L1 vertebra	128	116	"
3	Horizontal section through the abdomen at the level of -L4	129	116	"
F	Brain			
1	Transverse section of medulla at the level of Pyramidal decussation	11.1	137	Cunningham's manual of practical Anatomy 15th Edn Vol-3

2	Transverse section little above pyramidal decussation	11.2	138	""
3	Transverse section at the level of olive	11.3	140	""
4	Transverse section at the level of lower part of pons	11.5	143	" "
5	Transverse section at the level of upper part of pons	11.7	143	" "
6	Transverse section at the level of lower part of mid brain	11.8	144	" "
7	Transverse section at the level of upper part of mid brain superior colliculus	11.9	146 "	" "
8	Horizontal section at the level of inter ventricular foramen	282	286	"
	II Sagittal Section			
1	Sagittal section through shoulder joint	64	65	Vol-1
2	Median section of brain	238	255	Vol-3
3	Median section through malepelvis	235	216	Vol-2
4	Median section through female pelvis	236	216	Vol-2 Cunningham -15th Edn
	111 Gross Anatomy			
	a Upper limb-(1) Typical spinal Nerve	2	6	Vol-1
1	Brachial plexus	24	33	Vol-1
2	Anastomosis around elbow joint	80	82	Vol-1
3	Superficial palmar arch 4 Deep palmar arch	90	92	Vol-1
	b Lower limb			
1	Femoral triangle	131	140	Vol-1

2	Longitudinal arches of foot -Medial - Lateral	213	226	Vol-1
3	Structures surrounding the hip joint	10.33	591	Clinical Anatomy Richard S Snell
	c Thorax			
1	Typical intercostal space	16	12	Cunningham's manual 15th Edn- Vol-2
2	Relations of heart & great vessels to the anterior wall of thorax Surface marking- Borders , Surfaces, valves of heart)	53	44	Vol-2
3	Sternocostal surface of the heart	51	41	Vol2
	Mediastinal surface of lung -Left lung	41	32	Vol2
	Right lung	41	33	Vol2
	Abdomen			
	Visceral surface of liver	176	156	Vol-2
	Structures seen posterior to the stomach	149	132	Vol-2
	Anterior surface of right and left kidney showing relations	191	169	Vol-2
	Posterior surface of right and left kidney showing relations	190	168	Vol-2
	Head and neck			
	Diagrammatic section of eyeball	184	164	Vol3
	Dissection of submandibular region showing hyoglossus muscle and its relations	111	131	Vol-3
	Distribution of cutaneous nerves to Head & Neck	75	98	Vol-3

f	Brain			
	Circle of willis	196	218	Vol-3
	Blood supply of cerebrum			
	Inferior Surface	197	198	Vol-3
	Superolateral surface	201	221	Vol-3
	Medial surface	232	250	Vol-3
	Floor of IV ventricle- posterior view of brainstem	227	243	Vol-3

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

Introduction, Pectoral region and axilla, cutaneous nerves and vessels

The brachial plexus

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- anterior compartment, Posterior compartment of arm

The forearm and hand, Palmer aponeurosis, superficial palmar arch, Flexorretinaculum, Flexor tendons

The arteries and nerves of the flexor compartment of the forearm

Muscles of the front of the forearm and hand 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, urist joint, radio ulnar joints, intercarpal-carpo metacarpal

Intermetacarpal joints

Lower limb

60 hrs

Sole of the foot I and II layers, III and IV layers, V and VI layers

Front of thigh, 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

Ankle, Tibio-fibular and other joints, revision

Thorax

30 hrs

Introduction: Walls of thorax, Cavity of thorax Mediastinum, Root of lungs Autonomic nervous system The lungs, Anterior mediastinum, Middle mediastinum, surface anatomy of the heart, 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, 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 The parotid region, The parotid gland 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, mylohyoid muscle, hyoglossus stylohyoid, The mouth and pharynx, The cavity of the nose, 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 cerebellum, The fourth ventricle, The midbrain, pons, medulla The cerebrum, 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 The deep nuclei of the telencephalon The nuclei and connections of the thalamus, Cerebral topography

Abdomen

125 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, joints of pelvis

Perineum

12 hrs

Ischioanal fossa, Perineal pouches Perineal body, Pudendal canal

Histology

60hrs

Epithelium

Connective tissue

Cartilage- Hyaline, elastic, fibro cartilage

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- Male-Female Testis epididymis, vas deferens, prostate ovary uterus-proliferative and secretory, fallopian tube, cervix

Digestive system- Salivary gland- mucous, serous , mixed pancreas, liver, gall bladder, tongue , oesophagus stomach-fundus, pylorus, duodenum, jejunum, ileum, large intestine, appendix

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

Prescribed text books

1. Cunningham's Manual of Practical Anatomy-3 Volumes, 15th Edition
2. Essentials of Human Anatomy-A.K.Datta, 3 Volumes
3. Text Book of Anatomy by I.B.Singh, 3 volumes
4. Human Embryology-Inder Bir Singh
5. Human Neuro Anatomy-Inder Bir Singh
6. Human Neuro Anatomy-Vishram Singh
7. Text Book of Human Histology-Inder Bir Singh
8. Text Book of Human Histology-Gunasekharan
9. Surface and Radiological Anatomy-A. Halim & A.C.Das
10. Text Book of Osteology by I.B.Singh
11. Text Book of General Anatomy-G.P.Pal
12. Clinically Oriented Problem Based Anatomy-Dr.Neeta Kulkarni.
13. Gross Anatomy Text Books (3 Vol) – Dr. Vishram Singh

Reference text Books

1. Gray's Anatomy- 39th Edition/40th edition
2. Cunningham's text book of Anatomy- 11th edition
3. Grant's Method of Anatomy- J. V. Basmijan

4. Langman's Medical Embryology- T. W. Sadler 11th edition
5. Clinical Neuro Anatomy- Richar S Snell
6. Clinical Embryology- Richard S Snell
7. Essentials of Human Embryolgy- A. K. Datta
8. Essentials of Human Genetics- Bhatnagar, Kothari and Lopa Mehta
9. Histology Atlas- De Fiore
10. Text Book of Histology -Hamilton Bailey
11. Clinically Oriented Anatomy- Keith L Moore, 3 rd edition
12. Gray's Anatomy for students- Richard L Drake
13. The Developing Human- Moore and Persaud 8th edition
14. Clinical Anatomy by Regions Richard S Snell -8th edition
15. Human genetics -S.D.Gangane

Evaluation

University Examination

Theory-Topic Division

Paper I - General Embryology, General Anatomy, Genetics, Upper Limb, Lower Limb, Thorax

Paper II - Head and Neck, Brain, Abdomen, Pelvis, Perineum

MODEL QUESTION PAPER

First Professional MBBS Degree Examination

Paper I - ANATOMY

Time: 3 hrs

Max marks: 50

*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.

(1+4+2+3=10 marks)

Write briefly on:

2. Inversion and eversion of foot
3. Bronchopulmonary segments of right lung
4. Radioulnar joints

(3x5=15 marks)**Write notes on:**

5. Decidua
6. Medial longitudinal arch of foot
7. Clavipectoral fascia
8. Coronary sinus
9. Rotator cuff

(5x3=15 marks)**Write short answers on:**

10. Enumerate the derivatives of neural crest
11. Down's Syndrome
12. Microscopic structure of lymph node

(3x2=6 marks)**Draw neat labelled diagram of the following:**

13. Sagittal section through the shoulder joint
14. Sternocostal surface of heart

(2x2=4 marks)**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:

2. Ischiorectal fossa
3. Constituent fibres and arterial supply of internal capsule
4. 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)

9.2 BIOCHEMISTRY

(INCLUDING MEDICAL PHYSICS AND MOLECULAR BIOLOGY)

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 sub cellular components.
- (b) Delineate structure, function and inter-relationship of biomolecular 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 sequelae
- (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 defences 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. Analyse and interpret investigative data
3. Demonstrate the skills of solving scientific and clinical problems and decision making

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

DETAILED SYLLABUS

DETAILS OF COURSE

Duration of the course: 2 semesters Total number of hours: 240 Lectures: 160 Practicals + Seminar: 80 Innovative session (projects, seminars, structured discussion, integrated teaching, formative evaluation and revision): Along with practicals.

	DETAILS OF LECTURES	Hours allotted
(1)	Introduction- Structure and functions of cell, cellular organelles and bio membranes, (details of transport and ion channels in physiology).	1 hour
(2)	Biomolecules	15 hours
A.	Proteins Amino acids - classifications based on structure,	3

	<p>polarity, nutritional requirement and metabolic fate Important biochemical properties-ionic properties of amino acids, iso-electric pH, buffering action of amino acids and proteins, biologically important peptides</p>	
	<p>Structural organization of proteins with examples-insulin, collagen, primary, secondary, tertiary and quaternary structure</p>	2
	<p>Classification of proteins ,Denaturation, Coagulation ,isoelectric precipitation, precipitation using salt solutions, (colour reactions to be covered with practicals) , Electrophoresis & chromatography– briefly mention on separation techniques (details of techniques and application in practical demonstration)</p>	2
B	<p>Carbohydrates</p>	
	<p>Classification - Monosacharides – glucose, fructose, galactose, mannose. Reactions- reducing property, oxidation, reduction, furfurals, osazone (details along with practicals) Isomers, anomers and epimers. Derivatives like amino sugars and deoxysugars. Glycosidic bond.</p>	2
C.		2
	<p>Disacharides – lactose, sucrose, maltose.</p>	
	<p>Poly saccharides – starch, glycogen, dextrans, use of dextrans as plasma expanders, blood group antigens. Glycosaminoglycans (basic structural features and functions), Mucopolysaccharidoses</p>	
	<p>classification and enzyme defect only, blood group antigens</p>	2
(3)	<p>Lipids Definition</p>	10 hours
	<p>Classification with examples, saturated and unsaturated fatty acids, essential fatty acids , PUFA including omega 3 fatty acid ,triacyl glycerols, phospholipids – classification, structure and functions</p>	
	<p>Structure and function of bio membrane</p>	4

4	Enzymes	2
	Nature of enzymes, Coenzymes & cofactors, Classification	
	Mechanism of enzyme activity, active site, specificity	1
	Enzyme kinetics, Factors affecting enzyme activity, Km value and its significance(derivation not required)	3
	Types of enzyme inhibition – competitive, non-competitive, uncompetitive, suicidal, allosteric , feedback inhibition, kinetics and their clinical applications	7
	Enzyme regulation in biological systems – allosteric regulation, covalent modification, zymogen activation, induction and repression.	2 1
		18
5	Clinical enzymology – functional and non-functional enzymes, Isoenzymes, Diagnostic importance of enzymes – LDH, CPK, AST, ALT, ALP, ACP, GGT, NTP, GPD, cholinesterase, amylase, lipase Cardiac markers Therapeutic enzymes	3
	Digestion and absorption of nutrients – Carbohydrates ,Glucose transporters, disorders associated, dietary fibre	1
	Digestion of lipids and Malabsorption syndrome.	2
	Digestion and absorption of proteins, nitrogen balance, PEM	3
	METABOLISM OF CARBOHYDRATES	
	EMP Pathway -reactions, regulation in brief, energetics	2
6.	Rappaport-Leubering cycle, Fate of pyruvate in aerobic anaerobic conditions, PDH reaction	2

7.	Gluconeogenesis, key enzymes, regulation and significance, Cori cycle	
8	Glycogenesis, glycogenolysis ,regulation in brief ,inborn errors associated	3
. 9. B.	HMP Shunt pathway ,tissues where operating, NADPH generation, Transketolase reaction, G6PDdeficiency, functional significance of HMP shunt (non-oxidative phase need not be elaborated) Uronic acid pathway, Metabolism of galactose, fructose, polyol pathway, inborn errors associated	1 1 17
1.	Regulation of Blood Glucose level Action of insulin, receptors, glucagon, cortisol, growth hormone, adaptation during fed state, fasting state. & in starvation.	3
2	Diabetes mellitus, aetiology, bio chemical abnormalities symptoms & biochemical basis of complications (acute in detail and chronic in brief), Lab diagnosis and monitoring of Diabetes mellitus, microalbuminuria, Glycated hemoglobin.	2
3	Metabolic syndrome - Insulin resistance Glycosurias and reducing substances.	2
4	GTT- procedure, criteria of normal and diabetic status, interpretation of graph.	2
	METABOLISM OF LIPIDS	
5	Fatty acid oxidation- beta oxidation, transport of fatty acids across mitochondrial membrane, regulation, energetics, alpha oxidation-points only, Refsums disease, Zellwegers syndrome. Oxidation of odd chain fatty acid (need not be elaborated),fate of propionyl Co A Synthesis of fatty acids, fatty acid synthase complex, regulation, elongation and desaturation	2
6		4
	Formation and utilization of ketone bodies, ketoacidosis, in diabetes and starvation	1
7	Metabolism of adipose tissue, hormone sensitive lipase, action of hormones insulin, glucagon, epinephrine and cortisol. Liver-adipose tissue axis, Fatty liver and lipotropic factors, obesity,	1
C	Metabolic syndrome in brief.	16

1	Structure, synthesis of cholesterol upto mevalonate in detail then mention the intermediates with basic Chemical changes, regulation, metabolic fate, bile acids formation, bile salts, steroid hormones. Transport of plasma lipids, Lipoproteins-classification, metabolism, functions and disorders	1 3
3	– Dyslipidaemias, atherosclerosis, biochemical basis of management of hyperlipidaemia – diet and drugs, lipid profile.	2
4.	Phospholipids and sphingolipids-inborn errors.	2
5	Eicosanoids - Prostaglandins, thromboxanes and leukotrienes-formation (major steps only), biochemical actions.	2
6	METABOLISM OF AMINOACIDS	2
7	Body amino acid pool, dynamic state of body proteins, inter organ transport of amino acids, glucogenic and ketogenic amino acids	1
8	Reactions - Transamination, decarboxylation, oxidative deamination, transdeamination,	3
	formation and detoxification of ammonia, urea	6
D.	cycle, regulation and energetics, hyperammonemias –acquired and congenital	3
1	Metabolism of glycine, compounds synthesized, inborn errors associated	3
2	Metabolism of Sulphur containing amino acids-methionine and cysteine, transsulphuration, transmethylation, formation of taurine, PAPS, excretion of sulphur, inborn errors associated.	
(6)	Phenyl alanine and tyrosine metabolism, compounds synthesized inborn errors associated and VMA	6

1	Tryptophan- metabolism, compound synthesized and inborn errors associated, Hartnupsdisease,5HIAA & carcinoid syndrome	4
2	Histidine metabolism and inborn errors	2
(7)	Glutamic acid, GABA, Glutamine, asparagin, Aspartic acid- serine, threonine, arginine, NO and polyamines (synthesis and function), Brached chain aminoacids- MSUD (pathway not required).Biologically important amines, organic acidurias	9
1.	TCA CYCLE AND E T C	4
2.	Reactions, regulation, energetics, and significance, Inter relationship of carbohydrate, lipid, amino acid metabolism	2
3. 4.	Anaplerotic reactions, Amphibolic role , Metabolic adaptation during fed state and starvation	2
(8)	Electron transport system - components and site of ATP Synthesis, Mechanism of Oxidative Phosphorylation. ATP Synthase, uncouplers and inhibitors, brown adipose tissue.	7
1	HAEMOGLOBIN	2
	Heme synthesis& porphyrias- Breakdown of Hb, Biochemical basis of jaundice and distinguishing features of different types of jaundice, neonatal hyper bilirubinemias, lab diagnosis	1 4 3
	Haemoglobinopathies and thalasseмииs, haemoglobin derivatives and significance	
	VITAMINS	6

(10) 1.	(Classification, chemical nature, (detailed structure not required) Dietary sources, coenzyme form biochemical role, deficiency manifestations, daily requirement and toxicity of following vitamins	1
	. Vitamin A, D, K, E	2
2.	Thiamine, Riboflavin, Niacin, Pyridoxine, Biotin, Pantothenic acid	2
3.	Folic acid, one carbon metabolism and B12	
4.	Ascorbic acid and anti-vitamins	1
	MINERAL METABOLISM	
(11) A.	Classification Dietary sources, requirements absorption, biochemical role deficiency and toxicity of the following minerals	24
1.	Calcium and phosphorus - role of PTH, 1,25 DHCC and calcitonin	2
2	Iron – metabolism and disorders	2
3.	Copper, magnesium , trace elements - Zinc ,iodine, Fluoride, Selenium, Manganese Sodium, Potassium chloride	2
	XENOBIOTICS	2
4. B.	Biochemical basis of environmental health & environmental toxicology, mechanism of detoxification and role of cytochrome p 450 Deleterious effects of smoking , alcohol metabolism ,free radicals free radical scavenging system, lipid peroxidation, antioxidants	2

C.	MAINTENANCE OF HOMEOSTASIS	2
D. E.	Acid base regulation: pH, Acids, Bases, Buffers, Henderson Hasselbalch Equation in relation to body systems (derivation not required), buffer capacity	1 3
F.	Body buffers, Role of kidneys and lungs in Acid base homeostasis.	2
G.	Acid base disorders, causes , compensatory mechanisms , anion gap, assessment of acid base status	3
H.	Fluid and electrolyte balance – distribution of body water and disorders (hormonal regulation not in detail)	3
	NUCLEIC ACIDS and MOLECULAR BIOLOGY	3
	Structure of purines, pyrimidines, nucleosides, nucleotides	3
(12)	Purine: nucleotide synthesis and catabolism and inborn errors (synthetic pathway need not be considered in detail, with names of intermediates. Only the source of different atoms and sequence of addition). Salvage pathway and regulation, hyperuricemia and gout, Lesch Nyhan syndrome, hypouricemia	3
(13)	Pyrimidine: nucleotide synthesis, regulation, oroticaciduria, formation of deoxy nucleotides, thymidylate synthase reaction, folicacid antagonists and nucleotide analogues as chemotherapeutic agents(Antimetabolites)	4 3
(14)	Nucleic acids: structure and organisation of DNA, different types of DNA, mitochondrial DNA, base pairing rule, differences between DNA and RNA, different types of RNADNA replication, Telomerase, DNA polymerase, DNA repair (basic mechanism of repair and disorders Transcription, RNA polymerase, post-transcriptional modifications, splicing, inhibitors, reverse transcriptase, ribozyme	1 9

