Regulations and Syllabus
for
MBBS Degree Course

2014
(Incorporates JSS University
Regulations for
MBBS 2009 & MCI Amendments upto April 2014)

JSS UNIVERSITY
Deemed-to-be-University under section 3 of the UGC Act. 1956
Accredited 'A' Grade by NAAC
Sri Shivarathreeshwara Nagara, Mysuru-570 015
Karnataka

Jagadguru Sri Shivarathreeshwara University

Mysuru, Karnataka

VISION

The mission of JSS University is to nurture and develop the talents of students and to create applicable knowledge in order to support social and economic advancement.

MISSION

As a comprehensive university, JSS University is committed to offering high quality undergraduate, graduate and professional education to its students.

Regulations are approved by:
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CONTENTS

CONTENTS

Section I

INTRODUCTION

The Medical Council of India (MCI) has revised the curriculum of MBBS with effect from May 1997. The new Regulations are called the "Regulations on Graduate Medical Education, 1997", vide MCI notification dated 04 Mar 1997, published in part III, Section 4 of the Gazette of India dated 17th May 1997. These regulations have been amended vide MCI notifications dated 29th May 1999, 02nd Jul 2002, 30th Sep 2003, 16th Oct 2003, 01st Mar 2004, 20th Oct 2008, 15th Dec 2008, 22nd Dec 2008, 25th Mar 2009 and 19th Apr 2010. Jagadguru Sri Shivarathreeshwara University, Mysore, Karnataka has implemented the new regulations, for the batches of students admitted to MBBS course for the academic year 2008-09 onwards. The amendments shall also be applicable to these batches of students.

SHORT TITLE

These Regulations shall be called "JSS University Regulations for MBBS".

The new Regulations on Graduate Medical Education, 1997 recommend:

1. Graduate medical curriculum be oriented towards training students to undertake the responsibilities of a physician of first contact who is capable of looking after the preventive, promotive, curative & rehabilitative aspect of medicine.
2. With wide range of career opportunities available today, a graduate has a wide choice of career opportunities. The training, though broad based and flexible, should aim to provide an educational experience of the essentials required for health care in our country. Training should be able to meet internationally acceptable standards.
3. To undertake the responsibilities of service situations which are changing conditions and of various types, it is essential to provide adequate placement training tailored to the needs of such services as to enable the graduates to become effective instruments of implementation of those requirements. To avail of opportunities and be able to conduct professional requirements, the graduate shall endeavour to have acquired basic training in different aspects of medical care.
4. The importance of the community aspects of health care and of rural health care services is to be recognized. This aspect of education & training of graduates should be adequately recognized in the prescribed curriculum. Its importance has been systematically upgraded over the past years and adequate exposure to such experiences should be available throughout all the three phases of education & training. This has to be further emphasized and intensified by providing exposure to field practice areas and training during the internship period. The aim of the period of rural training during internship is to enable the fresh graduates to function efficiently under such settings.

5. The educational experience should emphasize health and community orientation instead of only disease and hospital orientation or being concentrated on curative aspects. As such all the basic concepts of modern scientific medical education are to be adequately dealt with.
6. There must be enough experiences to be provided for self learning. The methods and techniques that would ensure this must become a part of teaching-learning process.
7. The medical graduate of modern scientific medicine shall endeavour to become capable of functioning independently in both urban and rural environment. He/she shall endeavour to give emphasis on fundamental aspects of the subjects taught and on common problems of health and disease avoiding unnecessary details of specialization.
8. The importance of social factors in relation to the problem of health and diseases should receive proper emphasis throughout the course and to achieve this purpose, the educational process should also be community based than only hospital based. The importance of population control and family welfare planning should be emphasized throughout the period of training with the importance of health and development duly emphasized.
9. Adequate emphasis is to be placed on cultivating logical and scientific habits of thought, clarity of expression and independence of judgment, ability to collect and analyse information and to correlate them.
10. The educational process should be placed in a historic background as an evolving process and not merely as an acquisition of a large number of disjointed facts without a proper perspective. The history of Medicine with reference to the evolution of medical knowledge both in this country and the rest of the world should form a part of this process.
11. Lectures alone are generally not adequate as a method of training and are a poor means of transferring/acquiring information and even less effective at skill development and in generating the appropriate attitudes. Every effort should be made to encourage the use of active methods related to demonstration and on first- hand experience. Students will be encouraged to learn in small groups, through peer interactions so as to gain maximal experience through contacts with patients and the communities in which they live. While the curriculum objectives often refer to areas of knowledge or science, they are best taught in a setting of clinical relevance andhands- on experience for students who assimilate and make this knowledge a part of their own working skills.
12. The graduate medical education in clinical subjects should be based primarily on out-patient teaching, emergency departments and within the community including peripheral health care institutions. The out-patient departments should be suitably planned to provide training to graduates in small groups.

13. Clinics should be organised 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 the patients.
14. Proper records of the work should be maintained which will form the basis for the students' internal assessment and should be available to the inspectors at the time of inspection of the college by the Medical Council of India.
15. Maximal efforts have to be made to encourage integrated teaching between traditional subject areas using a problem based learning approach starting with clinical or community cases and exploring the relevance of various preclinical disciplines in both understanding and resolution of the problem. Every attempt shall be made to de-emphasize compartmentalisation of disciplines so as to achieve both horizontal and vertical integration in different phases.
16. Every attempt is to be made to encourage students to participate in group discussions and seminars to enable them to develop personality, character, expression and other faculties which are necessary for a medical graduate to function either in solo practice or as a team leader when he begins his independent career. A discussion group should not have more than 20 students.
17. Faculty member should avail of modern educational technology while teaching the students and to attain this objective, Medical Education Units/ Departments be established in all medical colleges for faculty development and providing learning resource material to teachers.
18. To derive maximum advantage out of this revised curriculum, the vacation period to students in one calendar year should not exceed one month, during the 4 ½ years Bachelor of Medicine and Bachelor of Surgery (MBBS) Course.
19. The students will be given an outline on "History of Medicine". This will be taught in an integrated manner by subject specialists and will be co ordinated by the Medical Education Unit of the College.
20. All medical institutions should have curriculum committee which would plan curricula and instructional method which will be regularly updated.
21. Integration of ICT in learning process will be implemented.

Section II
Objectives of MBBS Education Stated in MCI Regulations, 1997

1. National Goals:

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

a. Recognize 'Health for All' as a national goal and health right of all citizens and by undergoing training for medical profession fulfill his/her social obligations towards realization of this goal.

b. Learn every aspect of national policies on health and devote himself / herself to its practical implementation.

c. Achieve competence in practice of holistic medicine, encompassing promotive, preventive, curative and rehabilitative aspects of common diseases.

d. Develop scientific temper, acquire educational experience for proficiency in profession and promote healthy living.

e. Become exemplary citizen by observation of medical ethics and fulfilling social and professional obligations, so as to respond to national aspirations.

2. Institutional Goals:

In consonance with the national goals, the 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 the medical institute should:

a. Be competent in diagnosis and management of common health problems of the individual and the community, commensurate with his/her position as a member of the health team at the primary, secondary or tertiary levels, using his/her clinical skills based on history, physical examination and relevant investigations.

b. Be competent to practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems.

c. Appreciate rationale for different therapeutic modalities, be familiar with the administration of the "essential drugs" and their common side effects.

d. Be able to appreciate the socio-psychological, cultural, economic and environmental factors affecting health and develop humane attitude towards the patients in discharging one's professional responsibilities.

e. Possess the attitude for continued self learning and to seek further expertise or to pursue research in any chosen area of medicine.

f. Be familiar with the basic factors which are essential for the implementation of the National Health Programmes including practical aspects of the following:

   i. Family Welfare and Maternal and Child Health (MCH).

   ii. Sanitation and water supply.

   iii. Prevention and control of communicable and non-communicable diseases.

   iv. Immunization.

   v. Health education.

   vi. IPHS standard of health at various levels of service delivery, medical waste disposal

   vii. Organisational and 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 counseling.

h. Be able to identify community health problems and learn to work to resolve these by designing, instituting corrective steps and evaluating outcome of such measures.

i. Be able to work as a leading partner in health care teams and acquire proficiency in communication skills.

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.

l. All efforts must be made to equip the medical graduate to acquire the skills as detailed in Annexure II

Section III

Regulations Governing MBBS Degree Course

Eligibility for admission, selection and duration:

I. Eligibility:

Eligibility Criteria: No candidates shall be allowed to be admitted to the medical curriculum of first Bachelor of Medicine and Bachelor of Surgery (MBBS) course until:

A. He / She shall complete the age of 17 years on or before 31st December, of the year of admission to the MBBS course.

B. He /She has passed qualifying examination as under:-

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

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

Or

2. The intermediate examination in science of an Indian University/Board or other recognised examining body with physics, chemistry and biology which shall include a practical test in these subjects and also English as a compulsory subject.

Or

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

Or

4. B.Sc examination of an Indian University, provided that he/she has passed the B.Sc examination with not less than two of the following subjects physics, chemistry, biology (botany, zoology) and further that he/she has passed the earlier qualifying examination with the following subjects - physics, chemistry, biology and English.

Or

5. 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.

II. Selection of Students to MBBS Course:

The selection of students to medical college shall be based solely on merit of the candidate and for determination of the merit, the following criteria be adopted uniformly throughout the country:

a) A competitive entrance examination should be held so as to achieve a uniform evaluation as there may be variation of standards at qualifying examinations conducted by different agencies.

b) Procedure for selection to MBBS shall be as follows:

1. In case of admission on the basis of qualifying examination under clause (1) of MCI Regulations Governing Graduate Medical Admission, (see I, B, 1 above) based on merit, candidate for admission to MBBS course must have passed in the subjects of physics, chemistry, biology & English individually and must have obtained a minimum of 50% marks taken together in physics, chemistry and biology at the qualifying examination as mentioned in the clause (2) of regulation 4 of MCI Regulations Governing Graduate Medical Admission (see I, B, 2 above). In respect of candidates belonging to scheduled castes, scheduled tribes or other backward classes the marks obtained in physics, chemistry and biology taken together in qualifying examination be 40% instead of 50% as above. Provided that the eligibility criteria for admission to persons with locomotor disability of lower limbs in terms of clause 4(3) of MCI Regulations Governing Graduate Medical Admission (see I, C above) will be a minimum of 45% of marks instead of 50% taken together in qualifying examination and competitive entrance examination for admission to MBBS course.
2. In case of admission on the basis of competitive entrance examination under clause (2) to (4) of MCI Regulations Governing Graduate Medical Admission of this regulation (see I, B, 2 to 4 above), a candidate must have passed in the subjects of physics, chemistry, biology and English individually and must have obtained a minimum of 50% of marks taken together in physics chemistry and biology at the qualifying examination as mentioned in clause (2) of regulation 4 of MCI Regulations Governing Graduate Medical Admission(see I,B,2 above) and in addition must have come in the merit list prepared as a result of such competitive entrance examination by securing not less than 50% marks in physics, chemistry and biology competitive examination. In respect of candidates belonging to schedule caste, schedule tribes or other backward class the marks obtained in physics, chemistry, and biology taken together in qualifying examination & competitive entrance examination be 40% instead of 50% as stated above. Provided that a candidate who has appeared in the qualifying examination the result of which has not been declared, he may be provisionally permitted to take up the competitive entrance examination and in case of selection for admission to the MBBS course, he shall not be admitted to that course until he fulfills the eligibility criteria under regulation 4 of MCI Regulations Governing Graduate Medical Admission (see I above).

III. Migration :

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

Note: 1.

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

b. Any request for migration not covered under the provision of these regulations shall be referred to the Medical Council of India, for consideration on individual merits

by the Director (Medical Education) of the State or the Head of Central Government Institution concerned. The decision taken by the Council on such requests shall be final.

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

Note 2: * Compassionate grounds criteria:

a. Death of a supporting guardian.

b. Illness of the candidate causing disability.

c. Disturbed conditions as declared by Government in the Medical College area.

6. Complete application, with all requisite documents, to be made as per guidelines provided, on the format which has been prepared, in view of regulations and policy decision in the matter.

Application for Migration Certificate

Migration of Mr / Miss ..... from

..... Medical College,

.....to.....Medical College

.....

1.	Date of admission in 1st MBBS course	
2.	Date of Passing 1st MBBS University exam	
3.	Date of application	
4.	NOC from relieving college (enclosed) Yes / No	
5.	NOC from relieving University (enclosed) Yes / No	
6.	NOC from receiving college (enclosed) Yes / No	
7.	NOC from receiving University (enclosed) Yes / No	
8.	Affidavit, duly sworn before 1st Class Magistrate containing an undertaking that "I will study for full 18 months of IInd Phase of MBBS course in transferee medical college before appearing In the IInd professional University examination"(enclosed) Yes / No	
9.	Reasons for migration in brief (Please enclose copy as proof) Yes / No	
10.	Bank Draft of Rs.500/- (non-refundable migration fee) in favour of Secretary, Medical Council of India, New Delhi payable at New Delhi	
11.	Permanent Address	
12.	Phone No.	
13.	Mobile No.	
14.	Email	

IV. Duration:

Phase distribution, timing of examinations, training period & time distribution

A. Every student shall undergo a period of certified study over 4 ½ academic years, divided into 9 terms of 6 months each, from the date of commencement of his study, for the study of subjects comprising the medical curriculum, to the date of completion of examination, followed by one year compulsory rotating internship.

B. The 4 ½ years course is divided into three phases as follows:

1. Phase I

a. 1 year, consisting of two semesters. Examination will be conducted at the end of 2nd semester.

b. The University shall organize admission timings and admission processes in such a way that teaching in first semester starts by 1st of September each year.

c. There shall be no admission of students in respect of any academic session beyond 30th September under any circumstances.

d. The MCI may direct that any student identified as having obtained admission after the last date for 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.

e. Pre-clinical subjects (human anatomy, physiology including bio-physics, biochemistry and introduction to community medicine including humanities) shall be taught in this phase. 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 & Biochemistry 1/3).

g. 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.

h. No student shall be permitted to join the Phase II (Para-clinical/clinical) group of subjects until he has passed in all the Phase 1 (Pre-clinical) subjects.

2. Phase II :

a. 1½ years consisting of three semesters. Phase II will be devoted to para-clinical and clinical subjects, along with clinical posting.

b. Examination will be conducted at the end of 5th semester.

c. 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.

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

e. The clinical subjects shall consist of all those detailed below in phase III.

3. Phase III

a. Part I: 1 year consisting of two semesters. Examination will be conducted at the end of 7th semester.

b. Part II: 1 year consisting of two semesters. Examination will be conducted at the end of 9th semester.

c. Phase III will be 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 specialties, Surgery and its allied specialties, Obstetrics and Gynaecology and Community Medicine.

d. Besides clinical posting as per schedule mentioned herewith, rest of the teaching hours shall be divided for didactic lectures, demonstrations, seminars, group discussions, etc. in various subjects.

e. Medicine and its allied specialties training will include General Medicine, Paediatrics, Tuberculosis and Chest diseases, Dermatology, Venereology & Leprosy, Psychiatry, Radio-Diagnosis, Infectious Diseases etc.

f. Surgery and its allied specialties training will include General Surgery, Orthopedic surgery including Physiotherapy and Rehabilitation, Ophthalmology, Otorhinolaryngology, Anaesthesia, Dentistry, Radio-therapy etc.

g. Obstetrics & Gynecology training will include family medicine, family welfare planning etc.

h. During clinical phase (phase III) pre-clinical and para clinical teaching will be integrated into the teaching of clinical subjects where relevant.

i. During third to ninth semesters, clinical postings of three hours duration daily as specified in the table is suggested for various departments, after introductory course in clinical methods in medicine and surgery.

Note:

a. Each semester will consist of approximately 120 teaching days of 8 hours each, including one hour of lunch.

b. Passing in phase I is compulsory before proceeding to phase II training.

c. Passing in phase II examination is not compulsory before entering 6th and 7th semester training. However passing of phase II is compulsory for being eligible for phase III - part I examination.

d. Passing in phase III - part I examination is not compulsory before entering 8th and 9th semester training. However passing of phase III - part I is compulsory for being eligible for phase III - part II examination.

e. The MCI Regulations provide that supplementary examination for 1st professional MBBS examination may be conducted within 60 days after the announcement of the main examination result, so that students who pass can join the main batch and the failed students will have to appear in the subsequent year, provided that the students who pass the supplementary examination shall be allowed to appear in the second professional MBBS examination only after he/she completes three terms.

V. Teaching Hours:

Note: Didactic lectures should not exceed one third of the time schedule; two third schedule should include practical, clinical or/and group discussions. Learning process should include living experiences, problem oriented approach, case studies and community health care activities.

A. Phase I

Table I Distribution of teaching hours in Phase I subjects

Method	Method Subject/ Number of Hours			
	Anatomy	Physiology	Biochemistry	Community Medicine
Lectures	160 hrs	160 hrs	120 hrs	40 hrs
Tutorials	80 hrs	80 hrs	20 hrs	10 hrs
Group discussion *	80 hrs		20 hrs	04 hrs
Practical / Demonstration **	400 hrs	240 hrs	80 hrs	06 hrs
Dissection		-	-	-
Total	**720 hrs**	**480 hrs**	**240 hrs**	**60 hrs**

* Includes seminars, integrated teaching ** Includes field visits.