		2
	Genetic code, tRNA, ribosomes	1
	Translation, steps, post-translational modifications, inhibitors, Protein folding in brief and conformational disorders - chaperon, prion disease, protein targeting	2
		2
	Regulation of gene expression, induction, repression and depression. Gene rearrangement in brief	2
	Recombinant DNA technology, restriction endonucleases; southern, Northern and Western blotting. RFLP, DNA finger printing, Polymerase chain reaction, anti-sense therapy, Gene therapy, clinical application of above techniques, cloning	
	Biochemical basis of inherited disorders: Mutations, Pathogenesis of inborn errors of metabolism in general, types of mutations with examples in each case, mode of inheritance, Mitochondrial DNA and mitochondrial myopathies	
	PLASMA PROTEINS & IMMUNOGLOBULINS.	
	<p>Functions of plasma proteins, transport proteins, acute phase proteins Structure and functions of immunoglobulins, hyper and hypo gammaglobulinemias, monoclonal antibodies, multiple myeloma and Bence-Jones proteins, biochemistry of AIDS –immunology, reverse transcriptase and lab diagnosis- ELISA, Southern blot, PCR</p> <p>BIOCHEMISTRY OF CANCER</p> <p>Cell cycle, apoptosis, mutagens, Role of carcinogens in carcinogenesis, Tumour suppressor genes, oncogenes, viruses in carcinogenesis tumour markers- common parameters and their utility in clinical practice.</p> <p>CLINICAL CHEMISTRY</p> <p>Liver function tests- Common tests</p> <p>1 Performed serum bilirubin, enzymes, AG ratio, BSP test, urine tests and and interpretation of laboratory reports.</p> <p>2 Thyroid function test and interpretation</p> <p>3. Renal function tests- BUN ,NPN, Clearance</p>	

	test , tests of tubular function urine analysis and clinical interpretation of laboratory reports, newer renal markers – Cystatin C
4	Special laboratory investigations –RIA,ELISA, Principles of colourimetry,
5	Radioactivity – diagnostic, research, & therapeutic applications and radiation hazards
	(The topics mentioned above have to be covered within the stipulated period of one year. Hence the basic fundamentals may be covered as lectures and the other topics as tutorials, group discussions, integrated teaching sessions (horizontal and vertical), seminars and symposia. In all these sessions active participation of students must be ensured. A few topics have been identified for the non-conventional type of learning)

TOPIC DIVISION

PAPER-1 Topics (1) to (5)

Introduction, biomolecules, Enzymology, Digestion and Absorption of nutrients, Metabolism of Carbohydrates, Lipids, Proteins, TCA cycle & ETC

PAPER -II Topics (6) to (14)

Haemoglobin,, Vitamins , minerals, Xenobiotics, maintenance of homeostasis , Nucleic Acids & Molecular Biology, plasmaproteins & Immunoglobulins, Biochemistry of Cancer and clinical chemistry

DETAILS OF PRACTICALS 35sessions

1. Reactions of carbohydrates: glucose, fructose, lactose, sucrose 4 sessions
2. Reactions of proteins
3. sessions 3.Reactions of urea and uric acid/creatinine 1session (Hypobromite and specific urease test for urea and Benedict's test and Schiff's test for uric acid, Jaffe's test)
4. Identification of biochemically important compounds in given solution 3sessions
5. Normal urine-organic and inorganic constituents 2sessions 11
6. Abnormal urine-urinalysis (physical and chemical) 3sessions
7. Demonstration of electrophoresis-agargel-interpretation of simple patterns 1session
8. Demonstration of chromatography-paper/TLC-Diagnostic importance 1session
9. Haemin crystals 1session
10. Introduction to clinical chemistry-collection of samples, anticoagulants and Preservatives, principles of colorimetry 1session
11. Estimation of glucose-GTT curves-lab data analysis 1sessions
12. Estimation of urea in serum-calculation of clearance from given values of U and V 1session
13. Estimation of creatinine in urine or serum-calculation of clearance 1session
14. Estimation of total protein and albumin-A/G ratio 1session
15. Spotters-Demonstration –Simple instruments, graphs, tests etc. 1session

16. (a) Laboratory data interpretation-liver diseases, renal diseases, acid base disturbances, Diabetes mellitus, cardiac diseases, lipid profile-data interpretation, lipid disorders 2sessions
 (b) Problem solving exercises-short history of different conditions may be given and students will be asked to suggest investigations to arrive at a diagnosis 2sessions
17. Revision -5 sessions

TEACHING LEARNING METHODS			
Structured Interactive sessions, Tutorials, Group Discussions, Seminars,			
Projects, Self learning modules and e- modules etc.			
5 sessions			
SUGGESTED BOOKS IN BIOCHEMISTRY			
Books for study:			
1. Text of Biochemistry for Medical students by Vasudevan & Sreekumari -			
latest edition			
2. Harper's review of Biochemistry- latest edition			
3. Medical Biochemisty by Dinesh Puri -latest edition			
4. Lippincott's Illustrated Review of Biochemistry -latest edition			
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			
5. Textbook of medical Biochemistry by Bhagwan			
Evaluation			
University examination		Marks	
Theory paper I & II		50 + 50 =	100
Internal assessment			20
Viva			20

Practical I & II		20 + 20	=	40
Internal assessment				20
Total				200

MODEL QUESTION PAPER

**First Professional MBBS Degree Examination
Paper - I BIOCHEMISTRY**

Time: 3 hrs

Max marks: 50

Instructions:

Draw diagrams wherever necessary

Answer all questions

1. Name the sulphur containing amino acid. Discuss metabolism of the essential amino acid of this group and add a note on associated inborn errors.

(1+5+4=10 marks)

Discuss the following:

2. Complication of Diabetes mellitus
3. Components and sequence of reactions occur in Electron transport chain.

(2x5 =10 marks)

Write short notes on:

4. Structure of human insulin.
5. Structure of bio membrane.
6. Fatty acid synthase enzyme complex.
7. Glycation of haemoglobin and its significances.
8. What is the Normal serum cholesterol? Why HDL & LDL Cholesterol are known as good and bad cholesterol respectively?

(5x3 =15 marks)

Write briefly:

9. Key enzymes of gluconeogenesis.
10. Energy expenditure in Urea cycle.
11. Importance of Carnitine in lipid metabolism
12. Deficient enzyme and clinical features in galactosemia.
13. What is the biochemical basis of fatty liver in alcoholism?

(5x2 =10 marks)

Give precise answers:

14. What is the basis of curdling of milk?
15. Mention any four fate of acetyl CoA.
16. Mention any two functions of phospholipids.
17. Mention any two enzymes used as therapeutic agents
18. Why sample for glucose estimation is collected in a fluoride bottle?

(5x1 =5 marks)

MODEL QUESTION PAPER

**First Professional MBBS Degree Examination
Paper - II BIOCHEMISTRY**

Time: 3 hrs

Max marks: 50

Instructions:

*Draw diagrams wherever necessary
Answer all questions.*

1. What is translation? Discuss the process of translation and add a note on post translational modifications.

(1+6+3=10 marks)

Discuss the following

2. Porphyrias.
3. Renal mechanism of regulation of blood pH

(2x5=10 marks)

Write short notes on:

4. Telomerase
5. Orotic aciduria.
6. Cytochrome P450.
7. Diseases related to copper metabolism
8. Role of one carbon compounds in purine & pyrimidine formation.

(5x3=15 marks)

Write briefly:

9. Creatinine clearance
10. Metabolic role of vitamin C.
11. Factors affecting electrophoresis.
12. Effects of radiation on normal tissue
13. Deficient enzyme and clinical features in Lesch – Nyhan syndrome.

(5x2=10 marks)

Give precise answers:-

14. Nucleosomes
15. Klenow fragment
16. Name two selenium containing enzymes.
17. Mention any two oncosuppressor gene.
18. Name the most important extra cellular caution and write its normal serum level.

(5x1=5 marks)

9.3 HUMAN PHYSIOLOGY INCLUDING BIO-PHYSICS

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

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

DETAILS OF CLASSES IN PHYSIOLOGY

General Physiology

LECTURES	3 hrs
Introduction to Physiology Principles of Homeostasis Structure of cell membrane Transport Mechanism Intercellular communication	
	2 hrs
Body Fluid compartments – divisions, composition, and determination (mention Fick's principle) Blood volume – normal value, abnormalities – hypovolemia & hypervolemia	
	1 hr
SEMINAR/ TUTORIAL	
Apoptosis and aging	1 hr
Homeostasis	2hrs

HEMATOLOGY

LECTURES	20 hrs
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Introduction

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

Plasma proteins: types, quantity, functions, A: G ratio, abnormal proteins (2) - Bence Jones & C reactive proteins 1 hr

Red Blood Cells

Morphology, composition and functions, normal RBC count and variations

Properties – PCV, ESR, Osmotic fragility – definition, normal values, factors affecting and variations (methods in practical classes).

1 hr

Haemoglobin – outline only normal basic structure, normal content, functions, types (Hb A, Hb A2 and Hb F) abnormal Hbs (only two - Thalassemias & Haemoglobin S)

1 hr

Erythropoiesis – sites (intra and extrauterine) different stages, Factors influencing & regulating Erythropoiesis Life Span of RBC and its destruction (outline), jaundice (mention)

1 hr

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

Bone marrow study – Importance, myeloid: erythroid ratio

1 hr

White Blood Cells:

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,

Leucopoiesis

4 hrs

Immunity

Definition,

Types – innate and acquired, Humoral and cellular

Mechanisms of immune response, plasma cell, immunoglobins, Autoimmune disorders, AIDS (mention)

1 hr

Platelets:

Morphology, properties and functions, normal count, variations, thrombopoiesis, and factors Influencing this

1hr

Reticulo endothelial system (briefly)

½ hr

Haemostasis

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)

Anticoagulants - used in lab and in vivo

Bleeding disorders

Purpura, Hemophilia, Vitamin K deficiency

Tests for bleeding disorders – bleeding time, clotting time (in practicals)

Prothrombin time and PTT (principles only)

Thrombosis and Embolism – mention

4hrs

Blood groups

ABO and Rh systems, inheritance, differences, Bombay group,

Landsteiner's laws I and II

Mention about other minor blood groups, Bombay blood group (mention)

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)

2 hrs

Blood banking and transfusion

Blood transfusion – indications, precautions and complications
 Blood Banking – anticoagulants used, storage, changes during storage
 Transfusion of blood components – with special reference to recent advances

1½ hrs

Lymph – formation, circulation, functions

Tissue fluid – formation, circulation and functions

Starling's hypothesis – edema formation

1hr

SEMINARS / TUTORIAL

Reticuloendothelial system

2 hrs

INTEGRATED TEACHING

Immune mechanisms (with microbiology department)

Modern trends in blood banking (with transfusion medicine department)

Blood and bone marrow smears – normal and abnormal (with pathology dept)

6 hrs

CARDIOVASCULAR SYSTEM**LECTURES**

24 hrs

Functional anatomy of heart and blood vessels

Chambers, valves, great vessels, Systemic and pulmonary circulations

Structure and functions of different segments of blood vessels – correlate with functions

Properties of cardiac muscle

Excitability, rhythmicity, conductivity, contractility, distensibility, Treppe (mention)

1hr

Conducting system of heart

Parts of conducting system, origin and spread of cardiac impulse,

Abnormal pacemakers, conduction defects

1hr

Cardiac cycle:

Definition, phases, events of cardiac cycle

Pressure changes – Atria, Jugular vein (mention clinical significance).

Ventricles – right and left

Aorta and Pulmonary artery

Methods of measurement, cardiac catheterization – basic principle

Volume changes – in different chambers.

Heart sounds – causes, character, murmur (definition, physiological basis)

Arterial Pulse - genesis and characters of normal pulse

Common abnormalities in practical classes

Venous blood flow-Venous tone, valves

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

Echo cardiography (principle only)

5hr

ECG

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

Clinical uses of ECG – (mention)

Abnormal ECG pattern in myocardial infarction, cardiac arrhythmias (briefly)

Effect of changes in ECF K^+ , Ca^{++} and Na^+ Conduction defects - define IO, 20 and 30 block (mention)

2hr

Cardiac output:

Definition, normal values, variations

Method of measurement (Fick's principle – mention)

Regulation of cardiac output – heart rate - Regulation of heart rate, stroke volume – determinants, regulation

Correlation of normal ECG pattern with events of cardiac cycle in a diagram

5hr

Haemodynamics

Functional organisation correlated with structure of vascular system (review)

General principles including physical laws governing flow of blood in heart and blood vessels -Pressure – resistance - flow relationship, Poiseuille-Hagen formulae, law of Laplace

Laminar flow, turbulent flow, Reynold's number, critical closing volume

Importance of peripheral resistance, venous circulation, venous tone

Regulation of blood flow

2hr

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

3hr

Regional circulation

Coronary, capillary, cutaneous, cerebral, foetal, pulmonary, renal, and splanchnic circulation to be taught in respective systems

3hr

Circulatory shock

Types pathophysiology, stages, compensatory mechanisms

1hr

Cardio-vascular adjustments in health and disease

Effects of exercise, effect of gravity (+ve and -ve), weightlessness (brief)

1hr

Seminar/tutorial

Cardiovascular changes in exercise

Effect of gravity (+ve and -ve), weightlessness

2hr

Integrated teaching

Current investigative procedures in cardiology (with cardiology dept)

2hr

Respiratory System

LECTURES

16 hrs

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
-1hr

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

-2hrs

Measurement of pulmonary ventilation

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) Ventilation – pulmonary and alveolar

Dead space – Anatomical & Physiological- definition, normal values, variations (1-2 eg) (Measurement not needed)

-2 hrs

Pressure – volume relation ship

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

-1 hr

Pulmonary blood flow

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

-1 hr

Pulmonary gas exchange

Composition of inspired air, expired air, partial pressures gas composition of Arterial & venous blood

Mechanism of gas exchange

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 facilitates O₂ transport O₂ dissociation curve, factors shifting curve to right and left, P50 foetal Hb, Myoglobin, carboxy Hb.

-2 hrs

Co₂ transport in blood

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

-1 hr

Regulation of respiration

Neural control – neural centres, 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, Interactions between these
chemical stimuli (mention –details not required)

-3hrs

Hypoxia

Definition, types, clinical features, differences Oxygen therapy

Cyanosis, asphyxia and dyspnoea

Definition, CO poisoning (mention)

Periodic breathing Cheyne – stokes and biots breathing, voluntary hyperventilation

-1hr

Environmental Physiology

High altitude, rapid ascent, mountain sickness, acclimatization Effects of UV rays, dysbarism

-1hr

Effects of increased barometric pressure

Nitrogen narcosis, High pressure nervous syndrome, Oxygen toxicity Decompression
sickness (Caissons disease)

-1hr

Artificial respiration

Mouth to mouth, Holger-Neilson method, mechanical methods, ventilators

-1 hr

SEMINAR / TUTORIAL

Respiratory changes during exercise

Space physiology – effect of “G” forces on respiratory system

INTEGRATED TEACHING

-4 hrs

Pulmonary (Lung) function tests (with respiratory medicine dept)

Cardiopulmonary resuscitation

Gastrointestinal System**LECTURES****-12 hrs**

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

-1hr

Salivary glands

Functional anatomy (types and location) with relevant histology in brief

Saliva

Composition, functions, control of secretion

Conditioned and unconditioned reflexes

Disturbances in salivary secretion – in anxiety and dehydration

-1 hr

Gastric secretion

Functional anatomy of stomach and different gastric glands

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

-3hr

Pancreatic secretion -- exocrine Pancreas

Functional anatomy with relevant histology

Pancreatic juice: Composition, function, and regulation of secretion

(neural and humoral – CCK and secretin)-applied importance (mention steatorrhea)

-2hr

Liver and gall bladder

Functions of Liver, Functional anatomy with relevant histology

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

Functional anatomy with relevant histology

Composition, regulation of secretion, and functions of intestinal juice

Small intestine – Functions

-1hr

Movements of G.I. tract

Electrophysiology of smooth muscle in the GIT (revise) – BER, MMC

Peristalsis – definition, basis, functions

Mastication – definition, muscles involved, functions and regulation

Deglutition – definition, muscles involved, stages, functions and regulation

-1hr

Gastric motility – types, regulation, abnormal movements (vomiting, diarrhoea)

Gastric emptying – duration, factors affecting

-1hr

Movements of small intestine

Types with reference to BER – mixing, pendular, movements of villi and peristalsis

-1hr

Large intestine

Functions – secretory, motor, absorptive, synthesis of short chain fatty acids

Defecation reflex

Role of dietary fibre, bacterial flora -1 hr

SEMINAR / TUTORIAL

Gastro intestinal hormones (Gastrin, CCK-PZ, Secretin, Villikinin, VIP, GIP) -4hr

ASSIGNMENT

Bowel function test and blind loop syndrome
Digestion and absorption of carbohydrates, fats and lipids -4hr

INTEGRATED TEACHING

Liver and biliary system (depts of physiology, anatomy, biochemistry and internal medicine) -2hr

Renal System

LECTURES

Introduction Functions of kidney – homeostasis, as an endocrine organ Functional anatomy of Kidney Nephron-structure, parts, function, types (in detail)

Renal circulation

Normal flow, regulation, peculiarities, and principle of measurement
Juxtaglomerular apparatus
Site, structure, function

-1hr

Glomerular filtration

Definition, rate, filtration membrane, forces governing filtration and permeability of the membrane, measurement of GFR Clearance values – definition, values for glucose, inulin, and urea

-2hrs

Tubular functions

Tubular reabsorption – define Sodium, glucose, water, urea, electrolytes - sites, mechanisms involved Water - reabsorption in different segments – obligatory and facultative