B.Phase II

Table II: Distribution of teaching hours in Phase-II subjects

Subject	Theory	Practical	Integrated teaching	Total Hours
Pathology	120 hrs	144 hrs	36 hrs	300 hrs
Pharmacology	120 hrs	144 hrs	36 hrs	300 hrs
Microbiology	120 hrs	144 hrs	36 hrs	300 hrs
Forensic medicine	80 hrs	40 hrs	10 hrs	120 hrs
Community medicine *	100 hrs	80 hrs	20 hrs	200 hrs
Total	**540 hrs**	**552 hrs**	**138 hrs**	**1220 hrs**

* Community medicine teaching will continue in Phase III part I also.

C. Phase III

Table III: Distribution of teaching hours in Phase-III subjects

Subjects	Hours
General medicine	300
Pediatrics	100
Tuberculosis & chest diseases*	20
Psychiatry	20
Skin & STD	30
Community medicine	50
Anaesthesia	20
General surgery	300
Orthopedics	100
Ophthalmology	100
Oto-rhino-laryngology	70
Radiology (includes Radio-diagnosis & imaging & radiotherapy	20
Dentistry	10
Obstetrics & gynaecology	300

Note: a. This period of training is minimum suggested. Adjustments will be made where required depending on availability of time.
b. This period of training does not include University examination period.
c. Extra time available will be devoted to other sub-specialties.

D. During semesters 3 to 9, following clinical postings of 3 hrs duration for each student is suggested for various departments, after introductory course in clinical methods in medicine and surgery of 2 weeks each for the whole class.

Subject	3rd Semester (Wks)	4th Semester (Wks)	5th Semester (Wks)	6th Semester (Wks)	7th Semester (Wks)	8th Semester (Wks)	9th Semester (Wks)	Total (Wks)
General*** Medicine	**6**	**-**	**7**	**-**	**-**	**6**	**4**	**23**
Paediatrics	**-**	**-**	**-**	**4**	**-**	**6**	**-**	**10**
Tuberculosis and chest diseases	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**02**
Derm, ven & Lep	**-**	**-**	**-**	**4**	**-**	**-**	**-**	**04**
Psychiatry	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**02**
Radiology*	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**02**
General**** Surgery Orthopaedics**	**6**	**-**	**7**	**-**	**-**	**6**	**4**	**23**
Ophthalmology	**-**	**-**	**-**	**4**	**-**	**6**	**-**	**10**
Ear, Nose and Throat	**-**	**-**	**-**	**4**	**7**	**-**	**-**	**11**
Obstetrics & Gynaecology ***** including Family Welfare Planning	**-**	**-**	**-**	**4**	**7**	**-**	**-**	**11**
Community Medicine	**6**	**-**	**7**	**-**	**-**	**6**	**4**	**23**
Casualty	**-**	**5**	**-**	**-**	**7**	**-**	**-**	**12**
Dentistry	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**02**
Anesthesia	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**02**
Forensic Medicine	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**02**
Total (Weeks)	**18**	**17**	**21**	**20**	**21**	**30**	**12**	**139**

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.

** 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 the 3rd semester posting shall be in Family Welfare Planning.

E. Model time-table - Phase I

Day	Lectures				Practical 2 - 4 pm		
	8 - 9 am	9 - 10 am	10 - 11am	1 1am - 1pm	Anatomy	Physiology	Biochem
Mon	Anatomy	Physiology	Physiology	Dissection	B-I	B-II	B-III
Tue	Biochemistry	Physiology	Anatomy	Dissection	B-II	B- III	B- I
Wed	Anatomy	Physiology	Physiology	Dissection	B-III	B-I	B-II
Thu	Physiology	Biochemistry	Anatomy	Dissection	B-I	B-II	B-III
Fri	Indian Constitution/ Kannada/Com Med	Physiology	Physiology	Dissection	B- II	B- III	B-I
Sat	Physiology	Anatomy	Biochemistry	Practical B-III B-I B-II	Integrated Teaching / Seminar / Tutorial		

F. Model time-table - Phase II & Phase III

Day	8-9 am	9.30-12.30	1-2 pm	2-3 pm	3-5 pm
Mon	Lecture	Hospital postings	L U N C H	Lecture	Practical/ Tutorials
Tue	Lecture	Hospital postings		Lecture	Practical/ Tutorials
Wed	Lecture	Hospital postings		Lecture	Practical/ Tutorials
Thu	Lecture	Hospital Postings		Lecture	Practical/ Tutorials
Fri	Lecture	Hospital postings		Lecture	Practical/ Tutorials
Sat	Lecture	Hospital postings			

VI. Eligibility to take University Examination :

A. Attendance

1. To be eligible to take the University examination, a candidate shall have undergone satisfactorily the approved course of study in the subject / subjects for the prescribed duration.
2. 75% of attendance in a subject (theory and practical / clinical, jointly), is compulsory for appearing in the examination, inclusive of attendance in non lecture teaching ie. Seminars, group discussions, tutorials, demonstrations, practical, hospital (tertiary, secondary, primary) posting and bedside clinics etc.
3. The Principal should notify the attendance details at the end of each term without fail, at the college, under intimation to the University.
4. A candidate lacking in prescribed attendance and progress in any subject(s) in theory or practical / clinical in the first appearance should not be permitted to appear for the examination in that subject(s).

B. Internal assessment

To be eligible to take the University examination, a candidate:

1. Shall secure at least 35% of total marks fixed for internal assessment in a particular subject.
2. Shall fulfill any other requirement that may be prescribed by the University from time to time.

C. Others:

A candidate:

1. Shall pass in all the phase 1 (pre-clinical) subjects, before joining the phase II (para-clinical) subjects.
2. Who fails in any subject of the phase II examination shall not be allowed to appear in part-I of phase III examination, unless he / she passes all subjects of phase II examination.
3. Who fails in any subject of part I of phase III examination shall not be allowed to appear in part II of phase III examination unless he/ she passes all subjects of part I of phase III examination.

VII. Scheme of Examination :

A. Internal Assessment

1. General

a. It shall be based on day to day assessment (see note), evaluation of student assignment, preparation for seminar, clinical case presentation etc.

b. Regular periodical examinations shall be conducted throughout the course. The question of number of examinations is left to the institution.

c. Day to day records should be given importance during internal assessment.

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

e. Student must secure at least 35% marks of the total marks fixed for internal assessment in a particular subject in order to be eligible to appear in final university examination of that subject.

f. The internal assessment marks are displayed in the departmental notice board and signature of candidates is taken in the marks list.

g. Internal assessment marks of failed students shall be retained. However such students are permitted to take subsequent internal assessment exams with a view to improve their internal assessment marks. The higher of the internal marks scored shall be considered.

h. A student who has missed internal assessment exam(s) due to genuine reseaons such as illness, hospitalization etc, may be permitted to avail additional chances to make up for the same.

2. Note: Internal assessment shall relate to different ways in which students' participation in learning process during semesters is evaluated. Some examples are as follows:

a. Students' seminar.

b. Clinical case discussion.

c. Clinical case study/problem solving exercise.

d. Participation in project for health care in the community (planning stage to evaluation).

e. Proficiency in carrying out a practical or a skill in small research project.

f. Multiple choice questions (MCQ) test after completion of a system/teaching.

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

3. Theory

Minimum of three theory internal assessment examinations shall be conducted. Average of best two out of three internal assessments shall be calculated and reduced to respective internal assessment marks to be sent to University.

4. Practical

Minimum of three practical internal assessment examinations shall be conducted. Average of best two out of three internal assessments shall be calculated and reduced to respective internal assessment marks to be sent to University. (In case of Departments like ENT, Ophthalmology, Orthopaedics & Paediatrics which conduct only two internal assessments, the average of the two shall be considered).

a. Phase I

Subjects	Theory (Marks)	Practical (Marks)
Anatomy	60	20
Physiology	60	20
Biochemistry	60	20

a. Phase II

Subjects	Theory (Marks)	Practical (Marks)
Pathology	60	20
Microbiology	60	20
Pharmacology	60	20
Forensic Medicine	30	10

a. Phase III

B. University Examinations:

1. Theory question papers will be prepared by the examiners as prescribed (As per the Syllabus and model question papers provided). Nature of questions will be short answer type /objective type and marks for each part indicated separately. However, the present pattern of questions shall continue, till amended.
2. Practical/clinical will be conducted in the laboratories or hospital wards. The objective will be to assess proficiency in skills, conduct of experiment, interpretation of data and logical conclusion. Clinical cases should preferably include common diseases and not esoteric syndromes or rare disorders. Emphasis should be on candidate's capability in eliciting physical signs and their interpretation. Clinical cases/ practical shall take into account common diseases which the student is likely to come in contact in practice. Rare cases/obscure syndromes, long cases of neurology shall not be put for final examination.
3. Viva shall be conducted by all the examiners and shall include all the topics in the syllabus.
4. Valuation of each theory script shall be done by one external and one internal examiner. There shall be no provision for re- valuation.
5. Two exams shall be conducted in a year.
6. Subject components & Distribution of Marks (Each question paper shall be for duration of 3 hours)

Subjects	Theory(Marks)	Practical / Clinical (Mark
Part I		
ENT	30	20
Ophthalmology	30	20
Community medicine	60	20
Part II		
Medicine	60	40
Pediatrics	30	20
General surgery	45	30
Orthopedics	15	10
OBG	60	40

a. Phase I

Phase I	Theory	Viva	IA (Th)	Total	Prac	IA (P)	Total	Grand Total
Anatomy	2x100=200	40	60	300	80	20	100	**400**
Physiology	2x100=200	40	60	300	80	20	100	**400**
Biochemistry	2x100=200	40	60	300	80	20	100	**400**

b. Phase II

Phase II	Theory	Viva	IA (Th)	Total	Prac	IA (P)	Total	Grand Total
Pathology	2x100=200	40	60	300	80	20	100	**400**
Microbiology	2x100=200	40	60	300	80	20	100	**400**
Pharmacology	2x100=200	40	60	300	80	20	100	**400**
Forensic medicine	1x100=100	20	30	150	40	10	50	**200**

c. Phase III

Phase III	Theory	Viva	IA (Th)	Total	Prac / Clin
				Part - I	
ENT	1x100=100	20	30	**150**	80
Ophthalmology	1x100=100	20	30	**150**	80
Community Medicine	2x100=200	40	60	**300**	80
				Part - II	
Medicine	2x100=200	40	60	**300**	160
Pediatrics	1x100=100	20	30	**150**	80
General Surgery & Orthopedics	2x100=200	40	60	**300**	160
OBG	2x100=200	40	60	**300**	160

7. Type, Number of questions & distribution of marks for written paper

Type of questions	No of questions	Marks for each question
Essay type questions	02	10
Short essay type questions	10	05
Short answer questions	10	03

8. Submission of Laboratory Record Book

a. At the time of practical/ clinical examination each candidate shall submit to the examiners his/ her laboratory notebook duly certified by the Head of the Department as a bonafide record of the work done by the candidate.

VIII. Appointment of Examiners:

A. No person shall be appointed as an examiner in any of the subjects of the professional examination leading to and including the final professional examinations for the award of the MBBS degree unless he has taken at least five years previously, a doctorate degree of a recognized university or an equivalent qualification in the particular subject as per recommendation of the Council on teachers' eligibility qualifications and has had at

B. There shall be at least four examiners for 100 students, out of whom not less than 50% must be external examiners. Of the four examiners, the senior most internal examiner will act as the Chairman and co-ordinator of the whole examination programme, so that uniformity in the matter of assessment of candidates is maintained. Where candidates appearing are more than 100, one additional examiner, for every additional 50 or part thereof candidates appearing, be appointed.

C. Non medical scientists engaged in the teaching of medical students as whole time teachers, may be appointed examiners in their concerned subjects provided they possess requisite doctorate qualifications and five year teaching experience of medical students after obtaining their postgraduate qualifications. Provided further that the 50% of the examiners (internal & external) are from the medical qualification stream.

D. External examiners shall not be from the same university and preferably be from outside the state.

E. The internal examiner in a subject shall not accept external examinership for a college from which external examiner is appointed in his subject.

F. A university having more than one college shall have separate sets of examiners for each college, with internal examiners from the concerned college.

G. External examiners shall rotate at an interval of 2 years.

H. There shall be a Chairman of the Board of paper-setters who shall be an internal examiner and shall moderate the questions.

I. Except Head of the Department of subject concerned in a college/ institution, all others with the rank of reader or equivalent and above with requisite qualifications and experience shall be appointed internal examiners by rotation in their subjects; provided that where there are no posts of Readers, then an Assistant Professor of 5 years standing as Assistant Professor may be considered for appointment as examiner.

IX. Criteria for pass:

A. For declaration of pass in any subject in the University examination, a candidate shall pass both in theory and practical/ clinical examination components separately as stipulated.

B. A student has to secure marks as follows to pass in the subject

i 35% in internal assessment (for eligibility to appear for university examination)

ii 50% of the total marks for theory with orals (only externals)

iii 50% of marks for Practicals/Clinical (only externals)

iv 50% of the aggregate (total of externals and internals)

C. For passing in theory, a candidate shall secure not less than 50% marks in aggregate i.e. marks obtained in written examination, viva-voce examination and internal assessment (theory) added together.

D. For passing in practical/ clinical examination, a candidate shall secure not less than 50% marks in aggregate, i.e. marks obtained in university practical/ clinical examination and internal assessment (practical) added together.

E. A candidate not securing 50% marks in aggregate in theory or practical/ clinical examination in

a subject shall be declared to have failed in that subject and is required to appear for both theory and practical/ clinical again in the subsequent examination, in that subject.

X. Declaration of class:

A. A candidate who has appeared in all the subjects in the same examination and passed that examination in the first attempt, securing 75% of marks or more of grand total marks prescribed, shall be declared to have passed the examination in First Class with Distinction.

B. A candidate who has appeared in all the subjects in the same examination and passed that examination in the first attempt, securing 65% of marks or more but less than 75% of grand total marks prescribed, shall be declared to have passed the examination in First Class.

C. A candidate who has appeared in all the subjects in the same examination and passed that examination in the first attempt, securing 50% of marks or more but less than 65% of grand total marks prescribed, shall be declared to have passed the examination in Second Class.

D. A candidate passing the University examination in more than one attempt shall be placed in Pass Class irrespective of the percentage of marks secured by him/ her in the examination.

Section IV
COURSE CONTENTS
ANATOMY

GOALS:

The broad goal of teaching of undergraduate in Anatomy aims at providing comprehensive knowledge of macroscopic, microscopic and embryological anatomy and correlate this study with clinical application.

OBJECTIVES:

(a) Knowledge

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

1) Describe the general anatomy of structures and organ systems of the human body.
2) Describe the normal disposition, interrelationships, innervations, vascular supply and functional anatomy of clinically relevant structures and organs of the human body.
3) Correlate the normal microscopic structure of various organs with their functions (as a prerequisite for understanding the altered state in commonly encountered disease processes).
4) Explain basic principles and sequential development of the organ systems
5) Explain the embryologic basis of the major developmental abnormalities and variations.
6) Explain the basics of medical genetics with respect to common genetic syndromes.
7) Explain the anatomical basis of contraception.

(b) Skills:

1) Identify all the major structures, organs & viscera of the body.
2) Demonstrate normal movements at various joints.
3) Demonstrate how to test the functioning of different muscles or muscle groups.
4) Mark/draw the surface anatomy of all the major structures and organs of the body on a cadaver or a volunteer.
5) Locate and palpate arterial pulsations, and identify structures against which arteries can be compressed to stop bleeding.
6) Locate ideal sites for venepuncture.
7) Locate the site for emergency tracheostomy.
8) Locate subcutaneous positions of large nerves.
9) Locate ideal sites for lumbar and sternal puncture, pericardial, intercostal and peritoneal tapping, and biopsies of liver, kidney and spleen.

10) Interpret the cross-sectional anatomy of the human body

11) Identify normal anatomical structures, organs and viscera in radiographs, ultrasound images, computerized tomograms, magnetic resonance images and the endoscopic views.

12) Identify the organs and tissues in sections under the microscope

13) Identify the critical stages in the embryonic development and interpret the effects of common teratogens, genetic mutations and environmental hazards on development

14) Identify and interpret normal karyograms, abnormal karyograms and clinical features of common genetic disorders.

(c) Integration

With other basic sciences namely Physiology & Biochemistry and with the Clinical departments inSurgery and Radiology and the ability to correlate these with basic Anatomy.

Syllabus at a glance for MBBS Phase I Course:

1.	General Anatomy	:	Basic tissues of the body Terminology and Nomenclature, History of Anatomy
2.	Elements of Anatomy	:	Osteology, Arthrology, Myology, Angiology, Neurology
3.	Regional Anatomy	:	Upper limb, Lower limb, Thorax- including diaphragm, Abdomen including Pelvis, Head and Neck, Brain & Spinal cord
4.	Gen-embryology	:	Development of individual organs and systems.
5.	Systemic embryology	:	Postnatal Growth & Development
6.	Histology	:	General Histology, Microanatomy of individual organs and systems
7.	Human Genetics	:	Principles of Human Genetics and Molecular Biology
8.	Radiological Anatomy	:	Skiagrams, Special X-Rays and CT scan
9.	Surface Anatomy	:	In cadavers, in the living
10.	Sectional Anatomy	:	Head and Neck, Brain, Thorax, Abdomen including Pelvis
11.	Applied Anatomy	:	Of all the regions
12.	Bio-medical analysis	:	Types, potential risks and their safe management.