Tubular secretion – H⁺ (acidification), K⁺ Filtered load, Tubular maximum, glomerulo tubular feedback, and renal threshold

- 1 hr

Acidification of urine Mechanisms and sites of H⁺ secretion, pH changes along renal tubules, fate of H⁺ in the renal tubule (buffer systems), non-ionic diffusion

-1 hr

Concentration of urine 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

-2hrs

Micturition

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
-2 hrs

Urine

Normal volume, constituents Abnormal constituents – albuminuria, glucosuria (mention) Polyuria, Oliguria, Anuria (mention) Dialysis – artificial kidney (basic principles of hemo and peritoneal dialysis) Renal function tests (mention)
-1 hr

SEMINAR / TUTORIAL

-6 hrs

Acid base balance

Juxtaglomerular apparatus

Water and electrolyte balance

Skin and Temperature regulation

Structure and function of skin

Methods of heat conservation and loss in human body Regulation of body temperature – role of skin, hypothalamus Hyperthermia, Fever, Heat stroke, hypothermia, cold injuries (frost bite)
-2 hrs

NERVE – MUSCLE PHYSIOLOGY**LECTURERS**

-10 hrs

Excitable tissue

Definition, properties

Neuron

Structure of a typical neuron, types, properties, functions

StimulusDefinition, types – threshold, subthreshold, suprathreshold
-1hr**Nerve fibres**

Types, classification, and functions

Resting membrane potential

Definition, ionic basis and genesis
-1hr**Nerve action potential**

Definition, ionic basis and properties, Monophasic, biphasic and compound action potential
-1hr

Transmission of nerve impulses

Types (myelinated and unmyelinated), differences in impulse transmission

Velocity of conduction and factors affecting it -1hr

Peripheral nerve injury

Wallerian degeneration, regeneration, denervation hypersensitivity -1hr

Neuromuscular junction

Functional anatomy, transmission of impulses across neuromuscular junction, EPP

Neuromuscular blocking drugs (important ones with clinical correlation)

Pathophysiology of Myasthenia Gravis -1hr

Muscles

Classification

Skeletal muscle

Structure including molecular details, properties

Action potential - Definition, ionic basis and properties, Comparison with nerve action potential

Molecular basis of muscle contraction - Excitation – contraction coupling

Types of muscle contraction – isotonic and isometric with examples

Muscle types – fast and slow, differences

Energy sources and metabolism in muscle at rest and during contraction

Muscular changes during exercise

Length –tension relationship

EMG – basic knowledge of what it is and clinical importance

Fasciculation, fibrillation (briefly) -2hrs

Cardiac muscle

Structure, properties

Action potential- Definition, ionic basis and properties, Comparison with nerve and muscle action potential

Pacemaker potential - molecular basis, properties

Mechanism of contraction

Length – tension relationship -2hrs

Smooth muscle

Types, Structure, innervation and neuromuscular junction

Potentials –types, ionic basis

Mechanism of contraction - Excitation – contraction coupling

Plasticity (cystometrogram to explain)

Length – tension relationship (mention) -1 hr

SEMINAR / TUTORIAL

Comparison of structure and functions of the three types of muscles

Comparison of the excitation – contraction coupling in the three types of muscles

INTEGRATED TEACHING

EMG

NERVOUS SYSTEM

LECTURES

-30 hrs

Organisation of nervous system

General organisation Functional anatomy of brain and spinal cord, Coverings, white and grey mater – review briefly

Brain – lobes, functions, Brodmann's areas –important ones with functions Neuron, neuroglia – functions **Spinal cord** – Functional anatomy -coverings, structure, white and grey mater Cross section with location of sensory, motor and autonomic neurons and tracts
-2hrs

Cerebro spinal fluid

Ventricles of brain, Blood-brain barrier- importance CSF – formation, circulation, composition, functions, Lumbar puncture (brief)

-1 $\frac{1}{2}$ hrs

Synapse

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 with examples

Neurotransmitters – facilitatory and inhibitory with 2-3 eg and clinical applications

-3hrs

Reflex action

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

Sensations

Classification

-1hr

Sensory tracts

Organisation of sensory pathways

Name all ascending pathways of spinal cord

Tracing of pathways from body and face

Medial lemniscal system – dorsal column sensations

Spino thalamic system

- Sensation of touch and pressure
- Sensation of pain and temperature

Synthetic sensations

- Other ascending tracts – salient features-spinoreticular, spinocerebellar
- Pain Sensation – details

Different types of pain

Slow and fast pain – types of fibres, tracts and terminations

Modulation of pain - Spinal level, supra spinal level

Visceral pain, referred pain, radiating pain, - clinical correlates
 Altered pain sensations -3hrs

Thalamus

Functional anatomy, nuclei – classification, connections, Functions of thalamus
 Thalamic syndrome -1hr

Sensory Cortex

Location – primary area, secondary area, association areas
 Salient histological features
 Body representation -sensory homonculus
 Functions of primary, secondary and association areas
 Lesions -1hr

Cerebral Cortex

Brodmann's areas other than sensory & motor areas, Functions

Motor system

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

Reflex action

Definition, reflex arc - components
 Classification with examples (brief review)
 Stretch reflex, inverse stretch reflex, reciprocal innervation, withdrawal reflex
 o Review cross section of spinal cord – various ascending and descending Pathways
 o Stretch reflex – details and function
 Inverse stretch reflex, Reciprocal innervation, Other poly synaptic reflexes
 Pathological – Babinske sign -2hrs

Motor Cortex

Primary motor area and pre motor areas, Histological features
 Body representations -homonculus
 Functions

Descending tracts

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 -3hrs

Spinal cord injuries

Injuries of spinal cord: complete transection, incomplete transection, hemisection, section of anterior and posterior roots, injury to motor nerve -2hrs

Basal ganglia –

Organisation
 Normal Neuronal masses included
 Connections (afferent, efferent, inter connections)
 Functions
 Disorders – Parkinsonism, Chorea, Athetosis with explanation of the Physiological basis of the signs and symptoms

Wilson's disease – mention -2hrs

Cerebellum

Functional anatomy, Functional and evolutionary divisions, functions
Deep cerebellar nuclei, connections in relation to functions, functions
Neuronal circuit (mention)

Cerebellar lesion – features and their physiological basis -2hrs

Reticular formation

ARAS, descending reticular system –explain control of muscle tone

Limbic system

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

EEG and sleep

Define EEG, principle of recording,
Normal waves (α , β , δ and θ), alpha block, Clinical uses (mention)

-1hr

Vestibular apparatus

Functional anatomy - gross structure, receptors, receptor potential Connections and
Vestibular pathway, Functions

-2hr

Muscle tone, posture, equilibrium

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

-1hr

Hypothalamus

Functional anatomy, Nuclei, connections and functions (neural)

-1hr

Higher functions of the brain

Learning
Memory – types -
Speech – Types, Mechanisms of speech, Aphasia – classification

-2hr

Autonomic nervous system

Organisation and functions

SEMINAR / TUTORIAL

-8hr

Autonomic nervous system: sympathetic and parasympathetic systems.

Higher control – role of reticular formation and hypothalamus

-2hr

Hypothalamus: Nuclei, connections and functions

-2hr

Limbic system: parts and functions

CS of Spinal cord: to show tracts: Effects of lesions of spinal cord, nerve roots and nerves

-2hr

CSF: Formation, circulation, composition and functions

-2hr

SPECIAL SENSES

LECTURES -10hr

Olfaction -1hr

Receptor, pathway, lesions – anosmia, parosmia

Taste -1hr

Taste buds, receptor, primary taste sensations, pathway

Vision
LECTURES -8hr

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 -1½ hr

Basic optics

Optical system of the eye

Refractive media of eye -Refracting surfaces & refractive indices

Concepts of reduced eye, Image formation on retina

Emmetropic eye

Far and near points

Accommodation and accommodation reflex (Near response) –

3 components - Pupillary constriction, convergence of eye balls, increased anterior curvature of lens.

Range and Amplitude of accommodation

Errors of refraction – chromatic and spherical aberrations, hypermetropia, myopia, and Astigmatism

presbyopia, – causes (brief) features and corrective lenses

Contact lenses (mention) -2hr

Visual receptors (cones and rods)

Structure in detail

Visual pigments, role of vitamin A

Phototransduction

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)

Colour vision

Primary, secondary and complementary colors (mention)

Hue, brightness and saturation (mention)

Receptors

Trichromatic and Opponent Process Theories

Color blobs – location and function

Color blindness

Afterimages, contrasts

-3hr

Visual pathway

Mono ocular and binocular vision

Visual signals -Processing in the Retina

Pathway -Important features to be specified at all levels (on- off mechanism and details of cellular organization in different levels not required)

Effects of lesion at different levels

Macular sparing (recent views)

Visual cortex – all areas and functions

Visual reflexes

Papillary light reflex (direct and indirect) - pathway, lesion, Miosis & mydriasis (mention)

Accommodation reflex – pathways, lesions

Corneal reflex - pathway

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

-1 $\frac{1}{2}$ hr

AUDITION

LECTURES

-4hr

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 localisation, pitch discrimination, masking of sounds

Deafness (conduction and nerve deafness) – tests in practicals

Audiometry (details in practicals)

-1hr

SEMINARS / TUTORIALS

-6hrs

Lacrimal apparatus and tear, Aqueous humor, intraocular pressure

Role of Vitamin A in vision
 Functions of middle and inner ear

ENDOCRINOLOGY

LECTURES

-15 hrs

General endocrinology

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

Hormonal assay – mention about RIA, ELISA (no details)

-2 hrs

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

Functional anatomy, cell types
 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

-3 hrs

Thyroid gland

Hormones- names, biosynthesis (details in biochemistry), transport, physiological actions (physiologic, pharmacologic and pathologic) and regulation of secretion (H-P-T axis)

Thyroid function tests (details in biochemistry)

Hyper and hypofunction in children and adults – Cretinism, Myxedema, Hyperthyroidism

-2 hrs

Pancreas – endocrine

Functional anatomy, Hormones- physiological actions and regulation of secretion

Insulin - receptors and insulin resistance (mention) Physiological actions Regulation of secretion Hyper and hypofunction – diabetes mellitus and hypoglycemia

Glucagon – physiologic actions on carbohydrate, proteins and fat metabolism, on heart
Regulation of secretion

Somatostatin – site of production, actions, stimuli for secretion, paracrine regulations.

Pancreatic polypeptide – site of secretion, factors which increase secretion, actions
-2 hrs

Adrenal gland

Adrenal Cortex

Functional anatomy – 3 layers (briefly)

Biosynthesis of adrenal cortical hormones (details in biochemistry)

Hormones of adrenal cortex - glucocorticoids, mineralocorticoids, sex steroids

Transport, physiological actions and regulation of secretion

glucocorticoids -metabolic, permissive, anti inflammatory, anti allergic and in stress
Regulation of secretion – H-P-A axis

mineralocorticoids – role in salt and water balance, stress
Regulation of secretion – effects of K⁺, Na⁺, ACTH
Hyper and hypofunction – Cushings syndrome
Primary and secondary hyperaldosteronism, Addisons disease

Adrenal medulla

Hormones (catecholamines) , regulation of secretion, Pheochromocytoma -3hr

Calcium homeostasis

Normal calcium metabolism (outline)

Parathyroid hormone, calcitonin and vitaminD - target organs and physiological actions

Hypocalcemia and tetany -1hr

Other endocrine glands

Hormones, 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
-1hr

Physiology of growth and development

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

SEMINARS / TUTORIALS - 6hr

Calcium homeostasis : – parathormone, vitamin D and Calcitonin, Other regulating hormones

Adrenal medulla

Physiology of growth and development: Hormonal and other influences

PHYSIOLOGY OF REPRODUCTION

LECTURES

-11hr

Introduction

Sex organs, genetic basis of sex

Sex differentiation and development of Reproductive system

Briefly on factors influencing development of genitalia – hormones

Aberrant sexual differentiation

Chromosomal (Turners and Klinefelters), developmental (adrenogenital, hermaphroditism)

Puberty – normal, precocious and delayed puberty

-1hr

Male reproductive system

Functional anatomy

Functions of testis – endocrine -testosterone (functions and regulation of secretion)

- Spermatogenesis and factors influencing and regulating this Abnormalities of testicular function - cryptorchidism, male hypogonadism (mention)

Erection, ejaculation, composition of semen, sterility

-2hr

Female reproductive system

Functional anatomy

Ovary - oogenesis, ovulation, corpus luteum, ovarian hormones- estrogens, progesterone, relaxin

Control of ovarian functions by H- P- Gonadal axis

Pituitary gonadotropins (FSH, LH), Prolactin – physiologic actions, regulation of secretion

-2hr

Menstrual cycle

Menstrual, proliferative and secretory 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

-2hr

Pregnancy

Fertilisation, implantation, Corpus luteum of pregnancy

Placenta – functions, Placental hormones

Foetoplacental unit

Pregnancy tests – immunological (currently done)

Parturition – physiology of labour

Lactation

Hormones influencing and their actions

-3hr

Contraception

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

-1hr

INTEGRATED TEACHING

-4hr

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

DETAILS OF PRACTICALS**Human Physiology**

-76hr

1. Use and care of microscope and microscopic examination of blood
2. PCV, ESR, osmotic fragility
3. Haemoglobin estimation and blood indices
4. RBC count
5. WBC count
6. Examination of peripheral blood smear
7. Differential WBC count – normal, abnormal, anaemias
8. ABO grouping, Rh typing
9. Bleeding time, clotting time
10. Recording of BP – effects of posture and exercise
11. Recording of arterial pulse only
12. Respiratory movements demonstration
12. General examination
13. Examination of Respiratory system
14. Examination of CVS
- 15 Examination of higher functions and sensory system
- 16 Examination of Motor system
17. Examination reflexes
18. Examination of cranial nerves 1-6
19. Examination of cranial nerves 7-12
20. Revisions as required (38 hrs)

Experimental physiology

-28hr

1. Appliances in experimental physiology Laboratory including physiograph
2. Pithing, muscle nerve preparation, mounting, effects of different types of stimuli
3. Simple muscle twitch
4. Two successive stimuli, repetitive stimuli and fatigue
5. Genesis of tetanus and Starling's law of muscle (demonstration)
6. Effect of load and after load on muscle contraction
7. Effects of variations of temperature on muscle contraction
8. Velocity of nerve impulse (demonstration)
9. Normal cardiogram of frog's heart and effects of heat and cold.
10. Effect of temperature on frog's heart
11. Refractory period of frog's heart
12. Stannius ligatures. Properties of cardiac muscle – all or none law, treppe, summation of subminimal stimuli (demonstration)
13. Effect of vagal stimulation on frog's heart
14. Perfusion of frog's heart – action of ions, action of drugs
 (Nos. 4 to 8 & 10 to 14 – demonstration through e-modules/recorded graphs)

DEMONSTRATE SIMPLE MUSCLE TWITCH and NORMAL CARDIOGRAM

Others can be demonstrated with e- modules / recorded graph

Demonstrations (with e- modules / recorded graph/ clinical postings) -16hrs

I. Mammalian experiments

1. Heart perfusion

2. Intestinal movements

II. Biopotentials on Oscilloscope

Electro encephalogram (EEG), Electro miogram (EMG), Electro Cardio Gram (ECG),

III. Audiometry, Perimetry, Spirometry

Recommended Text Books**Prescribed Books**

1. Text book medical physiology – Arthur C. Guyton: W.B. Saunders

2. Review of Medical Physiology – W.F. Ganong – Lange Medical Book ed. 22nd.

3. Understanding Medical Physiology. R.I. Bijalani Jaypee Publishers

4. Best and Taylor's physiologic basis of medical practice J B West (edn) William and Walkins

Reference Books

1. Text book of Human Physiology. Madhavan Kutty, Sarada Subramaniam, HD Sing, S. Chand and Company

2. Wintrobe's Hematology

3. Williams text book of Endocrinology

4. Snell's neuroanatomy

EVALUATION

M.C.I. Guidelines

o Problem solving exercises

o OSPE (Objective Structured Practical Examination)

o Records – review

o Viva Voce – with practicals

o Written case scenario

University Examination	Marks
Theory Paper I, II	50+50=100
Internal Assessment	20
Practicals I, II	20+20= 40
Internal Assessment	20
Viva Voce	20
Total	200

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)

MODEL QUESTION PAPER**First Professional MBBS Degree Examination
Paper - I PHYSIOLOGY****Time: 3 hrs****Max marks: 50*****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.

- Give the most appropriate name of this clinical condition.
- What is the life span of RBC and how do you measure it?
- List the steps of breakdown of Haemoglobin

(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 Carbondioxide 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. Juxtglomerular 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
Paper - II PHYSIOLOGY**

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 Hemiplegia with UMN facial nerve palsy of the right side

- Name the tract affected in this patient
- Mention the most probable site of lesion
- Trace the affected pathway with the help of a diagram
- State the differentiating features of Upper Motor Neurons and Lower Motor Neuron lesions
- 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

(5x3=15 marks)**Draw and label:**

9. Organ of Corti
10. Hormonal changes during normal menstrual cycle.

(2x2½ =5 marks)

Write short notes on:

11. Actions of aldosterone
12. Impedence matching
13. Functions of sertoli cells
14. Sarcomere
15. Pre Synaptic Inhibition

(5x2=10 marks)

9.4 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.

Period of study	-	III, IV and V Semester.
Duration of training	-	18 months.
Methods of instructions	-	
Lecture	-	30 hrs.
Practicals and Innovative sessions-		70 hrs.
Total no of hours	-	100Hrs.