SEMESTER : 2

Total Number of Hours : 720

Lectures : 60

Seminars : 40

Practicals : 520

Innovation session (projects, structured discussion, integrated teaching, formative evaluation and revision).

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

Sl No	Topic	Lectures	Practicals
1	**Gross Anatomy**	**85**	**404**
	Upper Limb	10	60
	Lower limb	10	60
	Thorax	12	30
	Abdomen & Pelvis	25	130
	Head & Neck	20	124
2	**Microanatomy**	**30**	**65**
3	**Embryology**	**30**	**20**
4	**Genetics**	**5**	**1**
5	**Neuroanatomy**	**10**	**30**

1. GENERAL ANATOMY

Brief history of anatomy as related to medicine, subdivisions of anatomy; cadaver, anatomical position, other positions used in clinical practice, terms of position, terms of movement, colours used in anatomical drawings.

Structures met with during dissection: skin, superficial fascia - including contents, deep fascia - including its modifications; muscles - parts, origin, insertion, tendon, aponeurosis, bursa, synovial sheath; ligament, artery, vein, lymphatics, lymph node, peripheral nerves.

General principles of embryology, gestation period, subdivisions, spermatogenesis, structure of sperm, oogenesis, structure of ovum, growth & rupture of the ovarian follicles. Sperm in the male and female genital tracts, activation & capacitation of sperms in the female genital tract.

2. ELEMENTS OF ANATOMY

a) **Osteology:** Name of bones of the body and their positions; classification of bones with examples; general features; general pattern of blood supply; particular features; relations of blood vessels and nerves to bones. . Microscopic anatomy of bone, common sites of fractures, general pattern of blood supply, ossification of bones of limbs for age determination and applied anatomy. Desirable to know - Determination of age (Ossification).

Skull - All normae and interior of skull, foetal skull, mandible. Identification of individual skull bones.

b) **Arthology:** Classification of joints, general features of different types of joints, detailed study of the following joints of the body with movements; temporomandibular, atlanto occipital, atlanto axial, shoulder, elbow, radio ulnar, wrist, carpo metacarpal joint of thumb. Hip, knee, ankle and sub talar joint. Intervertebral and sacroiliac joint.Range of movement in major joints, microscopic anatomy of articular cartilage, maintenance of articular cartilage, blood supply.

c) Myology: Classification and identification of the muscles of the body; main attachments, nerve supply and actions; Actions of muscle groups on functional basis with reference to joints.Mechanism of movement caused by muscle/muscles & various forces exerted by them, nerve terminations.

3. REGIONAL ANATOMY

a) **Upper extremity:** Introduction, Pectoral region and axilla, The brachial plexus, The dissection of back, Lymph vessels, lymph nodes, cutaneous nerves and deep fascia of upper limb. The shoulder- movements of the limb at the shoulder, the shoulder joint. The arm- anterior & Posterior compartment of arm. The forearm and hand- Palmer aponeurosis, superficial palmar arch, Flexor retinaculum & Flexor tendons. The arteries, nerves & Muscles of the flexor compartment of the forearm. Muscles & Fascial compartments of the palm. The extensor compartment of the forearm and the hand & Extensor tendons of the fingers. Joints of the upper limb-elbow joint, wrist joint, radio ulnar joints, intercarpal-carpometacarpal & Intermetacarpal joints.

b) **Lower extremity:** Gluteal region, Front of thigh , adductor canal & medial side of thigh, popliteal fossa, Back of thigh, Hip joint, Front of leg and dorsum of foot-superficial dissection. Anterior compartment of leg, lateral compartment of leg & back of leg. Sole of the foot I and II layers, III and IV layers, V and VI layers.

Knee joint, Ankle joint, Tibio-fibular and other joints.

c) **Thorax :** Thoracic wall, Pericardium, Position and parts of the Heart, conducting system, blood supply and nerve supply of heart, name of the blood vessels and their distribution in the body, (region wise). Development & anomalies (as part of embryology). Pleura, Lungs - position, parts, relations, blood supply and nerve supply & emphasis on Bronchopulmonary segments.

Mediastinum - Superior - arch of aorta.

Posterior - Thoracic duct, esophagus and azygos system of veins.

Diaphragm - Attachment with nerve supply and action.

d) **Abdomen & Pelvis:** Peritoneum - General disposition - horizontal and vertical; viscerae - general disposition, position, parts, relations, blood supply and nerve supply of abdominal organs. Pelvic Organs- Parts, position, relations, blood supply and nerve supply.

Perineum- Boundaries, divisions, perineal body, ischiorectal fossa, pudendal canal,perineal spaces and membrane

e) **Head & Neck:** Cervical vertebrae & Skull, The scalp - Nerves and vessels of scalp. Temple - superficial temporal region ,The superficial dissection of face & Deep dissection of the face: Nerves of the face, Structures in the cheek and lips, The eyelids. Side of the Neck -Deepfascia of the neck Posterior triangle of neck, The anterior triangle of neck & subdivisions of anterior triangle. The midline structures of neck, Sub occipital triangle, Deep dissection of neck with Thyroid gland. The cranial cavity: Structures seen after removal of cerebrum, Anterior cranial fossa, middle cranial fossa, posterior cranial fossa. Orbit - The lacrimal apparatus & The structures in the orbits, The parotid region, The parotid gland, The temporal and infratemporal region with infratemporal fossa, Temporal fascia, Temporalis muscle, Temporomandibular joint, the submandibular gland, Sternocleido mastoid, Mylohohyiod muscle, hyoglossus & styloyoid muscles. 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.

f) **Brain & Spinal Cord:** Parts of nervous system, meninges, ventricles, motor and sensory pathways, cranial nerves, functional areas, normal development, microscopic anatomy of neurons, motor and sensory, cortex and their blood supply with cross sectional studies and morphology of spinal cord. General features of medulla oblongata, pons, midbrain, cerebellum and cerebrum

Section of Medulla	-	a) At Pyramidal decussation
		b) Sensory decussation
		c) Open part of Medulla
Pons	-	a) Lower pons
		b) Upper pons
Midbrain	-	a) Inferior colliculus
		b) Superior colliculus
Cerebrum	-	a) Mid Saggital section
		b) Horizontal section at interventricular foramen
		c) Coronal section at anterior commissure
		d) Coronal section at mammillary body

Common neurological disorders: case studies and demonstration

Special Sensory Ograns - Gross anatomy of eyeball, ear, nose and tongue.

4. EMBRYOLOGY

First week of development:

Fertilization, formation of zygote, cleavage division, formation of morula & blastocyst, implantation, formation of decidua - its subdivisions. Types of implantation & abnormal sites of implantation. Anatomical basis of contraception.

Second week of development:

Differentiation of embryoblast & trophoblast, changes in the embryoblast - bilaminar germ disc, changes in trophoblast, formation of cytotrophoblast, syncytiotrophoblast, amniotic membrane, yolk sac, extra-embryonic mesoderm & extra-embryonic celom & connecting stalk, formation of chorion, amniotic cavity, primary yolk sac cavity, appearance of prochordal plate.

Third week of development:

Appearance of primitive streak & primitive node, formation of intra embryonic mesoderm resulting in trilaminar germ disc, formation of notochord, buccopharyngeal & cloacal membranes, pericardial bar, paraxial, intermediate & lateral plate mesoderm, secondary yolk sac, intra embyronic coelom & allantoic diverticulum, derivatives of ectoderm, mesoderm & endoderm.

Third to tenth month of development:

Maturation of tissues & organs & rapid growth of body. Estimation of age, horizons of development.

Placenta:

Formation of placenta & chorionic villi, decidua basalis, features & functions of placenta, placental circulation, abnormalities, placental barrier, types of placenta.

Umbilical cord:

Formation of umbilical cord, features of umbilical cord.

Amniotic cavity: Amniotic cavity & membrane, amniotic fluid - functions, expansions of amniotic cavity & fusion with chorion, chorion leave with decidua capsularis, decidua capsularis with parietalis, obliteration of chorionic & uterine cavities, function of fused fetal membranes to dilate cervical canal. Abnormalities, obliteration of chorionic & uterine cavities, abnormalities of chorion.

Formation and types of twins.

Arrangement of fetal membranes.

Development of face, pharyngeal arches, clefts, pouches, & associated common congenital anomalies

Teratology:

Genetic & environmental factors as causative factors for congenital malformations. Mode of actions of teratogens & critical periods.