	TOPIC	Method of teaching	Hours
	Forensic medicine	Lecture	1
1	Definition of forensic medicine, Forensic pathology and medical jurisprudence		
2	Introduction to the subject, historical aspects of forensic medicine.		
3	Inquest procedures	Lecture	3
4	Courts in India and their powers. Supreme court, High court, Sessions court, Assistant sessions court and Magistrate courts.	Innovative session (Moot court) Practical	2
5	Court procedures. Summons, warrant, Conduct money, Oath/affirmation, Types of witnesses, Recording of evidence, Conduct of doctor in witness box, Perjury, Hostile witness.		2
6	Medical certificates and Medico legal reports. Birth, death, wound, drunkenness, potency, offence cases, intimation, notification.	Lecture	1
7	Death sex	Lecture	4
8	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. B) Decomposition, modified forms of decomposition, estimation of time since death. C) Common post mortem artifacts.	Practical demo.	4

9	Identification	Lecture	1
	A) Definition. 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.	Practical demo. Group discussion.	2 2
10	Medico legal autopsy and exhumation. A) Definition of medico legal and clinical/pathological autopsy. B) Objectives, procedures and formalities of medico legal autopsy. C) Preservation of articles and tissues of importance during autopsy.	Lecture	1
		Practical	6
11	Mechanical injuries or wounds. A) Definition of wound, injury, hurt, assault, battery. 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 injuries, 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.	Innovative (Gp.discn.)	6
		Practical	6

	<p>F) Injuries due to traffic occurrences.</p> <p>G) Injuries due to physical agents and their medico legal importance: Heat, cold electricity and lightning. Explosion injuries.</p>	Innovative (Project)	4
12.	<p>Asphyxial deaths: Definition, causes, types, postmortem appearances and medico legal significance of violent asphyxia deaths like hanging, strangulation, suffocation, smothering, choking, drowning, traumatic asphyxia.</p>	Lecture Innovative (Gp.discn)	4 2
13	medico legal aspects of Deaths due to starvation-forced feeding.	Practical	4
	Human sexual functions:	Lecture	2
14	<p>A). Potency, sterility, virginity, pregnancy, delivery.</p> <p>B) Abortion, MTP, sexual sterilization, artificial insemination and their legal aspects.</p> <p>C) Sexual offences and abnormal sexual practices.</p> <p>D) Legal aspects of the above.</p>	Lecture Innovative (Gp.discn) Lecture Practical	3 2 1 2

	<p>ethics in medical practice.</p> <p>D) Professional secrecy and privileged communication.</p> <p>E) Medical negligence: Civil, criminal, contributory negligence, vicarious responsibility, res ipsa loquitur, prevention of medical negligence and defence in medical negligence suits.</p> <p>F) Consent; Types, age in relation to consent, consent in relation to mental illness and alcohol intoxication, consent in emergency situations.</p> <p>G) Consumer protection act.</p> <p>H) Certification of births, deaths, illness, fitness, disability.</p>	Innovative (Seminar)	
19.	<p>Forensic toxicology:</p> <p>A) Definition and general principles of management of a case of poisoning.</p> <p>B) Medico legal duties of a doctor in a case of poisoning, preservation and dispatch of viscera for chemical analysis. Role of chemical examiner's laboratory and forensic science laboratory in brief.</p> <p>C) Diagnosis and principles of therapy and medico legal aspects of the following poisons, giving special emphasis to those of regional importance</p> <p>-a) Corrosive poisons: strong mineral acids, alkalis and organic acids-(carbolic, formic and oxalic acid).</p> <p>b) Metallic poisons: Lead, Arsenic, and Iron.</p> <p>c) Animal poisons-snake and scorpion</p>	Lecture Innovative (Seminar) Innovative Integration Pharmacology	2 5 4

	<p>bites.</p> <p>d) Deliriant: Dhatura, Cannabis and Cocaine.</p> <p>e) Inebriants: Methyl and Ethyl alcohol.</p> <p>f) Asphyxiants: Carbon monoxide, carbon dioxide, Hydrogen sulphide and Cyanides.</p> <p>g) Cardiac poisons: Cerbera odollam, Cerbera thevitia, Nerium odorum.</p> <p>h) Insecticides: Organophosphorous compounds, Carbamates and Organochloro compounds, Aluminium phosphide and Zinc phosphide.</p> <p>D) Drug abuse and dependence.</p> <p>E) Inorganic non metallic poisons: Phosphorous.</p> <p>F) Organic vegetable irritants: Abrus precatorius, capsicum, calotropis, Semicarpus anacardium, Croton.</p> <p>G) Convulsants: Strychnine.</p> <p>H) Paralytic agents: Curare.</p> <p>I) War gases and industrial gases.</p> <p>J) Chloral hydrate.</p> <p>K) Mechanical poisons.</p>	<p>Practical</p> <p>Innovative</p> <p>(Gp.discn)</p>	
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SKILLS		Level of achievement			
		Able to perform independently	Able to perform under guidance	Assist	Observe
1.	Prepare certificates of birth and death.			1	
2.	Prepare dying declaration.			2	
3.	Give evidence in court of law as expert witness.				3
4.	Collect, preserve and properly label and dispatch specimens of medico legal importance.	4			
5.	Diagnose and manage common acute and chronic poisoning.		5		
6.	Perform medico legal duties in case of poisoning.		6		
7.	Observe ten medico legal autopsies and enter in practical record.				7
8.	Age estimation from bones, skiagrams and dentition	8			
9.	Examination of injuries and weapons and report writing.	9			
10.	Examination of an alcohol intoxicated person and report writing.	10			
11.	Examination of victim and accused in sexual offence cases.	11			
12.	Study of specimens of poisons.	12			
13.	Study of wet and models, charts etc.dry specimens,	13			

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.
5. Drug abuse and drug dependence. Integration with pharmacology.

Suggested topics for e-learning

1. Ethical and medico legal issues in clinical practice.
2. Child abuse.
3. HIV/AIDS.
4. Torture medicine.
5. Lie detection.
6. Narco analysis.
7. Brain finger printing

Prescribed books

1. Practical Forensic medicine. B.Umadethan, CBS publishers & distributors.
2. Forensic medicine, P.V. Guharaj, 2nd Edition, University press.
3. Text book of Forensic medicine and Toxicology-principles and Practice, Krishan Vij, 4th Edition, Elsevier

Reference books

1. Essentials of Forensic medicine and toxicology. K.S. Narayana Reddy, 29th Edition.
2. Modis text book of Medical Jurisprudence and Toxicology, 23rd Edition, Lexis Nexis.
3. Text Book of Forensic medicine and Toxicology by Nagesh Kumar G.Rao, 2nd Edition. Jaypee brothers Medical Publishers
4. Principles and practice of Forensic medicine. Dr.B. Umadethan 2008, Swami Law Publishers.
5. Parikhs Text Book of Medical Jurisprudence, forensic medicine and Toxicology, 6th edition, CBS Publishers and Distributors.
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

Theory

Section A	20
Section B	20
Internal assessment	10
Total	50

Practicals	30
Internal assessment	10
Viva	10
Total	50
Grant total	100

Topics and mark allotment

Medical jurisprudence	20%
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%

Sample Question paper

FORENSIC MEDICINE AND TOXICOLOGY

Time: 2 Hours

Max.Marks:40

Instructions: 1) Answer Section A and B in separate answer books.
 2) Draw labeled diagrams wherever necessary.

SECTION – A

I. Write short notes on:

1. On the complaint of a father that his minor daughter was kidnapped by her lover, the police officer arrested the girl and her lover. The girl was sent for medical examination. How can you help the police by resorting to radiological examination?

(2)

2. External examination of a dead body showed that Rigormortis had disappeared from the jaw muscles, but still retained in the limbs, greenish yellow discolouration was seen in the right flank. What is the appropriate time since death, from the findings? What is the reason for the colour change in the right flank?

(1+1=2)

3. A person alleges that he was hit on the head with an iron rod; on examination, an open wound with clean cut margins is seen on the scalp in the occipital area. How will you decide whether the allegation is true or not?

(2)

4. In an alleged case of rape of a 25 year old female, the accused pleaded that he had done sex with her consent. The blood examination of the victim soon after the act showed alcohol level of 200mg%. Comment on the criminal responsibility of the accused. Which criminal court has the jurisdiction to conduct the trial of such a case?

(1+1=2)

5. A case of criminal abortion is admitted to the ward. What are the medicolegal duties of the doctor in such a case?

(2)

II. Write short answers on:

6. Define infamous conduct (1)

7. What is Oedema Aquosum? (1)

8. In a case of death due to gunshot injury, a bullet was recovered from the dead body. How will you decide whether the gun recovered from the house of the accused was used for firing this bullet? (1)

9. What is precipitate labour? What postmortem findings in the foetus suggest this condition? (1)

10. A dead body was brought with a ligature around the neck. Mention two definite external postmortem findings of antemortem hanging. (1)

11. A patient was admitted with gastroenteritis and brady arrhythmia. Blood examination showed hyper kalemia. What is the poison responsible? What is the antidote?
(1/2+1/2=1)

12. A woman was admitted with superficial burns on the whole of lower limbs, perineum and genitalia. Is it sufficient to cause death in the ordinary course? Why? (1)

13. A boy was allegedly bitten by a snake. What findings at the bite mark will tell you that it was a Viper? (1)

14. A patient under treatment in a Govt. District Hospital suffered an injury due to the negligence of the doctor. Can the patient approach the consumer protection forum to get compensation? Why? (1)

15. A dead body is brought with a stab injury on the neck. What precaution will you take before starting the dissection of the heart? (1)

SECTION - B

III. Write short notes on

16. An old woman is admitted with history of ingesting some corrosive acid. What will be the postmortem findings in the (A) mouth (B) Stomach, if it was sulphuric acid?
(1+1=2)

17. Dead body showed a ligature mark around the neck. How will you decide whether it is a case of hanging or strangulation from

(a) External neck findings

(b) Internal neck findings

(1+1=2)

18. A dead body was found in water. Autopsy did not show any signs of inhalation of water. However the autopsy surgeon opines that it could be a case of drowning; your comments.

(2)

19. Young male was found dead with two gunshot injuries on the head, one on the right side and the other on the left side. How will you differentiate the entrance wound from the exit? What findings at the entrance wound will make you suspect the possibility of a homicide?

(1+1=2)

20. A female was discharged after hysterectomy operation. Doctor neglected to tell the patient when to come back to remove the cotton packs which were kept inside the vagina. When the packs got infected, patient went to a nurse, who removed it from vagina. Patient sued the doctor for his negligence. What will be the most likely defence of the doctor? Why?

(2)

IV. Write short notes on:

(1x10=10 Marks)

21. Unconscious person was brought to casualty; Neuro surgeon suggests surgery to save the life of the patient. But there are no relatives to give written consent for surgery. What will you do? What is the principle involved?

22. What are Tox albumins?

23. In an alleged case of death by poisoning chemical analysis report comes as negative. Mention four reasons for it.

24. How will you classify the following injuries legally? Give reasons?

A) Dislocation of tooth

B) Stab injury on the liver

25. What is dowry-death?

26. What is acid phosphatase test?

27. A 50 yr. old man died suddenly due to natural disease. What is the commonest cause? What postmortem findings will confirm the diagnosis?

28. What is testamentary capacity? What are the conditions to be satisfied for it?

29. A person is bearing accusatory voices in his ears without any external sound. What is suffering from? In which mental disease, this condition is commonly seen?

30. Name the poisons against which the following specific antidotes are useful.

(a) Penicillamine (b) Copper sulphate (c) Amyl nitrate (d) Thiopentone sodium

Practical Examination (Total Marks-30)

Exercise.No.1 -8 Spotters (each carrying 1 mark, Total 8 Marks)

Exercise.No.2 -Perusing the postmortem findings & answering questions in writing
(7 marks)

Exercise No.3 -Wound certification by perusing the data given& answering the question.
(8 Marks)

Exercise No.4 -Certification of sexual offence/Potency/Drunkenness and answering the questions by perusing the data.
(7 Marks)

Exercise Nos. (1), (2), (3) & (4) will be common for all candidates appearing on the same day but the selection of the question for exercise no.4 will be done by the concerned examiner on each day.

9.5 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. Apply methods of disinfection and sterilization to control and prevent hospital and community acquired infections
- vii. 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

3. Integration

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

C. DETAILED SYLLABUS DETAILS OF THE COURSE

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. Certain portions to be

Deleted—Detailed morphological, cultural, Biochemistry, and Antigenic characters, detailed life cycle of parasites)

DETAILS OF LECTURES	80 hrs
1.General microbiology	12 hrs
1. Introduction to microbiology	
2. Morphology of bacteria comparison with other microbial forms	
3. Growth, nutrition culture media	
4. Identification of bacteria	
5. Bacterial genetics	
6. Antibacterial agents and antibiotic sensitivity test	
7. Infection-Source and spread of infection	
8. Sterilisation and disinfection	
9. Response to microbial infections	

II. Systematic bacteriology	25 hrs
1. Gram positive Cocci-Staphylococci, Streptococci, Pneumococci	
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. Bacteriophages	
IV.Immunology	12hrs
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	
10. Immunoprophylaxis and immunotherapy	
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	

4. Systematic mycosis	
5. Opportunistic fungi	
DETAILS OF PRACTICALS AND DEMONSTRATION	40 hrs
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

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 infections
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**

1. Textbook of Microbiology by R. Anantha Narayanan and C.K.J. Paniker 7th Edition Orient Longman
2. A guide to Microbial Infections, Pathogenesis, Immunology, Laboratory diagnosis and Control by Greenwood. Slack and Penthera
3. Textbook of Parasitology by C. K. J. Paniker / Chakraborty / Baveja / Pareja
4. Textbook of Parasitology by Chatterjee.

Reference Books

1. Microbiology in clinical practice by Shanson
2. Medical Microbiology by Jawetz E, Melnick J L, Adelberg E A
3. Textbook of Immunology-Roitt
4. Diagnostic Microbiology by Koneman

EVALUATION: 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 X5) = 10 marks
 Short answer questions (10 X2) = 20 marks

Total = 40 marks**Microbiology paper II-Virology, Parasitology, Mycology, Clinical Microbiology**

Structured Essay = 10 marks
 Short Essays (2 X5) = 10 marks
 Short answer questions (10 X2) = 20 marks

Total = 40 marks**Total marks (40 + 40) = 80 marks**

98

Internal assessment = 15 marks

Viva voce = 15 marks

Total for theory = 110 marks

Practical = 25 marks

Internal assessment = 15marks

Total for practical = 40 marks

Total for the subject = 150marks

(Duplication of the questions should be avoided)

Practicals

Total marks : 25 marks

1. Gram staining (Clinical material) – 5marks

2. AFB staining (Clinical Material) – 5 marks

3. Applied microbiology – 5 marks

4. Spotters-10 numbers – 10 marks

2 minutes for each spotter, 2-4 subquestions with each spotter.

*(2 Mycology, 3 Parasitology, 2 General Bacteriology, 2 Virology/Immunology
& 1 Clinical Bacteriology)*

Oral

15 marks

MODEL QUESTION PAPER**MICROBIOLOGY PAPER -1****General Bacteriology, Immunology, Systematic Bacteriology**

Time: 2 hours

Max. marks: 40

*(Draw diagrams wherever necessary)***READ THE CLINICAL HISTORY AND ANSWER THE FOLLOWING QUESTIONS**

A 30 year old male comes to the Medical O.P with C/O 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.

1. What is the probable diagnosis and source of infection?.
2. What are the specimens sent for laboratory diagnosis in this case?
3. How will you proceed with laboratory diagnosis here?
- 4 .How can the disease be prevented?
5. What is the skin test done routinely for the diagnosis? Discuss the interpretation?

(1+1+4+2+2=10)

SHORT ESSAYS

6. Pathogenesis & lab diagnosis of cholera
7. Type 1 Hyper sensitivity reaction

(2×5=10)

WRITE SHORT NOTE ON

8. Clostridium difficile
- 9.. Inspissation
10. Bacterial growth curve
11. Null cells
12. Transport medium
13. Legionellapneumophila
14. TRIC agents
15. Scrub typhus
16. MRSA
17. Coliform count

(2×10=20)

MODEL QUESTION PAPER
MICROBIOLOGY PAPER -11
Clinical Microbiology, Parasitology, Mycology, & Virology

Time: 2 hours

Max. marks: 40

(Draw diagrams wherever necessary)

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 month back.

1. What is the probable diagnosis and causative agent?
2. What is the pathogenesis?
3. Which are the serological markers which will help in the diagnosis and assessment of severity of the disease?
4. What is the prophylaxis?
5. How do you treat this patient?
6. Name four viruses transmitted through blood transfusion?

(1+2+3+2+1+1=10)

SHORT ESSAY

7. Kala azar
8. Entamoeba histolytica

(2×5=10)

WRITE SHORT NOTES ON

9. Rhinosporidiosis
10. Prions
11. Cryptococcus neoformans
12. Tzanck smear
13. Hydatid cyst
14. HAART
15. Pneumocystis jiroveci
16. Occult filariasis
17. Pathogenesis of dengue virus infection
18. Trichomonas vaginalis

(2×10=20)

9.6 PATHOLOGY

GOALS

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

- 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

- 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

- 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

- Mycobacterial diseases: tuberculosis and leprosy
- Bacterial diseases: Pyogenic infections, typhoid, diphtheria, gram –veinfections, 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

- 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

- 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

- 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

- 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 spherocytosis 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

- 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

- 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

- 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
- 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

- 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 Biliary tract pathology

- 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

- Lymphadenitis: non – specific, granulomatous
- Non-Hodgkin's lymphoma: classification, morphology
- Hodgkin's lymphoma: classification, morphology
- Thymus-hyperplasia (myasthenia gravis), thymomas
- Diseases of spleen: congestive splenomegaly and infarction spleen. Hypersplenism. Conditions producing rupture spleen, involvement in storage diseases.

15. Reproductive system

- 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 tumor.

- Prostate: nodular hyperplasia, carcinoma
- Ovarian and testicular tumors
- Carcinoma of penis
- Pelvic inflammatory disease including salpingitis
- Genital tuberculosis.

16. Osteopathology

- 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

- 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

- 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

- Skin tumors: squamous cell carcinoma, basal cell carcinoma and malignant melanoma.
- Inflammatory dermatoses of skin –psoriasis, lichen planus, bullous diseases

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 Microcopy

4. Do/ perform and interpret hemoglobin estimation, TLC, DLC, ESR, PCV, blood smear preparation (thick and thin) and staining Reporting peripheral smears
5. Do blood grouping
6. 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, 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)

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
- 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 150marks or more for pass.

2. Theory and Practical Internal assessment marks should be added to the marks obtained in Theory and Practical University exams respectively for deciding the pass

3. For Theory (80 + 15 viva+ 15 marks internal assessment = 110) the minimum for pass should be 55marks.

4. For Practical (25 + 15 marks internal assessment = 40) the minimum for pass should be 20marks.

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 - 5marks

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 Internal Assessment University exam

	exam marks	marks
Peripheral smear Reporting	20	10
Clinical Pathology exercise	20	10
(1 out of 6)		
Blood grouping	20	10
Urine analysis	20	10
Spotters (20x3)	60	(20x3) 60
Records (4+3+3)	10	
(HP + CLIP + Ax/CPC) TOTAL	150	100
To be converted to	15	25

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

Write short answers on: 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:

Section A

Saq+ Single word type + structured essay + 2 short notes =4+4+6+6=20

Section B

SAQ+ 4 short notes 8+12=20

Paper I

Section A	=	20 marks
Short notes	=	4 marks
Single word type	=	4 marks
Problem based structured essay	=	6 marks
SAQ-2 questions	=	6 marks
Section B	=	20marks
Standard/modified essay	=	8 marks
SAQ-4questions	=	12 marks

Paper II

Section A	=	20 marks
Short notes Single	=	4 marks
word type	=	4 marks
Problem based structured essay	=	6 marks
SAQ-2 questions	=	6 marks
Section B	=	20 marks
Standard/modified essay	=	8 marks
SAQ-4questions	=	12 marks

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 =5

Hematology slide =2(one bone marrow)

Cytology slide =1

Histogram interpretation =1

Interpretative clinical pathology charts with photos =1

Clinicopathological correlative exercise (specimens/slide combinations

With clinical history) =2

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

Practicals' guidelines

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

They would be

HISTOPATHOLOGICAL SLIDES			
For diagnosis/spotting		For demonstration	
1	Acute Appendicitis	1	CVC Lung
2	Granulation tissue	2	CVC Liver
3	Calcinosis cutis	3	Filarial Lymph node
4	T.B. lymph adenitis	4	Infarction (Spleen/placenta)
5	Lepromatous Lepresy	5	Actinomycosis/Aspergillosis
6	Rhinospndrosis	6	Fatty liver
7	Capillary Haemangioma	7	Warthin's tumor
8	Cirrhosis Liver	8	Neurofibroma
9	Lipoma	9	Interdermal anevus
10	Leiomyoma	10	NHL
11	Fibroadenoma	11	HCC
12	Pleomorphic Adenoma	12	Cavernous Haemangioma
13	Schwanoma	13	Secretory endometrium

14	Osteochondroma	14	Adenoma thyroid
15	Malignant Melanoma skin	15	Molluscum contagiosom
16	Squamous cell carcinoma skin	16	Vesicular mole
17	BCC	17	Adenomyosis/endometriosis
18	MNG	18	Mets lymphnode from SCC
19	Hodgkin's lymphoma	19	Bronchopneumoma
20	Papillary carcinoma thyroid	20	Nephro blastoma
21	Hashimoto's thyroiditis		
22	Giant cell Tumor bone		
23	Osteosarcoma		
24	Adenocarcinoma colon		
25	Teratoma ovary		
26	Infiltrating duct carcinoma breast		
27	Renal cell carcinoma		
28	Tuberculoid Leprosy		
29	Atheroma aorta		
30	Meningioma		

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.

They would be

Specimens

GIT for spotting /diagnosis for demonstration

1. Chronic Gastric Ulcer
1. Gangrene intestine with round worms
2. Carcinoma Stomach with omental – metastasis
- 3 Lipomatous polyp intestine
4. Polyp small intestine
- 5 Typhoid ulcer intestine
- 6 Multiple Polyposis large intestine
7. Intussuption intestine
- 8 Gangrene intestine
- 9 Tuberculous ulcer intestine with stricture
10. Amoebic ulcer large intestine
- 11 Acute appendicitis
12. Carcinoma colon

HEPATOBIILIARY SYSTEM & PANCREAS

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Cirrhosis liver (Macronodular) 2. Calculous cholecystitis 3. Calcifying Pancreatitis 4. CVC liver 5. Angioma liver 6. Hemochromatosis liver- Perls stain | <ol style="list-style-type: none"> 1. Fatty liver 2. Amyloidosis liver 3. Amoebic liver 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. Fibrocaceous 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
1. Aneurysm aorta
2. Fibrinous pericarditis
3. Mural Thrombus Heart

LYMPHNODES

1. Caseating TB adenitis
2. Lymphoma

THYROID

1. Multinodular goitre
1. Diffuse colloid goitre
2. Hashimoto's thyroiditis
3. Adenoma thyroid
4. Carcinoma thyroid

SALIVARY GLAND

1. Pleomorphic adenoma

BONE

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

CNS

1. Suppurative Meningitis

SKIN AND SUBCUTANEOUS TISSUE

1. Calcinosi Cutis
 2. Lipoma
 3. Squamous cell Carcinoma Foot
 4. Basal Cell Carcinoma
 5. Melanoma Foot
1. Filariasis skin

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

Hematology Spotters			
For spotting		Demonstration	
1	HMA	1	Filaria
2	AML	2	Lymphocytosis with atypical lymphocyte
3	CML	3	Spherocyte
4	Neutrophilia	4	Reticulocyte
5	Eosinophilia	5	Thalassemia with target cells
6	Megakaryocyte	6	Toxic granules
7	LE cell	7	Myeloperoxidase stain
8	Multiple myeloma	8	Megaloblast
9	Normoblast	9	Sickle cells
10	Malaria – PV/PF	10	CLL

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

MODEL QUESTION PAPER

PATHOLOGY Paper I (Clinical Pathology and General Pathology)

Time: 2 hours

Total marks: 40

Answer in single sentence

1. Define metaplasia.
2. List two infective ulcers of the intestine
3. Define Type II hypersensitivity reaction.
4. Mention two tests for proteinuria

(4x1/2=2 marks)

STRUCTURED (Case Study) ESSAY

5. Male 15 yrs. Presented with fever, sore throat, cervical lymph node enlargement.
Investigations: TC 14,000/cmm, DC-p20L75E5. Peripheral smear-No immature cells seen.

- What is your diagnosis?
- Describe the characteristic peripheral smear findings.
- What is the etiology of this condition?
- What is the test to confirm the diagnosis?
- Name two organs involved in this condition

(1+2+1+1+1= 6 marks)

Write short answers on:

6. Ghons complex.
7. Ketonuria
8. Scurvy
9. Fat embolism

(4x2=8 marks)

STRUCTURED ESSAY

10. 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 marks)

Write short notes on:

11. Pathogenesis of reversible cell injury.
12. Blood grouping and cross matching.
13. Routes of metastasis.
14. CSF examination.

(4x4=16)

MODEL QUESTION PAPER
PATHOLOGY Paper II
(Hematology and Systemic Pathology)

Time: 2 hours

Total marks: 40

Answer in single sentence

1. MEN type-I
2. Mott cell.
3. Caplan's syndrome.
4. Schiller- Duval body

(4x1/2=2 marks)

STRUCTURED(Case Study) ESSAY

5. A 50 year old man developed sudden chest pain with vomiting. He was dysnoeic. 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? Give reasons.
- 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=6marks)

Write short answers on:

6. Peripheral smear findings in Megaloblastic anaemia
7. List the hepatocyte changes in acute viral hepatitis.
8. Classification of renal cell carcinoma
9. Ring sideroblast

(4x2=8 marks)

STRUCTURED ESSAY :

10. 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)

Write Short notes on:

11. Etiopathogenesis of Peptic ulcer.
12. Lab. Investigations in Multiple myeloma
13. Medullary carcinoma of thyroid.
14. Paget's disease of bone.

(4x4=16)

9.7 - 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

(d) Integration

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)

1. General Pharmacology and basic concepts of clinical Pharmacology 16 hours

- Introduction – definition, scope, various branches, drug nomenclature, orphan drugs
- Mechanism of drug action (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 pharmacoconomics
- 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; 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.

Drug used in the treatment of parkinson's disease: anticholinergic agents, dopamine agonists, MAOI, COMTI: 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

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

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)

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; antidiuretics.

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 rationale 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 principles 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
 - Antiseptics, disinfectants and their use based on their pharmacological properties. (Seminar)
- Anticancer drugs, mechanism of action, indications, s/e, C/I, precautions

Toxicology

General principles of treatment of poisoning
Management of overdose 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 gonorrhoea & STD (seminar)
6. Upper and lower respiratory infections;
7. OCP
8. Filariasis
9. Anaemia
10. Diabetes Mellitus

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

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
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
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 antivirals
14. Preparation and use of oral rehydration solution
15. Informed Consent Form
16. Computer assisted learning (CAL)
17. Experimental pharmacology charts interpretation
18. Drug/drug and Drug/Food interaction.
19. Selection of P-drug

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. Antitussives
3. Shock
4. Alzheimer's disease and cognitive enhancers, neurodegenerative disorders.
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

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

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)
6. Pharmacology by HP Rang. M M Dale, J.M Ritter, P.K.Morore (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 = 25marks

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 - $1 \times 4 = 4$ marks

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

IV. Structured essay question (1) = 5 marks

V. Clinical problem (1) = 5 marks

VI. Choose the drug and justify - $1 \times 5 = 5$ marks

VII. Write briefly on (4 Nos) - $3 \times 4 = 12$ marks

Paper II

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

- I. Name the following $\frac{1}{2} \times 10 = 5$ marks
- II. Specify the important spectrum of antibiotics $1 \times 5 = 5$ marks
- III. Write 2 uses and 2 contraindications/ precautions $1 \times 4 = 4$ marks
- IV. Rational basis for use of drugs/comment on the interactions produced $1 \times 4 = 4$ marks
- V. Structured essay question (1) - 5 marks
- VI. Clinical problem (1) - 5 marks
- VII. Write briefly on (4 Nos) - $3 \times 4 = 12$ marks

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 = 2 marks
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

Total = 10 marks

VIVA VOCE

Total 4 stations each student to be examined by all the four examiners

Total 15 marks

Model Question Paper
Second Professional MBBS Degree Examination
Pharmacology Paper I
(New scheme)

Time: 2 hours

Maximum marks: 40

Answer all questions.

I. Name the following

1. DOC for petit mal epilepsy
2. Drug producing phocomelia
3. Cerebroselective anticholinesterase
4. One 5HT₃ antagonist
5. Antidepressant effective in chronic pain
6. A Clot specific fibrinolytic agent
7. DOC for anaphylactic shock
8. The diuretic used in cerebral edema
9. Transdermal patch used in angina pectoris
10. Shortest acting cardio selective beta blocker

(½ x 10 = 5 marks)

II. Give the rationale for use of following drugs

- a. Sumatriptan in acute attack of migraine
- b. Promethazine in motion sickness
- c. Haloperidol in acute schizophrenia
- d. Fluticasone inhalation in bronchial asthma

(1 x 4 = 4 marks)

III. Write two uses and two adverse effects of the following drugs

- a) Lithium
- b) Amlodipine
- c) Verapamil
- d) Neostigmine

(1 x 4 = 4 marks)

IV. Enumerate 4 groups of antihypertensives with one example for each. Mention 4 drugs safe for use in pregnancy. Write the pharmacological action, adverse effects and drug interaction of any one antihypertensive

(2+1+ 2= 5 marks)

V. Read the clinical problem and answer the following questions

Ramesh, 28 years was administered an injection of Adrenaline with Lignocaine at base of his thumb for nail extraction. Later he developed severe gangrene of thumb

- a. Why has gangrene developed? How could this have been avoided?
- b. Write the mechanism and pharmacological actions of adrenaline and lignocaine
- c. List the other two surface anaesthetics and write their adverse effects

d. Write the cardiac use of lignocaine with dose and rationale.

(1+2+1+1=5 marks)

VI. Choose the appropriate drug and justify

- a. Dopamine/ adrenaline in cardiogenic shock
- b. Diazepam/ alprazolam in depressed person with anxiety
- c. L-dopa/ trihexyphenidyl in drug induced parkinsonism
- d. Ketamine / Fentanyl in dissociative anaesthesia
- e. Digoxin/ adenosine in atrial fibrillation

(1 x 5 = 5 marks)

VII Write briefly on

- a. Uses and adverse effects of skeletal muscle relaxants
- b. Teratogenicity
- c. Ketamine
- d. Chlorpromazine

(3 x 4 = 12marks)

Second Professional MBBS Degree Examination
Pharmacology Paper II
(New scheme)

Time: 2 hours

Maximum marks: 40

Answer all questions.

I. Name the following

- a) The laxative preferred in a patient with hepatic coma
- b) Longest acting penicillin
- c) DOC for VRSA
- d) Site of action of caspofungin
- e) Route of administration of Streptomycin
- f) Insulin in diabetic pregnant woman
- g) A cephalosporin causing Disulfiram like reaction
- h) The Tetracycline active against Mycobacterium leprae
- i) The drug used to treat antibiotic associated pseudomembranous colitis
- j) The antifungal preferred in fungal meningitis

(1/2 x 10 = 5 marks)

II Specify the important spectrum of the following antimicrobial agents

- a. Ceftriaxone
- b. Azithromycin
- c. Vancomycin
- d. Linezolid

e. Rifampin

(1x 5=5marks)

III. Write two important uses and two contraindications of

1. Ketoconazole
2. Methotrexate
3. Tetracycline
4. Metronidazole

(1x4= 4marks)

IV. Comment on the interaction produced by the following drugs

1. Propranolol and Glibenclamide
2. Sulfamethoxazole and Trimethoprim
3. Ciprofloxacin and theophylline
4. Dapsone and pyrimethamine

(1x4=4marks)

V. Read the case history and answer the following questions

Ramesh 40 years, is an alcoholic and a smoker. He gives history of nausea, abdominal pain, heart burn, loss of appetite and one episode of haematemesis. Endoscopy confirms peptic ulceration

- 1) Prescribe a drug for the above condition with dosage schedule
- 2) Write its mechanism of action and adverse effects
- 3) What advice on life style modification should be given to him?
- 4) List two drugs from different groups which can cause peptic ulceration

(1½+1½ + 1+1= 5 marks)

VI. Classify oral Hypoglycemic drugs. Write the mechanism of action, adverse effects and drug interactions of any one drug. Name two drugs which cause hyperglycemia

(2½ +1½ +1= 5marks)

VII Write briefly on

- a. Protease inhibitors
- b. Cyclophosphamide
- c. OCP
- d. Newer Insulins

(3x4= 12 marks)

9.8 - COMMUNITY MEDICINE

A. VISION

To develop a group of medical graduate for being 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 primary 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**B.1. GENERAL OBJECTIVE**

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

B.2. SPECIFIC OBJECTIVES**B.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 social dynamics & social factors in relation to health and disease
14. To understand the Gender issues in health and diseases
15. To understand the Developmental Health Interface & health of deprived

B.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 safe guard 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

B.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

C. 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 CONTENTS

I.	CONCEPT OF HEALTH & DISEASE
Sl. No.	Course contents
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
3	Characteristics of agent, host and environmental factors in health and disease and the multi factorial etiology of 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
II	SOCIAL AND BEHAVIORAL SCIENCES
Sl no	Course contents
1	Concept of Sociology & Behavioral Science, Clinico-socio-cultural and demographic evaluation of the individual, family and community.
2	A sssessment of barriers to good health and health seeking behavior
3	Role of family in Health and Disease
4	Socio-cultural factors related to health and disease in the context of urban and rural societies
5	Assessment of socio-economic status, effect of health and illness on socio economic status
6	Doctor-patient relationship
7	Social Psychology, Community Behavior and community relationship, hospital sociology and psychology
8	Social security-Health Insurance: Organized sector, unorganized sector, special groups (Eg: elderly)
9	Impact of urbanization on health and disease-will be covered in chapter XIII
10	Poverty link to health and disease and poverty alleviation programmes
11	Intelligence – IQ and EQ
12	Personality – Types, Interpersonal relationships

13	Attitude, Behavior, habits
14	Emotions, Frustrations, role of emotions in health & coping with emotions
15	Conflicts-internal, interpersonal & conflict resolutions, defense mechanisms
16	Stress & coping skills – integrated (Psychiatry)
17	Ethics
18	Learning – Types and skills
19	Development & Health interface-Poverty & Health, Poverty alleviation programme. 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
Sl no	Course contents
1	Water: Concepts of safe and wholesome water, sanitary sources of waterborne diseases, water purification process. Water quality standards.
2	Physical, Chemical & bacteriological standards of drinking water quality and tests of assessing bacteriological quality of water.
3	Health hazards of air, water, noise, radiation pollution.
4	Concepts of water conservation, rainwater harvesting & Global warming.
5	Concepts of solid waste, human excreta and sewage disposal.
6	Awareness of standards of housing and his effect of housing on health.
7	Role of vectors in the causation of diseases.
8	Identifying the features of vectors and their control measures.
9	Life cycles of vectors and advantages and limitations of various vector control measures.
10	Mode of action, application cycle of commonly used insecticides and rodenticides.
11	Urban waste management.
12	Recent issue in environmental health

	a Stockholm convention b. Basel convention c. Kyoto Protocol.
13	Radiation Prevention and Control

IV. HEALTH PROMOTION AND EDUCATION/COMMUNICATION FOR BEHAVIOURAL CHANGE. (INFORMATION, EDUCATION, COMMUNICATION)

- a. Understand the concepts of health Promotion and education, IEC, Behavioral change communication, Counseling
- 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
- 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, anemia, 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 natural nutritional programmes.
- 8 National Nutrition policy.
- 9 Nutritional surveillance, education and rehabilitation.
- 10 New WHO Growth Charts.
- 11 Principles of Therapeutic Diet

VI. OCCUPATIONAL HEALTH

Course Contents

- 1 Relate the history of symptoms with specific occupations including agricultural related occupation.
- 2 Employees state insurance Act. Scheme.
- 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.

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 in 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 Principal 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

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.