Postnatal Growth and Development (For integrated teaching) : Meaning of the terms like growth, development, principles of growth and development, types of postnatal growth, periods of growth and development and factors influencing them. Assessment of growth and development, Genetic aspects of growth & development; Meaning of development, growth and development during adolescence, (for integrated teaching)

5. GENERAL HISTOLOGY:

Introduction including importance of studying histology in patient care, epithelium, surface specializations,connective tissue - definition, cells, fibres, ground substance, classification and features of different types of connective tissues, cartilage, bone, muscle, nerve tissue, general account of glands. Basement membrane, junctional complexes.

6. SYSTEMIC ANATOMY

a) Integumentary System

Skin and its appendages, superficial fascia, deep fascia, development and microscopic and applied anatomy.

b) Cardiovascular system

Position and parts of heart, names of blood vessels & their distribution in the body, normal development of heart, common congenital anomalies, microscopic anatomy of heart & blood vessels, gross anatomy of major blood vessels of the body, pericardium, pericardial cavity, concept of precordium and applied anatomy.

Developmental anomalies, valvular defects & their effects.

c) Respiratory system

Position, parts, relations, blood supply, lymphatic drainage, microscopic anatomy, normal development & congenital anomalies, thoracic cage, superficial and deep cardiac dullness, and movements of thorax during respiration, pleura, pleural cavity and applied anatomy. Blood air barrier, cell population in the respiratory tract.

d) Gastrointestinal system

Position, parts, relations, blood supply, nerve supply, lymphatic drainage, normal development & congenital anomalies, microscopic anatomy, sphincters of the gastrointestinal system. Peritoneum, peritoneal cavity, fossae & folds and applied anatomy. Sphincteric action & mechanism. Peptic ulcer, Payer's patches, positions of appendix, marginal artery of Drummond.

e) Genitourinary system

Parts, position, relations, blood supply, nerve supply, lymphatic drainage, normal development & congenital anomalies, microscopic anatomy of Genitourinary system. Normal sites of constrictions in the urinary passage. Prostate gland, Skenes tubules and applied anatomy. Anatomical basis of family planning measures.

e) Endocrine system

Organs, location, relations, blood supply, nerve supply, lymphatic drainage, microscopic anatomy & normal development & congenital anomalies and applied anatomy.

f) Nervous system

Parts of nervous system, meninges, neuroglia, cortex, functional cortical areas, basal ganglia, corpus striatum, white matter, ventricles, cerebellum, brain stem, motor & sensory pathways, cranial nerves, normal development, microscopic anatomy of neurons, motor & sensory cortex, blood supply and applied anatomy. Reticular formation, limbic system, extrapyramidal system, correlation of microscopic anatomy with function, developmental anomalies, anatomical basis of common neurological disorder / syndromes, nerve terminals.

Autonomic Nervous system

Sympathetic, parasympathetic systems, cortical control, peripheral plexuses, common associated disorders and syndromes.

Special sensory organs Introduction to the eyeball and internal ear, gross anatomy of middle ear, nose & tongue and applied anatomy.

g) **Lymphatic system**

Gross anatomy of major groups of lymph nodes of body & their drainage areas. Gross anatomy of major lymphatics, specially thoracic duct, jugular, subclavian and mediastinal lymph trunks.Microscopic anatomy of lymph nodes and applied anatomy.

Gross anatomy, development, blood supply and applied anatomy of thymus, spleen & palatine tonsil.

7) **MEDICAL GENETICS**

Morphology of human chromosomes, amniocentesis and other methods to procure tissue/cells for the genetic study, karyogram, anomalies of chromosomes - structural and numerical, introduction to the common genetic disorders like - Mongolism, Meta female (Super female), Turner syndrome, Klinefelter syndrome.

8) **IMAGING ANATOMY**

Identification of normal anatomical features in some commonly used skiagrams (plain & contrast), CT scan, ultrasound, MRI and endoscopy.

9) **SURFACE ANATOMY**

Surface marking of those structures, organs and viscera of the body which are commonly affected in various disease processes.

Perform Under Assist Observe

Independently Guidance

10) **SECTIONAL ANATOMY**

Gross / sagittal / coronal sections of thorax, abdomen, pelvis, limbs, head & neck and brain to understand interrelations of organs and interpret CTs & MRIs.

TEACHING / LEARNING METHODS

1. Lectures - not more than 1/3rd of the total teaching hours.
2. e-mode learning of some of the topics.
3. Small group teaching - such as:
    a) Demonstrations.
    b) Tutorials.
    c) Seminars.
    d) Problem Based Learning.
4. Dissection / Prosected parts demonstrations / Instructions on mannequins.
5. Skills Lab with CDs of various stages of dissection.
6. Histology Lab.
7. Surface marking.
8. Imaging anatomy Lab.
9. Visit to the museum.
10. Preparation of scientific article.
11. Preparation of gross anatomy practical drawing book
12. Preparation of histology practical drawing book.

PRACTICAL

GROSS ANATOMY:

Dissection/Demonstration of Prosected parts

Dissection of the whole body, at least once or prosected part demonstration or skill lab with CD of dissection stages and adequate number of mannequins depending on the number of students. Prosected part demonstration or skill lab with CD of dissection stages and adequate number of mannequins depending on the number of students.

Upper limb: demonstration: pectoral & scapular regions, shoulder region, axilla, arm, forearm, hand: palm & dorsum, joints of upper limb.

Thorax: demonstration: chest wall, diaphragm, mediastinum, lungs & heart.

Abdomen: demonstration: anterior abdominal wall, inguinal region, organs / viscera & posterior abdominal wall.

Pelvis: demonstation: pelvic viscera, wall, blood vessels and nerves.

Perineum: external genitalia, perineal pouches and anal triangle including ischiorectal fossa.

Lower limb: demonstration: gluteal region, thigh: anterior, medial, posterior compartments, popliteal fossa, leg: anterior, lateral and posterior compartments, Foot: dorsum, sole. Joints of lower limb.

Head & Neck: demonstration: scalp, superficial & deep dissection of face & neck, parotid region, cranial cavity, contents of orbit, triangles of neck, introduction to the eyeball, submandibular region, temporal & infratemporal fossa, oral cavity, pharynx, larynx, ear, thyroid & parathyroid gland, oesophagus, trachea, blood vessels and cranial nerves, vertebral canal and contents.

Brain: Sections & prosected specimens of brain to demonstrate meninges, blood supply, functional cortical areas, ventricles, visual pathways, auditory pathways, basal ganglia, corpus striatum, cerebellum and sections of the brain stem.

Demonstrations: Bones, Sectional anatomy, Radiological anatomy & Ultrasonography, CT & MRI scan and Endoscopic anatomy.

HISTOLOGY

Microscopic Anatomy:

Stained slides of all the clinically relevant tissues, organs and viscera.

DEVELOPMENTAL ANATOMY:

Models / specimens to demonstrate various stages of fertilization, implantation, formation of embryo, development of fetus and development of various organs & systems. Commonly encountered congenital defects.

MEDICAL GENETICS:

Demonstration of normal karyogram. Clinical picture, features and karyogram of the common genetic conditions.

Visit to the museum:

At least once a week to study specimens, models, charts etc.

SCHEME OF EXAMINATIONS:

Internal Assessment

Theory: 60 Marks

"Minimum of three examinations shall be conducted. Average of best two of three is taken into consideration. Maximum marks for each theory internal assessment shall be 60 marks and 20% IA marks shall include MCQs

Practicals: 20 Marks

Minimum three practical examinations shall be conducted. Average of best two of three is taken into consideration. The total marks will be reduced to 20 marks and sent to the University.