Communicable Diseases: Intestinal infections: Poliomyelitis, Viral hepatitis, Diarrhoea, Cholera, Helminthisis, typhoid, Amoebiasis & Giardiasis, Food Poisoning.
Respiratory Infections: Acute Respiratory infections, Measles, Diphtheria, Whooping cough, Tuberculosis, SARS, Influenza, Meningococcal meningitis, Mumps.
Vector borne infections: Malaria, Filariasis, KalaAzar, Dengue, Yellow Fever, Chickengunya fever. Surface infections:
Sexually transmitted diseases, Syndromic approach, HIV & AIDS, Tetanus Leprosy, scabies, Pediculosis. Zoonosis: Rabies, Japanese encephalitis Plague Kyasanur Forest Diases, Leptospirosis, Anthrax.
Hospital Acquired Infections
New Emerging Diseases

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
- 6 National health programme for health diseases.
- 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.
- 9 Training of health workers in diseases surveillance, control and treatment, health education.
- 10 Management information system in a particular diseases
- 11 Prevention and control of new emerging diseases and life style related health problems.
- 12 International classification of diseases.

X. DEMOGRAPHY AND VITAL STATISTICS

- 1 Concepts of demography, demographic cycle, Vital Statistics.
- 2 Definition, Calculation and interpretation of demographic indices like birth rate, death rae, fertility rates.
- 3 Declining explosion, population dynamics of India.gy.
- 4 Population exploration, population dynamics of India
- 5 Population control measures. Family planning methods including NSVand emergency contraception
- 6 National population Policy.
- 7 Sources of Vital Statistics like census, SRS NFHS, NSSO etc.

XI. REPRODUCTIVE AND CHILD HEALTH

1. Current statistics of reproductive and child health.
2. Screening of high risk groups and common health problems.
3. Local customs and practices during pregnancy, child birth and location child feeding practices.
4. IYCF (Infant and young child feeding practices)
5. Organization , implementation and evaluation of reproductive child health (RCH) 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(MTO Act& Pre Natal Diagnostic Test Act(PNDT Act)

8. Adolescent Health
9. Handicapped Child. Community based Rehabilitation
10. Gender issues and Women empowerment.
11. Organizations, technician and operational aspects of the National family welfare Programme.
12. Genetics Health

XII. SCHOOL HEALTH

1. Objectives and components of school Health programme
2. Activities of the 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.

XIII. URBAN HEALTH

1. Common health problems (Medical, Social, environmental, Economical, Psychological) due to Urbanization of Urban Slum dwellers
2. Organization of health services for and in urban slums
3. National policy on urban health.

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.
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 Goal
7. National health Policy & National Rural Health mission (NRHM)
8. Concepts of Health Economics I health Planning and management.
9. Concepts, Scope and methods of Health Audit.
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
12. Decentralization and PRI Institutions.

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

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
6. The International Health Regulations
7. The Cigarettes and Other Tobacco product Act 2003
8. The Narcotic and Psychotropic substance Act 1958
9. The Cigarettes and Other Tobacco product Act 2003
10. The Narcotic and Psychotropic substance Act 1958
11. The Medical Termination of Pregnancy Act 1971(MTP Act)
12. The Dowry Prohibition Act
13. The Immoral Traffic (Prevention) Act 19
14. The Medical Termination of Pregnancy Act 1971(MTP Act)
15. The Dowry Prohibition Act
16. The Immoral Traffic (Prevention) Act 1956
17. The Prenatal Diagnostic Techniques (Regulation and Prevention of Misuse) Act 1994
18. The Juvenile Justice Act 2000-
19. –Child Labour (Prohibition and Regulation) Act 1986
20. The Persons with Disabilities (Equal opportunity, Protection of wrights and full participation) Act 1995
21. The Factories Act 1948
22. The Employees State Insurance Act 1948
23. The Environment (Protection) Act 1986
24. The Bio-Medical Waste (Management and Handling) Rules 2000
25. The Consumer Protection Act 1986

XIX. INTERNATIONAL HEALTH

1. Role of various multilateral, bilateral international health organizations like WHO, UNICEF Etc.
2. Organizational structure of these organizations
3. New International health Regulation (IHR)

XX. HEALTH CARE WASTE MANAGEMENT

1. Classification/Category, sources, health hazards and treatment of Bio-Medical Waste.
2. Application of these principles in different setting of health care delivery system.

XVIII. HEALTH CARE OF ELDERLY

Course contents

1. Health problems of Aged
2. Preventive Geriatrics
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
5. Gender Issues and Women Empowerment
6. Gender Based violence, Domestic Violence, Epidemiology Prevention and Control

XX. DEVELOPMENT AND HEALTH INTERFACE

Course contents

1. Poverty and Health
2. Poverty Alleviation Programme
3. Health of a marginalized
4. Sustainable and inclusive Development

XXI. GENETICS

Course contents

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

XXII. DISABILITY

1. Types of Disability
2. Rehabilitation Clinical and community level.
3. Palliative Care

SKILLS

The student should be able to do:

1. Elicit Clinico-social history. Describe agent host and environmental factors 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 topic

1. Communication:

Should be well versed with the art of interviewing techniques of 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 for at home; and community, Individuals, family or a group for health promotion and education, and also with peers.

2. Team Activity

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

3. Environmental Sanitation:

Able to assess environmental risk factors plan and suggest action

Able to collect water and stool samples analysis for micro biological

Able to identify insects of public health importance, able to use effective insecticides.

Purification of water-small scale.

Vector Survey and control measures.

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.
- 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.
- Intranatel care –conducting a normal delivery, referral indications.
- Postnatal –assessment of new-born and mother, promotion of breast feeding, advice on wearing and on family planning.

- 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.
- Able to collect water and stool samples for microbiological analysis.
- Able to identify insects of public health importance, able to use effective insecticides, purification of water-small scale.

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. Occupation 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-sect oral 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.

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.

Stitching of clean lacerated wounds

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

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

14. Participatory Rural appraisal

Social Mapping

Focus group Discussion

Key informant Interview

15. Health Education

Health Education to various Groups BCC (individual and group Assignments).

16. Animal bite Management.

D1. DETAILS OF INTERACTIVE LECTURES

TOPICS

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)

Ethics

Gender Health Including Gender Based Violence

Life Skill Education

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
Infections Diseases Epidemiology_ concepts
Dynamics of Diseases Transmission & Concepts of prevention & control
Investigation of an epidemic (integrated with Microbiology)
Health services

Communicable Diseases

Smallpox & Chicken pox
Measles, Mumps, Rubella
Diphtheria, pertussis, Meningococcal meningitis
Influenza & SARS
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
Non Communicable Diseases
Coronary Heart Diseases & Rheumatic Heart Diseases
Hypertension & stroke
Cancers
Diabetes mellitus & obesity
Blindness & control Programme
Accidents (Integrated)

Demography & Family Planning

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

Maternal and Child Health

Maternal health-ante, intra, postnatal care & problem
(Integration with O &G)
Growth & Development/Growth Charts, WHO Grow Chart
(Integration with paediatrics)
Behavioural problems & Juvenile Delinquency
Indicators of MCH Care
Geriatric problems (Size, need for special care, National policy of elderly)
Adolescent problems

Nutrition

PEM& Child hood obesity
Nutritional requirements-RDA-integrated (Biochemistry)
Nutritional Disorders-integrated (Biochemistry)
National Nutritional Programmes.
Nutritional status assessment & Surveillance
Ecology of malnutrition, PFA

Social science

Concepts in sociology Family in Health & Diseases & cultural factors
Social problems-overview Social security measures

Development and Health

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

Genetics

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

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

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)

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

Occupational health

1. Occupational health problems

2. Prevention of occupational diseases ergonomics

Communication process

Communication process, Types, barriers & Health Communication

Health education-Definition & Principles

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

Role of Voluntary agencies in Health, New International Health regulations

Panchayati Raj

Management & Managerial Techniques

Health economics & cost containment issues health care

National Health Programmes

Revised National TB Control Programme

National Anti-Malarial 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 Programme

National Rural Health Mission and Indian Public Health Standards

Disaster management, Pandemic preparedness

Bioterrorism

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
6. The International Health Regulations
7. The Cigarettes and Other Tobacco product Act2003
8. The Narcotic and Psychotropic substance Act 1958
9. The Cigarettes and Other Tobacco product Act2003
10. The Narcotic and Psychotropic substance Act 1958
11. The Medical Termination of Pregnancy Act 1971(MTP Act)
12. The Dowry Prohibition Act
13. The Immoral Traffic (Prevention) Act 19
14. The Medical Termination of Pregnancy Act 1971(MTP Act)
15. The Dowry Prohibition Act
16. The Immoral Traffic (Prevention) Act 1956
17. The Prenatal Diagnostic Techniques (Regulation and Prevention of Mis use) Act 1994
18. The Juvenile Justice Act 2000
19. Child Labour (Prohibition and Regulation) Act1986
20. The Persons with Disabilities (Equal opportunity, Protection of wrights and full participation) Act 1995
21. The Factories Act 1948
22. The Employees State Insurance Act 1948
23. The Environment (Protection) Act 1986
24. The Bio-Medical Waste (Management and Handling) Rules 2000
25. The Consumer Protection Act1986

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
 Visit to support and auxiliary health facilities
 Identify a community Health Problem
 Community living programmes
 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
 tendencies/dispersion/sampling/hypothesis/significance tests
 Community interaction, identification and solving community with community participation
 health problems
 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
 Implementation of National Health Programmes through CHC/ PHC and sub centre visits
 Visits to institutions of medico social importance
 Pain & palliative care centre
 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 methodologies – Participation in workshop & Project work, computer skills
 Nutrition skills – Diet survey, balanced diet, Nutritional requirements, RDA, Nutritional
 disorders, Community Nutrition programme
 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
 Sanitary well, well Chlorination Procedure
 Purification of water – large and small scale
 Water Quality Standards and surveillance
 Sanitary Survey

METHOD OF ASSESSMENT

Modified essay question
 Short answer questions
 Problem solving exercises
 OSCE, OSPE
 Epidemiological exercises

Records review
Research, Project Reports
Viva Voce

TEACHING LEARNING METHODS

Structured interactive sessions
Small Group discussion
Focussed Group Discussion (FGD)
Participatory learning appraisal (PLA)
Institutional visits
Practical including demonstrations
Problem based exercises
Video Clips
Written case scenario
Self-learning tools
Interactive learning
E-modules

TIME OF EVALUATION

Examination of Community Medicine should be at the end of 7th Semester and formative and summative assessment during internship so that we have a basic doctor, competent to provide primary 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 aspects like

- Diabetes
- Hypertension
- Stroke
- Obesity
- Cancers
- Jaundice

Alcoholism Death
and Dying

Geriatric Medicine

Adolescent Health

Rational Drug Use

Contraception

Industrial health

Ethical issues

TOPICWISE MARKS DISTRIBUTION IN COMMUNITY MEDICINE

	Paper I	Marks
1	Concept of Community Medicine	5
2	Sociology & Developmental Health Interface	5
3	Environment including entomology	10
4	Biomedical Waste management, Occupational Health	5
5	Nutrition & Genetics	10
6	Basic Epidemiology	15
7	Health Promotion & Education	5

8	Demography , Biostatistics & Health Information System	5
	Total	60
	Paper II	Marks
1	Communicable diseases including Emerging & re-emerging diseases	15
2	Non-Communicable diseases, Disability, Rehabilitation	10
3	& RCH & Health of Elderly	10
4	Health care delivery system & Urban health Disaster Management Health Planning, management& Financing	10
5	Mental & behavioral health problems	5
6	National Health Programs & NRHM Health legislation & International Health	10
7	Health legislation & International Health	5
	Total	60

Each Paper should have:

- Structured essay one question: 10 marks
- Remaining structured short essay question: 50 divided marks
- Around 50 %problems based competency testing (Cognitive domain) in theory question paper
- Each paper shall be of 3 Hours duration Distribution of Marks

1. Theory

Theory	Max.Marks
Theory Paper I	60
Paper II	60
Internal assessment	20
Oral	10
Total	150

2. Practical

Practical and oral should be conducted in one day

Exercise	Max.Marks
Epidemiological exercise	3
Statistics	4

Clinic social case study & OSCE	8
Spotting & OSPE	5
Diet prescription	3
Project defense & Record	7
Internal assessment	20
Total	50

Grand Total (Theory & Practical) – 200

E. TEXT BOOKS RECOMMENDED:

E1. Prescribed Books

- a. Park's Text book of preventive and Social Medicine, K. Park (18th edn.) Banaridas Bhanot
- b. Textbook of Parasitology, Protozoology and Helminthology – Chatterji K D
- c. Introduction to Health Statistics – Swaroop S E & S. Livingstone Ltd.
- d. A treatise on Hygiene and Public Health – Ghosh B N Scientific Publising Company, Calcutta
- e. Text Book of Social & preventive medicine -Mahajan
- f. Epidemiology for undergraduates – Marine Rajan Joseph – Jaypee Publishers (2007) 1st edn.
- g. Syamalan's Statistics in Medicine (2006); National Health Programme by Jugal Kishore
- h. National Health Programme by D K Taneja
- i. Textbook of preventive & Social Medicine by Sunder lal, Adarsh, Pankaj
- j. Textbook of preventive & Social Medicine by T Bhaskar Rao
- k. Biostatistics by A Indrayan
- l. Methods in Biostatistics by B K Mahajan
- m. Textbook of Preventive & Social Medicine by Gupta & Ghai
- n. Text book of Preventive & Social Medicine by Gupta & Mahajan
- o. Essentials of Community Medicine by Suresh Chandra
- p. Introduction to Biostatistics by Sathya Swaroop
- q. Community Medicine with Recent Advances by AH Suryakantha

E2. Reference Books:

- a. Preventive Medicine and Public Health Appleton Century Crofts – Maxcy, Kennith F Rosenau
- b. Preventive Medicine for the doctor in his community – Level H R & Clark E G; Mc Graw Hill Book Company
- c. Theory & Practice of Public Health – Hobson W Oxford University Press
- d. American P H Association Communicable Disease Control in man
- e. Manson's tropical diseases – Wilcock's & Manson
- f. Oxford test book of Public Health 4th edn.

9.9 - OPHTHALMOLOGY

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 disciplines 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, Pingecula, 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, Neuroparalytic 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 cellulites, 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, Schiottz 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

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

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

X. Clinical postings

8.00 am to 9.00am - Clinical lecture

9.00am -12.am - 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 - 20marks (theory-10; practical-10)

Total - 100 marks

Question paper

Section –A

- | | |
|---------------------------|-----------------|
| 1. Draw&label | 2 marks |
| 2. Short answer questions | 1 x 4 =4 marks |
| 3. Short notes | 2 x 4 =8 marks |
| 4. Short answer questions | 3 x 2 = 6 marks |

Section –B

- | | |
|---|-------------------|
| 1. Structured question (clinical Problem solving) | 1+2+2+3+2=10marks |
| 2. Short answers | 2x2 =4marks |
| 3. Short answer questions | 2x3 =6marks |

9.10 - 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
- 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

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.

C. Detailed syllabus

1. Overview of course

Duration of the course-2 months (distributed in 2 semesters - first half in 5th semester and second half in 7th semester)

THEORY+INNOVATIVE SESSION -110 hrs

PRACTICALS -180 hrs

2. Details of lectures

2.1 Ear

2.1.1 Introduction to diseases of ear Topics: · Diseases of external ear: (with special mention on wax, otomycosis, foreign body, keratosis and malignant otitis externa · Diseases of middle

ear: Acute otitis media, otitis media with effusion, chronic suppurative otitis media - TTD, AAD, complications of middle ear infections. Deafness - classification, causes, investigations, early detection of deafness in children and rehabilitation (special mention to audiometry, otosclerosis, learning and speech rehabilitation).

Diseases of inner ear: Vertigo - classification, causes, investigations and management (special mention of Meniere's disease, positional vertigo and acoustic neuroma).

2.2 Nose and paranasal sinuses

Rhinitis - etiology, classification and management (special mention of allergic rhinitis, atrophic rhinitis and allergic fungal rhino-sinusitis).

Acute sinusitis (in detail), chronic sinusitis (in detail).

Complications of infections of nose and paranasal sinuses

Facio-maxillary injuries (in detail), epistaxis, DNS and nasal polyp (special emphasis on FESS)

Tumours of nose and PNS (special mention of inverted papilloma, naso-pharyngeal angiofibroma and malignancy)

2.3 Throat

Tonsils and adenoids (special mention of Quinsy, patches in oral cavity and pharynx) Neck space infections - Ludwig's angina, retropharyngeal and parapharyngeal abscess

Hoarseness - diagnosis and management

Stridor - diagnosis and management

Malignant lesions of larynx and laryngo-pharynx.

Dysphagia - causes, investigations and management (special mention of malignancy)

Foreign bodies of aero-digestive tract - diagnosis, management and complications, endoscopies in ENT.

3. Details of practicals

Clinical postings

8:00 - 9:00 am: Clinical lecture

9:00 - 12:00 am: Case demonstration in out-patient department, clinical discussions

12:00 - 1:00 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. Logan Turner's text book of Otorhinolaryngology
2. Diseases of ear, nose and throat - P L Dhingra (Elseviers publications)
3. Text book of ear, nose, throat and head and neck diseases - P Hazarika, D R Nayak, R Balakrishna (CBS publishers)
4. Current diagnosis and treatment Otolaryngology Head and Neck surgery - Anil K Lalwani (McGraw Hill company Inc)
5. Scot Brown's Otorhinolaryngology, Head and Neck surgery 7th edition - (Edward Arnold publishers limited)
6. Diseases of ear, nose and throat: B K Roy Chowdhury (Bijoya publications)

7. ENT simplified: Batchi Hathiram and D S Grewal. (Bhalani publishers)
8. Text book of ENT diseases - K B Bhargava, S K Bhargava, T N Shah (Usha publications)

Other resource materials

- 9.1.1.1 Skill laboratory
- 9.1.1.2 CDs and DVDs
- 9.1.1.3** Internet

D. Evaluation

Evaluation has to be both formative and summative in order to achieve the objectives mentioned earlier.

There has to be internal evaluation as well as external evaluation. Evaluation will be done through examinations.

1. Internal Examinations

Theory - 2 papers

EXAM I – After completion of the 4th semester postings in ENT

Duration - 3 hours -Topic - Otology

EXAM II -At the end of 7th semester postings Duration - 3 hrs

Topic - whole subject of ENT.

Practicals - 3 numbers

1 practical examination each should be conducted at the end of the 1 month posting in each semester.

Practical exam 1 – I long case viva 1 final practical exam similar to the University examination.

PATTERN OF QUESTION PAPER

THEORY

Time: 3 hrs

Max. Marks: 40

SECTION A			
1	Long answer question/structured essay	2x (3marks)	6 marks
2	Draw and label	2x(2 marks)	4 marks
3	Short answer questions	4x(1 mark)	4marks

4	Write short notes on	3x (2 marks)	6 marks
SECTION B			
6	Structured question (clinical problem solving)	1+2+2+2+3 marks	10marks
7	Short answer questions	4x(1 marks)	4 marks
8	Write short notes on	2x (3 marks)	6 marks

PRACTICALS

1. Two structured cases of 10 marks each - $10 \times 2 = 20$ marks
2. OSCE - 5 stations of 4 marks each - $4 \times 5 = 20$ marks
3. Internal assessment - 10 = marks

MODEL QUESTION PAPER
3rd Professional MBBS Degree Examination -Part 1
OTORHINOLARYNGOLOGY

(Draw diagrams wherever necessary)

Time: 2 Hours

Max. Marks – 40

SECTION - A

I. Write Briefly on

1. Cochlear implants
2. Aetiology, clinical features and treatment of vocal nodule

(2 x 3 = 6)

II Draw & Label

1. Organ of Corti
2. Lateral wall of Nose

(2 x 2 = 4)

III Short Answer Question

1. Fossa of Rossemuller
2. Complications of adenoidectomy
3. Killian's dehiscence
4. Little's area

(4 x 1 = 4)

IV Write short notes on

1. Cortical mastoidectomy
2. Inverted Papilloma
3. BPPV

(3 x 2 =6)

SECTION - B

V. A 6 year old boy is brought to the outpatient department with complaints of snoring and recurrent nasal discharge of 6 months duration. Since 2 months, parents also noticed inattentiveness and decreased hearing in the child.

1. What is the probable diagnosis?
2. What are the clinical signs in the ear?
3. How will you confirm the diagnosis?
4. What is the treatment?
5. What all complications can occur if left untreated?

(1+2+2+3+2=10)

VI. Short answer question

1. Carhart's notch
2. Laryngeal crepitus
3. Peritonsillar abscess
4. Osteomeatal unit

(4 x 1 = 4)

VII. Write Short notes on

1. Myringotomy
2. Pure tone Audiometry
3. Foreign body nose

(3 x 2 = 6)

9.11 - MEDICINE AND ITS ALLIED SPECIALITIES**MEDICINE****A. GOAL**

The broad goal of teaching of undergraduate students in 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.

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.

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	
Duration of the course	:5 semesters – III, V, VI, VIII & IX
Total number of theory	: 300
Lectures	: 100
Innovative sessions	: 200
Practicals	: Clinical posting as per schedule attached
(Project work, Seminars, Structured	, Integrated teaching, Formative evaluation, Revision)

LECTURES

I. Nutrition and Nutritional disorders

- a) Nutrition requirements
- b) Protein calorie malnutrition in adults
- c) Obesity
- Vitamin deficiencies
- Vitamin excess
- Hypo and Hypervitaminosis A&D

II. Fluid and electrolyte balance

- a) Hypovolemia and Dehydration
- b) Acidosis
- c) Alkalosis
- d) Hyponatremia + Hypernatremia
- e) Hypokalemia + Hyperkalemia

III. Disturbance of body temperature

Infections

Approach to fever and PUO
URI including sinusitis
LRTI – Bronchitis and Community acquired pneumonia
Tuberculosis
Gastroenteritis, Cholera, Food poisoning
Amoebiasis
Helminthic infections, Bacillary dysentery
Acute Viral Hepatitis
Chronic Viral Hepatitis
Malaria, Filariasis
Chickenpox, Herpes Zoster
Dengue fever, Chickungunya
Typhoid
Leptospirosis
Common exanthematous fevers
Skin & Soft tissue infections including, Cellulitis
UTI
HIV AIDS
Sepsis
Rabies
Tetanus
Common fungal infections
Influenza and other respiratory viral infections
Brucellosis, Rickettsia
Meningitis
Common gram negative infections
Common gram positive infections

IV. Immunology

Role of B and T Lymphocytes

Immunoglobulin

Immune Reaction

Anaphylaxis, Urticaria, Angioedemas

Primary Immune Deficiency Disorders**Genetics**

Clinical Genetics

Environmental and occupational problems

a) Common Poisonings Organophosphate and carbamate Sedatives, hypnotics, Antipsychotics, TCA

Rat poison + paracetamol Formic acid, Methyl alcohol, Odollum

b) Bites and stings Snake bite Scorpion sting + others

c) Alcohol abuse

d) Radiation hazards

e) Hanging, Drowning, Electrical injuries

VIII. Medical disorders in Pregnancy**IX. CVS**

Coronary circulation

Coronary artery diseases

ECG and X-ray interpretation

Rheumatic fever and RHD

Congenital heart disorders

Corpulmonale

Hypertension and Hypertensive heart disease

Cardiac failure

Peripheral Vascular Diseases

Infective Endocarditis

Cardiomyopathies

Pericardial disease

Rhythm disturbances

DVT + Pulmonary embolism

X. GI System

Approach to patient with Jaundice

Approach to patient with Ascites

Physiology of Absorption and Investigation procedures

Acid peptic diseases

Malabsorption syndrome and Tropical sprue

Drug/toxin induced hepatitis & NASH

IBS

Inflammatory bowel disease
Disease of colon and rectum
Abdominal Tuberculosis
Chronic liver disease
Upper GI bleed
Haemochromatosis & Wilson's Disease

XI. Respiratory system

Bronchial asthma
COPD
Suppurative lung disease
Pleural diseases
Bronchogenic carcinoma
Respiratory failure
ILD

XII. Haematology

Bleeding disorders
Coagulation disorders
Acute Leukemias
Chronic Leukemias
Haemolytic anemias
Fe deficiency anemia
Macrocyte and Megaloblastic anemia
Plasma cell disorders
Polycythemia
Lymphoma
Aplastic anemia + Agranulocytosis
HUS & TTP

XIII. Renal Medicine

Acute renal failure
Chronic renal failure
Glomerular disease
Nephrotic syndrome
RFT

XIV. Central Nervous System

Functional
Anatomy
Physiology and Investigation
Migraine and cluster headache
Seizures and Epilepsy
Ischemic stroke
Hemorrhagic stroke
Approach to a case of vertigo
Extrapyramidal disorders
Peripheral Neuropathy

Spinal cord disorders
Motor neuron disease and Myasthenia
CNS Tuberculosis
Demyelination
Cerebellar disorders
Dementias, Delirium
Pituitary dysfunction and Tumor
Endocrine disease related to Gonads

XV. Geriatrics

Normal ageing and age related common problems
Drug therapy in elderly

XVI. Critical care

Severe sepsis and shock
Acute LVF + Acute severe asthma
Cardiopulmonary resuscitation
Status epileptics
Approach to coma
Management of hepatic encephalopathy
DIC
Emergency management of Acute coronary syndrome
Bioterrorism and disaster management

XVII. Rheumatology

Rheumatoid arthritis
SLE
Spondylo arthropathies
Degenerative Joint disorders
Approach to chronic backache
Inflammatory muscle disease

XVIII. Endocrine disease

Diabetes Mellitus
Hypothyroidism
Hyperthyroidism
Thyroiditis & other thyroid disorders
Parathyroid disorders + Tetany
Metabolic bone disease + Osteoporosis + Vitamin Deficiency
Cushings disease + Syndrome
Addison's disease

XIX. Pain and principles of palliative care

Assessment and treatment of chronic pain

XX. Clinical Pharmacy and Therapeutics

General principles of drug therapy
Common drug interactions
Common adverse reactions
Monitoring drug therapy
Rational prescription writing

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. Clinical Medicine by Dr.K.V.Krishnadas
5. Macleods clinical examination
6. Hutchison's textbook of clinical methods

REFERENCE TEXT BOOKS

1. Harrison's Principles of Internal Medicine
2. Text Book of Medicine Cecil & Loeb

PSYCHIATRY LECTURES -20 HOURS

- a. Classification of psychiatric disorders
- b. Aetiological factors in psychiatric disorders
- c. Clinical interview & Mental state examination
- d. Organic brain syndrome
- e. Substance abuse
- f. Bipolar disorders
- g. Depressive disorders
- h. Schizophrenia
- i. Major manifestation of psychiatric illness
- j. Treatments used in psychiatric illness
- k. Neurotic, stress related and somatoform disorders
- l. Sleep disorders
- m. Legal aspects of psychiatry

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

DERMATOLOGY LECTURES -30 HOURS

Infections of Skin
Eczematous dermatitis
Bullous skin lesion Collagen disorder
Pigmentary disturbances
Maculo papular,
squamous lesion
Neoplastic lesions
Lesions of skin appendages
Gastrogenic disorders
Leprosy & national leprosy Control programmes

INNOVATIVE SESSION

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

I. Common symptoms of disease/clinical approach to

- a) Pain
- b) Fever
- c) Respiratory symptoms
- d) Pallor, Jaundice, Oedema
- e) GI symptoms
- f) Haemetemesis, Malaena, Bleeding PR/ Haematochezia
- g) rinary symptoms
- h) Neurological symptoms
- i) Musculoskeletal symptoms
- j) Weight loss and gain

II. 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 drug of Lung Structure and functions of Nephrons Digestion and absorption
Haemopoiesis and Iron metabolism
Thyroid functions and hormones Calcium metabolism
Physiology of pain

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) Refer a patient to secondary, tertiary care centre.
- d) Perform simple routine investigations
- e) Assist the common bed side investigative procedures like pleural tap, lumbar puncture

Part – II		
a)	Medicine	
	Theory – two papers 60 marks each	120 marks
	Paper I – General Medicine	
	Paper II – General Medicine (including psychiatry, dermatology and STD)	
	(Shall contain one question on basic sciences and allied Subjects)	
	Oral (Viva) interpretation of Xray , ECG etc.	20 marks
	Clinical (bedside)	100 marks
	Internal Assessment	60 marks
	(Theory – 30: Practical – 30)	
	Total	300 marks
	Paper -I	
	General Medicine – Section – A	
I.	10 marks x 1 = 10 marks	
	(problem oriented question)	
II.	2 marks x 10 = 20 marks)	

(short answers)		
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.

Practicals:

I. Long case (one) -50 marks Assessment 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

II. Short Cases - (two) 25 marks x 2 = 50 marks

Assessment based on

1. Elicitation of findings

9.12 -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, septicæmic 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

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. Meatotomy
- 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

DETAILS OF THE COURSE

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, Nosocomial 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, Malignant 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 thrombophlebitis

Lymphatics and Lymph nodes

Applied Anatomy and Physiology, Lymphodema-primary, Secondary, Lymph cyst -Cystic Hygroma

Inflammations - Lymphangitis, lymphadenitis, 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 tumours, 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, Plerura 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 includiRg 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, turnours, intestinal obstruction

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 of Bladder, Retention of urinr, Haematuria, Torsion, Undescended testis, Epididymo-orchitis, Carcinoma penis, Phimosis ,Prostate, testicular tumours. benign prostatic hypertrophy, carcinoma prostate, adrenal gland surgery pheochromacytoma&conn syndrome

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 etc. 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.

Operative Surgery –

Tracheostomy, gastrostomy, colostomy, suprapubic cystostomy, nephrostomy, AK amputation, BK amputation, Trendelenburg operation, Lumbar sympathectomy, Laparotomy, GJ and Vagotomy, Mastectomy, thyroidectomy, Eversion TV sac, herniorrhaphy, haemorrhoidectomy, vasectomy, Gastrojejunostomy. 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

9.11.1 SURGICAL SPECIALITIES

Lecture demonstration in surgical specialities should include Orthopaedics, Radiotherapy, Anaesthesiology, Thoracic Surgery, Plastic Surgery, Neurosurgery, Urology and Casualty

9.13. 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 inflammatory and neoplastic diseases occurring in the bones and joints should also be familiarised.

B. OBJECTIVES

1. Knowledge

- a. Explain the principles of recognised of bone injuries and dislocation
- 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 or rehabilitation
- d. Recognize metabolic bone diseases as seen in this country
- e. Explain aetiology, manifestations, diagnosis of neoplasm 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 forearm, phalanges etc
- b. Use techniques of splinting, plaster, immobilization etc
- c. Manage common bone infections, learn indications for amputations and corrective measures for bone deformities
- d. Advise aspects of rehabilitation for polio, Cerebral palsy and amputation

3. Application

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

4. Integration

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

C. DETAILED

Duration of the course		:	3semesters –IV, , VI, & IX
Total number of hours of theory		:	
Lectures	:	35	Lectures
Innovative sessions	:	Part of clinical work	Innovative sessions
Practicals	:	Clinicalpostin gs as per schedule	Practicals
(Project work, Seminars, Structured discussion, Formative evaluation, Revision)			

DETAILS OF LECTURES

Traumatology

Definition of a fracture and types of fracture and general Principles of management of fracture

Complications of fracture –Open fractures and pathological fracture

Fracture clavicle, Fracture neck of humerus and shoulder dislocation

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

Definition of a fracture and types of fracture and general Principles of management of fracture

Complications of fracture –Open fractures and pathological fracture

Fracture clavicle, Fracture neck of humerus and shoulder dislocation

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 fracture –Fracture of femur

Hip dislocation and fracture shaft of femur

Meniscus tear and fracture patella

Leg fracture

Ankle injuries –Pott's fracture

Hand injuries

Extensor mechanism injuries of knee

Fracture of tarsal bones

Cold Orthopaedics

C.T.E.V and flat foot

C.D.H

Torticollis, Congenital Pseudoarthrosis of Tibia and Arthrogryphosis multiplex congenita

Osteomyelitis Septic arthritis Tuberculosis –Spine, Hip, Knee, Elbow, Wrist and other sites (2 classes)

Perthe's disease and slipped upper femoral epiphysis

Rickets and Osteomalacia

Rheumatoid arthritis and Ankylosing spondylitis

Intervertebral disc prolapse.

Scoliosis and Spondylothesis

Bone, Tumour, Osteochondroma, Simple bone cyst, Aneurysmal bone cyst and Enchondroma
Giant cell tumour, Osteosarcoma and Ewing's sarcoma Chondrosarcoma, Multiple myeloma,
Metastatic bone diseases and Osteogenesis Imperfecta

Nerve injuries –Radial nerve, ulnar nerve, sciatic nerve, Amputations and Osteoarthritis Hip,
Knee Cerebral palsy.

Seminars/symposia

Symposia with clinical cases –Trauma

Fat embolism, compartment syndrome VIC, Physical Medicine and Rehabilitation,
Ankylosis,

Back pain, Bone tumours (benign), Bone tumours (malignant)

DETAILS OF PRACTICALS –Clinical Posting

Nerve injuries, Deformities, Malunion, Nonunion, CTEV, Bone tumours, Traction, Splints
and POP

TEXT BOOKS OF RECOMMENDED**Prescribed Books**

1. Graham Apley –System of Orthopaedics
2. Fracture and Joint injuries –Watson Jones
3. Orthopaedics –Samual F Turck
4. Mercer Orthopaedic Surgery
5. Outline of fractures - Adam's
6. Outline of orthopaedics –Adam's
7. Clinical Surgery –Das –Chapter on Orthopaedics
8. Crawford Adam's –Operative techniques (Orthopaedics)

Reference Books

1. Campbell's operative orthopaedics

9.14. 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 prosthetics –and rehabilitation aids their application in the rehabilitation of
disabilities
5. Disability evaluation –principles people with disabilities Act -1995
6. Pain management principles
7. Principles of rehabilitation of people with disabilities
8. To understand the basic principles of disability classification and for certification purposes
9. To get exposed to the potentials of socio-vocational rehabilitation of the various describing
conditions in the light of the 1995 Act People with Disabilities (equal opportunities etc) Act

1995 10. To get oriented to basic principles of community based rehabilitation of people with disabilities

Text books Recommended

Text book of Rehabilitation Medicine by Howard

9.15. 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. Identify 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 treating a patient)

C. DETAILED SYLLABUS

DETAILS OF THE COURSE

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, Brach) 1therapy and Nuclear
 Medicine
 Methods of Radiotherapy and Recent Advances
 Common malignancies, Diagnosis and Treatment

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

9.16. 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

DETAILS OF PRACTICALS

Practical Demonstrations: inside the theatre

1. Premedication,
2. Anaesthetic equipments,
3. N cannulation,
4. CVP 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,
11. Equipments used –Monitoring equipments, Ventilators, Boyle's apparatus,
12. Care of patients on ventilator,
13. Intra venous fluid therapy,
14. Pain management

TEXT BOOK RECOMMENDED

Reference Book –Synopsis of Anaesthesia by Alfred Lee

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)		
1.	structured question (clinical problem solving)	1+1+1+2=5 marks
2.	Short notes	5x2 (marks)=10 marks
3.	Structured question (clinical situation)	1x3 (marks)=3
4.	Short essays	2x6(marks)=12 marks
5.	Total	30 marks

Section B (Orthopedics)		
1.	Structured question (clinical situation)	1+1+1+1+1=5 marks
2.	Short answer question	3x1 (mark)=3 marks
3.	Short answer question	2x2(marks)=4 marks
4.	Short essays	5x1(marks)=5 marks
5.	Short answer question	1x4(marks)=4marks
6.	Short notes	3x3(marks)=9 marks
7.	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 and dental	
Section –A	
I. Short answer questions	(2marks x 5) = 10 marks
II. Short note	(3 marks x 2)= 6 marks
III. Short answer questions	(2 marks x 2)= 4 marks
IV. Structured question.	(5 marks x 1)= 5 marks
V. Short essay	(5 marks x 1)= 5 marks
Total	=30 marks
Section –B	
I Short notes	(2 marks x 3) = 6 marks

II Short answer questions	(3 marks x 2) = 6marks
III Structured question	(5 marks x 2) = 10 marks
IV Short essay	(4 marks x 2) = 8 marks
Total	=30 marks

Total marks - 120marks

Internal assessment - 30Marks

Viva Voce - 20 marks

Total for theory - 170marks

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

Practicals Clinical:

One *long case* - 45 minutes 50 marks

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)

Short case

One General Surgery & one Orthopaedics - 10 minutes each

Marks - 20 marks

OSCE - 5 marks

Total - 25 marks

OSCE –is a clinical demonstration in a patient.