UNIVERSITY EXAMINATIONS:

A. Theory: Two papers of 100 marks each and duration of each paper will be 3 hours.

Distribution of chapters for paper I and II with weightage of marks in Anatomy for University Examination

Paper - I		**Paper - II**	
Topics	**Marks**	**Topics**	**Marks**
Head and Neck	30	Abdomen	30
Brain, Spinal cord	10	Pelvis & Perineum	20
Upper limb	20	Lower limb	20
Thorax including diaphragm	20		
General Anatomy		Systemic Histology – 10	
General Embryology	20	Genetics – 10	30
General Histology		Systemic Embryology – 10	
Total	**100**	**Total**	**100**

The pattern of questions would be of three types

Paper - I

Chapter/ topic	Type & No. of questions	Marks
Head & Neck, Brain and Spinal cord, Thorax including diaphragm and upper limb and also relevant Systemic Embryology	Long Essay 2 x 10 Marks	20
Head & Neck, Brain and Spinal cord, Thorax including diaphragm and upper limb and General & Systemic Embryology & Histology	Short Essay 10 x 5 Marks	50
General Anatomy, General Histology, General Embryology and also Head & Neck, Brain and Spinal cord, Thorax including diaphragm and upper limb and also relevant Systemic Embryology & Histology	Short Answer 10 x 3 Marks	30

Paper - II

Chapter/ topic	Type & No
Gross Anatomy of Abdomen, Pelvis, perineum and lower limbs and relevant Systemic Embryology	Lo 2 x
Gross Anatomy of Abdomen, Pelvis, perineum and lower limbs and relevant Systemic Embryology & Histology + Genetics	Sh 10 x
Relevant Systemic Histology, Embryology, Genetics and also Abdomen, Pelvis, perineum and lower limbs	Sho 10 x

B. Practical : 80 Marks

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

Gross Anatomy : 50 marks		
a)	Spotters: Identification of structures in given specimens, each carrying two marks. Five specimens to be kept, one of which shall be a cross section	10 marks
b)	Discussion on two given dissected specimens: Structures above diaphragm and diaphragm - 15 marks Structures below diaphragm - 15 marks	30 marks
c)	Surface Anatomy	10 marks
	Total	**50 marks**

Histology : 30 marks		
a)	Identification of 9 slides & interpretation of one chart on genetics, each carrying one mark	10 marks
b)	Discussion on two given slides 10 x 2	20 marks
	Total	**30 marks**

I	Question on embryology (with models)
II	Radiological anatomy including ultrasound, C.T. and MRI
III	Osteology and soft parts in the regions of head and neck, and spinal cord, thorax including diaphragm and upper limb
IV	Osteology and soft parts in the region of abdomen, pelvis Lower limb

C. VIVA VOICE EXAMINATION 40 Marks

The Viva-voce examination will be conducted by four examiners individually. The distribution of topics and marks of each examiner will be as under:

LEARNING RESOURCE MATERIALS

Recommended books: Recent Editions.

I. Gross Anatomy

1. Cunningham's Manual of Practical Anatomy by G.J.Romanes. Vol I, II & III, Published by Oxford University Press
2. Grants Atlas of Anatomy by A.Agur, published by M.Lec
3. Clinical Anatomy by Regions by R.S.Snell, published by Little brown & Company, Boston
4. Text book of Anatomy by Vishram Singh, published by Elsevier
5. Gray's Anatomy for Students, published by Elsevier

II. Histology

1. Difiore's - Atlas of Histology with functional correlation, published by Lippincott Williams and Wilkins
2. Text book of Human Histology by I.B.Singh, published by Jaypee brothers
3. Text book of Histology by Gunasegaran, published by Elsevier

III. Developmental Anatomy/Embryology

1. Langman's medical Embyology, published by Lippincott Williams and Wilkins
2. Text book of Embryology by I.B.Singh published by Jaypee brothers
3. Text book of Embryology by Vishram Singh, published by Elsevier

IV. Neuroanatomy

1. Text book of Neuroanatomy by I.B.Singh, published by Jaypee brothers
2. Text book of Neuroanatomy by Vishram Singh, published by Elsevier

V. Osteology

1. Text book of osteology by Poddar, Published by Scientific Book Company
2. Text book of osteology by I.B.Singh, published by Jaypee brothers

VI. Surface and Radiological Anatomy

1. Surface and Radiological Anatomy-A. Halim & A.C.Das, published by CBS

VII. Genetics

1. Text book of Genetics by S.D.Gangane, published by Elsevier

VIII. General Anatomy

1. Hand book of General Anatomy by B.D.Chaurasia, published by CBS
2. General Anatomy by Shoba Rawalani, published by Jaypee brothers

Reference books, Recent Editions.

I Gross Anatomy

1. Gray's Anatomy by Susan Standring
2. Clinical Anatomy by Keith Moore, published by Lippincott Williams and Wilkins
3. Text book of Anatomy by R.J.Last, published by Churchill Livingstone

II Histology

1. Histology; A text & Atlas By M.H. Ross, published by W. Pawalina Lippincott Williams & Williams
2. Basic Histology by Luiz.C.Janqueira, published by Mc Graw Hill
3. Wheaters Functional Anatomy, published by Elsevier

III Developmental Anatomy/Embryology

1. The Developing Human by Moore & Persaud, published by Lippincott Willams and Wilkins
2. Human Embryology by William J. Larsen, published by Elsevier
3. Essentials of Human Embryology by A.K.Datta published by Current books international

IV Neuroanatomy

1. Clinical Neuroanatomy by Richard S.Snell, published by Lippincott Williams & Wilkins
2. Human Neuroanatomy by Malcolm B Carpenter, published by Williams & Wilkins
3. Essentials of Neuroanatomy by A.K.Datta, published by Current books international

V Genetics

1. Essential Medical Genetics by J.M. Connor, published by Blackwell Science Inc
2. Oxford text book of Medical Genetics.

CDs & Internet:

1. A.D.A.M. (Animated Dissection of Anatomy for Medicine) Comprehensive for Windows. Publisher: A.D.A.M. Software Inc.
2. A.D.A.M. Interactive Anatomy, Publisher: A.D.A.M. Software Inc.
3. Cardioviewer 3D: CD-ROM, ISBN: 0-8151-3106-2, publication date: 1996 Imprint: MOSBY (Marketed by Elsevier)
4. Histology/pathology slides: http://www.virtualslides.psu.edu/listSlides.jsp
5. Collection of Links to Anatomical resources on the internet: http://www.west.asu.edu/jbuenke/medicine/anatomy.html

Suggested topics for e-learning in Anatomy (Recommended to assist and supplement teaching)

1. Fertilization
2. Cleavage
3. Implantation
4. Post Natal Growth and Development
5. Development of Pharyngeal arches, clefts, pouches.
6. Descending tracts of Central Nervous System
7. Ascending tracts of Central Nervous system
8. Medical Genetics - common syndromes
9. Visual pathways and visual areas
10. Major Joints & Movements

PHYSIOLOGY

OBJECTIVES:

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

1. Describe the normal functions of all organ systems, regulatory mechanisms and interactions of the various organs for well co-ordinated total body function.
2. Understand the basic principles, mechanism and homeostatic control of all the functions of human body as a whole.
3. Elucidate the physiological aspects of normal growth and development.
4. Analyse the physiological responses and adaptation to different stresses during life Processes.
5. Lay emphasis on applied aspect of physiological functions underlying disease state.
6. Correlate knowledge of physiology in areas indicated by National Health Programmes.
7. Acquire the skills to do the experiments for study of physiological function.
8. Interpret experimental and investigative data.
9. Distinguish between normal and abnormal data derived as a result of tests which he/she performed and observed in the laboratory.

COURSE CONTENTS:

THEORY

1. GENERAL PHYSIOLOGY

1. Organization of the cell & its functions
   * Structure of cell membrane , cell organelles
   * Intercellular communications
2. Transport across cell membrane
3. Membrane potentials
4. Body fluid compartments and changes in body fluid compartments oedema and dehydration, osmolarity and osmolality
5. Homeostasis, concepts of physiological norms, range and variations.
6. Genetic control of protein synthesis, apoptosis. Programmed cell death.

2. BLOOD

Blood composition and its function

* Plasma protein
* Haematopoiesis
* RBC - Anaemia, Polycythemia
* Hb - Structure, synthesis, function, types
* Fate of Hb - Jaundice
* WBC - Types, Structure and functions

* Immunity - types, complement system,
* Phagocytosis, allergy and hypersensitivity
* Immunotolerance, Immunosuppression
* Host vs graft reaction

Haemostasis

* Platetets - Structure, function, development, coagulation of blood.
* Anticoagulants.