Points to be noted

- Introduction
- Consent
- Position of patient
- Interpretation

Oral Examamination (viva) - 20 marks

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

5 marks x 4 = 20 marks

**MODEL QUESTION PAPER
PAPER 1 GIT, ORTHOPEDICS**

Time -3 hrs

Max marks -60

*Answer Section A and B in separate answer books.
Draw diagrams wherever necessary.*

SECTION A – GIT

1. Read this paragraph and answer the following questions

You are asked to assist your consultant in doing an upper gastro intestinal endoscopy for a patient suspected to have carcinoma of stomach. A fibre optic endoscope is passed into the staomach under local anaesthesia and an ulcer is visualized in the greater curvature of the stomach. A four quadrant biopsy of the ulcer is taken.

- a. What is the distance from the incisors at which the diaphragmatic constriction is encountered?
- b. What is the common pathological type of carcinoma stomach?
- c. What will the gastric secretory studies reveal in such a patient
- d. What are the indications for D2 resection for gastric cancer

(1+1+1+2=5 marks)

- 2 Write short notes on
- Splenectomy
 - Complications of gall stones
 - Chew and spit test
 - Oschner Sherren regime
 - Child's criteria

(5x2 marks =10 marks)

- 3 Read the following paragraph and answer the questions

A 50 year old chronic alcoholic male patient was brought to the casualty with severe upper abdominal pain which radiates to back also. General examination showed tachycardia with tachypnoea . abdominal examination showed rigid abdomen with minimal free fluid. Liver dullness not obliterated.

- What is the probable diagnosis
- What is the most appropriate blood test to diagnose this condition
- What are the indications for surgery for this condition

(1+1+1=3 marks)

4.

- Describe the pathology and management of gastrointestinal stromal tumour
(6 marks)
- Mention the pathogenesis clinical presentation and management of anorectal sepsis
(6 marks)

SECTION B – ORTHOPAEDICS

MODEL QUESTION PAPER PAPER II GENERAL SURGERY (EXCEPT GIT), ANESTHESIA, RADIOTHERAPY, DENTAL

Time -3 hrs

Max marks - 60

*Answer Section A and B in separate answer books.
Draw diagrams wherever necessary.*

SECTION A

1. Short answer questions

- Fibroadenoma
- Aortic aneurysm
- Hydronephrosis
- Sublingual dermoid
- MenII syndrome

(5 x 2marks = 10 marks)

2. Write short notes on

- Deep vein thrombosis
- Tuberculous lymphadenitis

(2x3marks = 6 marks)

3. Short answer questions

- a. What is TRIAGE?
- b. What are blood substitutes?

(2x 2 marks = 4 marks)

4. Read this paragraph and answer the following questions

A fifty year old female has presented in OP department with the history of a painless lump on the right breast of two months duration. Examination showed a 2X2.5 cm hard lump in the upper outer quadrant of the right breast with no fixity to underlying structures. Examination of the right axilla showed 2x2 cm size single swelling which is mobile. Examination of abdomen did not reveal any abnormalities.

- a. What is the most probable diagnosis
- b. Mention two differential diagnosis
- c. How will you confirm your diagnosis
- d. What is the surgical treatment of this condition
- e. How will you follow up the patient

(1+1+1+1+1=5 marks)

5. Describe the clinical features and management of papillary carcinoma thyroid

(5marks)

SECTION B

1. Write short notes on

- a. Leukoplakia of the oral cavity
- b. Hyperparathyroidism
- c. Haemangioma

(2 marks x 3 = 6 marks)

2 Write short notes on

- a. Clinical features and management of Cervical rib
- b. Subdural haematoma

(3 marks x2 = 6 marks)

3 Read this paragraph and answer the following questions

A 50 year old male, chronic smoker is presenting with a pain less slowly increasing swelling on the lower part of the right parotid region. Examination showed it to be a tense cystic swelling .Oral cavity examination was normal except for tobacco staining. Examination of neck did not show any abnormality.

- a. What is the most probable diagnosis
- b. Mention two differential diagnosis
- c. Mention the most important non-invasive investigation to diagnose this condition
- d. Name the surgery done for this condition and Mention two complications of the surgery.

(1+1+1+2=5 marks)

4. Read this paragraph and answer the following questions

A 14 year old boy is coming to you saying that size of right testes has reduced to a pinhead size. He gives a history of sudden onset of severe pain on right testes a few months ago for which he has not taken any treatment and got symptomatic relief in a few days time.

- a. What is the diagnosis
- b. What are the diagnostic features of this condition
- c. Mention two predisposing factors for this condition
- d. (i)What would have been the treatment if you had seen the patient immediately after the onset of the pain?
(ii) What will you do now?

(1+1+1+2=5 marks)

5. a. Describe the role of cytoaines in inflammatory response (4marks)
- b. what are the complications of fracture ribs and how will you manage a case of flail chest (4marks)

9.17 - PAEDIATRICS

DETAILS OF THE COURSE

Duration of course	: 3 semesters	IV,VI,&IX
Total number of hours theory		:100
Lectures		:34
Practicals		:as per schedule attached
Innovative sessions		:66
(Project work, seminars, structured discussion,		
integrated teaching, formative evaluation, revision)		

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) Describe the common pediatric disorders and emergencies in terms of epidemiology, etiopathogenesis, clinical manifestations, diagnosis, rational therapy and rehabilitation.

- c) State age related requirements of calories, nutrients, fluids, drugs etc. in health and disease.
- d) Describe preventive strategies for common infectious diseases, malnutrition, genetic and metabolic disorders, poisonings, accidents and child abuse.
- e) Outline national programmes relating to child health including immunization.

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, conduct common bedside investigative procedures, interpret common lab results and plan and institute therapy.
- b) Take anthropometric measurements, resuscitate newborn infants at birth, prepare oral rehydration solution, perform tuberculin test, administer vaccines available under current national immunization programme, perform venesection, IV canulation, start an intravenous saline and provide nasogastric feeding.
- c) Observe diagnostic procedures such as lumbar puncture, liver and kidney biopsy, bone marrow aspirations, pleural tap and ascitic tap.
- 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.

3. Integration

The training in pediatrics should prepare the student to deliver preventive, promotive, curative and rehabilitative services for care of children both in the community and rehabilitative services and at hospital as part of a team in an integrated form with other disciplines, eg. Anatomy, physiology, forensic medicine, community medicine and physical medicine and rehabilitation.

The skill training is thoroughly inadequate though this is expected to be practiced during internship, there is no special allocation of hours to skill especially Resuscitation, Procedural skills (as in BDS course).

The emphasis given to critical case is less. There should be more emphasis on posting students in casualty (as in medicine and surgery).

Drug therapy in children should be given more importance in Curriculum also rational use of drugs.

DETAILS OF LECTURES

Infectious 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.

Gastro Intestinal Tract and Liver disorder

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

C.V.S

Congenital Heart disease. 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, Microcephaly and Hydrocephalus, Floppy infant, Therapeutics—

Treatment of epilepsy, GBS, ADEM

Haemopoietic system Anaemia in children, bleeding disorders

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

Endocrine disorder Diabetes melitus, Thyroid disorders, short stature and intersex, Ambiguous genitalia, Precocious puberty

Connective Tissue disorders JRA, Other vasculitis syndromes including SLE and HSP, Kawasaki disease

Malignancies in children Leukemia, Lymphomas, Neuroblastoma, Solid tumors, CNS tumors

New Born Respiratory Distress in new born. Perinatal Diagnosis and treatment, Sepsis in new born. Assesment and management of Asphyxia, Thermoregulation in new born Congenital Malformations. Disorders of gestation and low birth weight, Neonatal resuscitation, neonatal jaundice, Sepsis, BFHI and feeding, normal variations Intra uterine infections, neonatal seizures.

Behavioral problems in children

Enuresis, thumb sucking, breath holding, Dyslexia, Specific learning disorders, child rearing problems like infantile colic, growing pain etc.

Common poisoning and accidents in children

Kerosene, Dhatura, paracetamol and iron, snake bite, burns etc

Nutrition

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

National Programmes

IMNCI, RCH3,

NRHM, Vitamin A,

Iodine deficiency, IDSP, ARI, ADD, AFP & PPI

Common chromosomal disorders and genetic counselling Down's syndrome,

Turner syndrome,

Fragile X and Genetic counseling.

Innocent problems causing undue parental anxiety Breath holding spell.

Evening colic, growing Pain etc.

Tutorial Topics

Introduction to pediatrics

History taking and general Examination

CVS, RS, NS and GIT (History taking and system Examination)

Fluid and electrolyte balance

Growth and development, Nutrition, FTT, Fluid and electrolyte balance

Immunization –National immunization schedule & Optional vaccines

New born: Resuscitation of NB, LBW babies, Convulsions in NB, Jaundice in NB, Assessment of gestation, Examination of NB, normal variation of NB
 Approach to a child with congenital heart disease. Cardiac failure
 Approach to a child with cyanotic heart disease.
 Rheumatic heart disease
 Acute diarrhoeal disorders
 Approach to a child with anemia
 Bleeding disorders
 Oedema in children
 Wheezing and stridor in children
 P.U.O
 Failure to thrive
 Convulsions in children, Coma in children
 Approach to a child with jaundice
 Acute flaccid paralysis in children
 Shock in children
 Child with rash
 Paediatric surgery classes
 Instruments and procedures, X-ray and nutrition

Details of clinical postings	
8.00-9.00am	Lecture in clinical subject
9.00-12am	Case taking /OPD
12noon-1.00 pm	Lecture in clinical subject

Casualty posting on OP days in the evening
 Minimum 4 hours of Neonatology postings in VIIIth semester

Case Record

Separate clinical record book should be kept and at least 10 cases to be included
 Record books should have a uniform format

Log Book

In addition to record book of 10 cases, a separate uniform log book should be maintained by students to record daily activities, supervised by concerned Unit chief or Assistants.

Text Books Recommended

Prescribed Books

1. Text Book 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

Text Book of Pediatrics by Nelson

IAP Text Book of Pediatrics

Social and Preventive Medicine by Park

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

Evaluation	
One paper of 2 hours having 40 marks	
Section A	
Structured question (clinical situation)	5marksx2=10marks
SAQ(1 markX4)	4 marks
SAQ(2marksx3)	6marks
Section B	
Essay (problem solving)	10 marks

SAQ(1markx4)	4 marks
SAQ(3marksx2)	6marks
Total	40marks
Internal assessment	10 marks
Viva-voce	10 marks
Total for theory	60 marks
Practical	30 marks
Internal assessment	10 marks
Total for practical	40 marks
Total for the subject	100 marks

Practical

Clinical	short cases	-	25 marks
	OSCE	-	5 marks
	Total	-	30marks

9 .18 - 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 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, labour, puerperium and the problems related to these conditions.
3. To list the common causes leading to maternal and perinatal mortality 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. Aware of the principles of contraception and the various techniques employed in family welfare practice including medical termination of pregnancy, male and female sterilization.
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:

- 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 integrate activities with other departments like community medicine and paediatrics, in programmes like newborn care, immunization, nutrition, and other maternal & child health activities

General Guidelines for training:

1. Training in the department of Obstetrics & Gynaecology with facilities prescribed by MCI, for a period of 5 months with due exposure to antenatal, intranatal and postnatal care and family planning and general gynaecological care
2. Of this period of clinical instruction, not less than one month be spend as resident pupil in the department.
3. 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.
4. 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:	
Summary:	
Duration of course	Postings in 5 Semesters (IV, V, VI, VIII, IX)

Total number of hours:	
Theory	300
Lectures	100
Innovative sessions :	200
Clinical Work ss	As per the schedule attached

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

Assesment 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 foot ware, Exercise, sex, hygiene

Nutrition, Rest, drug in pregnancy

Drugs: Immunisation, Drug prescription relevant blood examination, urine examination and interpretation of the results & physiological changes in pregnancy

Ultrasound examination

Fetal surveillance

Normal Labour

Physiology of onset of labor, fetal skull &pelvis

Mechanism of labour

Labour monitoring Partogram, 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 with 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

Abnormal labor:

Hypertonic contractions, hypotonic contractions and

Incoordinate uterine action

CPD, obstructed labour

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: aetiopathology, classification, clinical features, Diagnosis, management, long term follow up and complications
 Hyperemesis gravidarum: definition, aetiopathology, clinical features advice and drug therapy
 Abnormal puerperium: Cause clinical presentation investigations and management
 Abnormal pregnancy:
 Multiple pregnancies
 Intrauterine 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
 Medical termination of pregnancy:
 MTP Act, Legal and ethical aspects, methods, complications and management
 Operative obstetrics
 Indication and steps of the procedure of episiotomy
 Vacuum extraction, forceps delivery
 Instrumental 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,
 fetal tissue biopsy
 Medical disorders in pregnancy:
 Hypertensive disorders of pregnancy
 Heart diseases complicating pregnancy
 Anemia in pregnancy
 Diabetes in pregnancy
 UTI, Hepatitis, TB-Chest disease complicating pregnancy
 Venereal disease, infections, HIV complicating pregnancy
 Thyroid disorders, Immunological disorders, like SLE, ACLA, 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 menstruation

Abnormal menstruation Definition, classification, clinical features and principles of investigations, diagnosis and management

Amenorrhoea: Definition, classification, causes, investigations and management.

Dysfunctional 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

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

Neoplasms of Genital tract – Benign and Malignant. Aetiopathology, Clinical feature, 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

Endometriosis: aetiopathology, classification, clinical features, diagnosis And management

Contraception

Operative Gynaecology:

Indications, complications of D&C, cervical biopsy

Medical termination of pregnancy Evacuation of incomplete

Abortion Tubal Ligation, IUCD insertion

Abnormal hysterectomy

Vaginal hysterectomy, Sling procedures

Ovarian tumours

Radical procedure for malignancy

Correction of enterocele, diagnosis and operation for vault prolapse

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 medicine (Gynaecology)

Analgesia

Urological problems

DETAILS OF PRACTICALS-Clinical postings-Ward/OP/OT/Labour room	
8.00 – 9.00am	Lecture in clinical subjects
9.00 – 12am	Case demonstration, Clinical discussions
12.00 – 1.00 pm	Lecture in clinical subjects

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 Dysfunctional uterine bleeding. Students should be exposed to operative procedures and diagnostic procedures like ultrasound endoscopy.

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.

Keeping records and Log books

- Each students must maintain a log book carried over from 4th semester to 9th semester
- 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 include 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 etc

b. In male – condom, vasectomy (NSV) etc

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 chemical contraceptives and oral contraceptive.

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, 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

Pediatrics: problems of child health in relation to large family: Organization of pediatric services Nutritional problems of mother and child, childhood diseases due to over crowding

TEXT BOOKS RECOMMENDED

Prescribed Books

1. Mudaliar and Menons Clinical Obstetrics 10th edition
2. Text book of Obstetrics by D C Dutta 6th edition
3. Text book of Gynaecology by D C Dutta 4th edition
4. Shaws Text book of Gynaecology 14th edition
5. Text book of Obstetrics by Sheila Balakrishnan (Paras Publications)

Reference books

1. Williams obstetrics 23rd edition (MacGraw Hill)
2. 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
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Paper 2 - (Gynaecology, Family Welfare &Demography)

Section - A

Draw & Label	-	2 marks
SAQ (1markX4)	-	4 marks
SAQ (2marksX3)	-	6 marks
Short essays (4marks x2)	-	8 marks

Section –B

Essay (Problem Solving)	-	10 marks
SAQ (1markX4)	-	4marks
SAQ (3marksX2)	-	6marks
Total	-	40 marks

Total (Paper I + II) 40+40 - 80 Marks

Internal Assessment	-	20marks
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

Clinical 1 : Long Case: 1 Case =15 Min - 25 marks
(Including Writing of the Case Sheet)

Clinical-2: Short Case - 25 marks

Oral Exam

X-rays, Instruments, Family planning & Operative surgery - 20 marks

Record of delivery cases - 10 marks

Model Question paper**PAPER I - OBSTETRICS & SOCIAL OBSTETRICS**

Time 2 hours

Marks 40

*Section A***I. Draw and Label**

2

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

Section B**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?

1+2+4+3
1x4

II. Short Answer Questions

1. Causes of polyhydramnios
2. Diagnosis of GDM
3. Cord prolapse
4. Bandl's Ring

III. Short Answer questions **3x2**

1. External Version
2. Management of Primary Post partum haemorrhage

PAPER II - Gynaecology (Family Welfare & Demography)**Time 2 hours****Marks 40****Section A****I. Draw and Label****2**

Ligamentous supports of uterus

II. Short Answer Questions**1X4**

1. Haematocolpos
2. Cystocoele
3. Adenomyosis
4. LNG-IUS

III. Short Answer Questions**2x3**

1. Emergency contraception
2. Irregular ripening
3. Bartholin's Cyst

IV. Short Essays**4x2**

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 hirsute.

- 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?

1+2+4+3**II. Short Answer questions****1x4**

1. Tests for tubal patency
2. Diagnosis of Bacterial Vaginosis
3. Danazol
4. Metorrhagia

III. Short Answer Questions**3x2**

1. Post menopausal bleeding
2. Microinvasive carcinoma