Blood Groups

* ABO & Rh grouping
* Inheritance
* Rh - incompatibility
* Blood transfusion and hazards
* Blood Banking
* Lymphatic system: composition, circulation and functions.
* Artificial blood

3. NERVE AND MUSCLE

* Structure of neuron and classification of nerve fibres, Properties
* Potential in nerve fibres
* Degeneration and regeneration of nerve fibre
* Neuroglia
* Muscle: Types , Physiological anatomy of skeletal muscle
* Neuromuscular junction and myasthenia gravis and NMJ blocking drugs
* Mechanism of muscle contraction and its molecular basis. Types of contraction iso tonic and isometric contractions.
* Energetics of muscle contraction - Rigor mortis
* Types and properties of muscle fiber
* Structure and types of smooth muscle
* Contraction of smooth muscle

4. GASTROINTESTINAL SYSTEM

* Functional anatomy of GIT
* Organization of GIT
* Composition, functions and regulation of secretions of salivary gland. Stomach pancreas. Liver and Gall bladder, small intestine and large intestine
* Gastrointestinal movement and its regulation
* Gastro intestinal hormones
* Mechanism of digestion and absorption
* Applied aspects and disorders

5. RENAL SYSTEM

* Physiological anatomy of kidneys
* Structure of Nephrons, Types, JGA apparatus
* Renal blood flow
* Mechanism of urine formation
* Glomerular filtration and its regulation, renal clearance
* Tubular processing of Glomerular filtrate.
* Tubular reabsorption and secretion
* Mechanism of concentration of urine.
* Regulation of ECF volume and osmolarity
* Regulation of electrolytes concentration - Na2+, K2+, Ca2+, Mg2+, Phosphate, with applied aspect.
* Regulation of acid base balance with acidosis and alkalosis
* Physiology of Micturition
  - Structure and innervations of urinary bladder
  - Cystometrogram and Micturition reflex.
* Disorders of Micturition
* Renal function tests, renal failure, artificial kidney

6. RESPIRATORY SYSTEM

* Functional anatomy of respiratory system
  Mechanics of normal respiration
* Physical principles governing flow of air in respiratory passages, lung volumes and capacities.
* Lung compliance, alveolar ventilation, ventilation perfusion ratio.
* Principles of gas exchange, diffusion of O2 and CO2 through the respiratory mem brane.
* Regulation of respiration
* Hypoxia, cyanosis, asphyxia , dyspnea
* Respiratory adjustments during muscular exercise, Hyperbaric condition and hy pobaric condition, oxygen therapy
* Respiratory failure and artificial respiration

7. CARDIOVASCULAR SYSTEM

* Functional anatomy of Heart.
* Cardiac muscle and its properties
* Conducting system and ECG
* Cardiac cycle - Mechanical events and heart sounds
* Innervations of Heart and Heart rate
* Cardiac output - measurement and regulation

* Overview of principles of circulation
* Interrelationship among pressure flow and resistance
* Arterial pulse
* Blood pressure and its regulation pathophysiology of hypertension regional circu lation-cerebral, splanchnic, skeletal muscle & foetal circulation
* Cardiac changes during exercise. Shock, cardiac failure, coronary artery diseases, cardio pulmonary resuscitation.

8. ENDOCRINES

* General principles: classification of hormones & mechanism of actions of hormones
* Regulation of endocrinal secretions
* Measurement of hormones - RIA, ELISA
* Functional anatomy hormones - structure, synthesis and regulation, clinical disor ders of hypothalamus and pituitary gland, thyroid gland, para thyroid, adrenals and endocrine pancreas.
* Physiology of growth
* Calcium and glucose homeostasis
* Pineal gland
* Local hormones.

9. REPRODUCTIVE SYSTEM

* Sex determination and differentiation and its disorders
* Puberty and gonadotrophins
* Male reproductive system
  - Physiological anatomy, spermatogenesis and its regulation testicular hor mones, composition of semen
* Female reproductive system
  - Physiological anatomy of ovaries and its functions. Ovarian hormones & ovarian cycle, menstrual cycle - ovulation and test for ovulation. Menopause.
* Fertilization and implantation
* Physiology of pregnancy
* Placenta - feto placental unit and hormones
* Physiology of labour
* Lactation
* Physiology of new born
* Family planning measures.
* Physiological basis of male and female contraception

10. CENTRAL NERVOUS SYSTEM

* Organization of central nervous system.
  - Synapse: Transmission and properties, neurotransmitters
  - Receptors and properties

- Sensory system: primary sensations : ascending tracts and sensory cortex.
- Pain sensation and thalamus

Motor System:

* Spinal cord: Reflexes.
* Motor tracts, basal ganglia, vestibular apparatus, cerebellum, control of motor activity and postural reflexes.
* Hypothalamus, ANS, limbic system, prefrontal lobe.
* Higher mental function
* Sleep and EEG
* Learning and memory
* Language and speech
* CSF and Blood brain barrier (BBB)

11. SPECIAL SENSES

* Vision: - Functional anatomy of eye
  - Aqueous humor, IOP, glaucoma
  - Optics of eye,
  - Image forming mechanism
  - Visual acuity
  - Errors of refractions.
  - Retina - structure and electrical activity of photoreceptor
  - Visual pathway and its lesion and visual cortex depth perception
  - Accommodation, Dark adaptation, pupillary reflexes,
  - Colour vision with applied aspect.
* Hearing: - Functional anatomy of ear
  - Physics of sound
  - Role of tympanic membrane, middle ear and cochlea in hearing
  - Auditory pathway and auditory cortex
  - Tests for hearing and deafness.
* Taste and smell: Modalities, receptors, pathways, cortical and limbic areas associ ated with taste and smell, olfaction and memory.

12. SKIN AND BODY TEMPERATURE REGULATION:

* Structure and function of skin
* Regulation of body temperature
* Changes during exposure to extreme heat and cold

PRACTICAL

The following list of practical is minimum and essential. Additional exercises can be included as and when feasible and required. All the practicals have been categorized as 'Procedures' and 'Demonstrations'. The procedures are to be performed by the students

during practical classes to acquire skills. Some of these would be included in the practical during University examination. Those categorized as "demonstrations" are to be shown to students during practical classes. However, these Demonstrations would not be included in the university examinations, but questions based on these would be given in the form of data, charts, problems and case - histories, for interpretation by students.

Procedures to be performed by the students:

I. Haematology:

1. RBC count
2. WBC Count
3. Differential Leucocyte Count
4. Estimation of haemoglobin
5. Blood grouping
6. Bleeding time
7. Clotting time
8. Absolute Eosinophil Count

II. Procedures to be performed on human subjects

1. Mosso's ergometry - at normal condition, after venous occlusion and arterial occlusion.
2. Recording of Blood Pressure, effect of posture and exercise on it.
3. Stethography - at rest, effect of deglutition, exercise, voluntary hyperventilation and break point afterbreath holding.
4. Spirometry - lung volumes & capacities, MVV and Dyspnoeic Index, FEV1
5. Peak Expiratory Flow Rate (PEFR) by Wright's mini peak flow meter
6. Cardiovascular fitness test - by Harvard's step test or bicycle ergometer or 2km walk.
7. Visual field by Perimetry
8. Recording of ECG in lead II.
9. Tests of autonomic function.

III. Clinical Examination

1. Examination of radial pulse
2. Clinical Examination of Cardiovascular system
3. Clinical Examination of Respiratory system
4. Examination of Sensory system
5. Examination of Motor system
6. Examination of Reflexes
7. Examination of Cranial Nerves
8. Cerebellar function tests

IV. Interpretation of - Charts, Problems and Case histories

Recommended Demonstrations:

1. Hematology: ESR Haematocrit, Reticulocyte count, Platelet count, Osmotic fragility, specific gravity
2. Nerve - Muscle Physiology: Electro myography (EMG)
3. Cardiovascular system: Electrocardiography (ECG), Demonstration of sinus arrhythmias, Recording of Arterial pulse tracing
4. Respiratory system "Determination of lung volumes and capacity and other lung function tests by computerized Spirometry.
5. Reproductive system : Sperm motility and Sperm count
6. Special senses: Audiometry, Purkinje - Samson's images, Ophthalmoscopy, Retinoscopy, examination of fundus.
7. Nervous system: Autonomic function tests.
8. Amphibian Practical: Muscle - nerve and heart experiments may be demonstrated if feasible for academic interest only and not for university practical examination as graphs on amphibian experiments are deleted.
9. Electro encephalogram (EEG)

TEACHING HOURS AND METHODS

1. Total Number of Hrs: : 480

- Theory Didactic Lectures : 160 Hrs.
- Non Lecture teaching : 80 Hrs.
- Practical / Demonstrations : 240 Hrs.

2. System wise Distribution of Teaching Hours

Sl.No	System	No.of Hrs
1	General Physiology, body fluids	8
2	Blood and lymph	16
3	Nerve – Muscle	8
4	Gastro- Intestinal	12
5	Kidney	10
6	Skin, Body temperature	2
7	Endocrine	16
8	Reproduction	10
9	Cardio Vascular	25
10	Respiration	12
11	Central Nervous System	30
12	Special Senses	10

Internal Assessment

Theory: 60 Marks

Minimum of three examinations shall be conducted. Average of best two of three is taken into consideration. Maximum marks for each theory internal assessment shall be 60 marks and 20% IA marks shall include MCQs

Practicals: 20 Marks

Minimum three practical examinations shall be conducted. Average of best two of three is taken into consideration. The total marks will be reduced to 20 marks and sent to the University.

UNIVERSITY EXAMINATION

A. Theory: 200 Marks

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

Type of questions	Number of questions	Marks for each question	Total
Long Essay	2	10	20
Short Essay	10	5	50
Short Answer	10	3	30
		Total Marks	**100**

Distribution of chapters and suggested marks in parenthesis for Paper I and Paper II in Physiology for University examination are as follows*:

PAPER - I	
Subjects	**Marks**
General Physiology	06
Blood	20
Cardiovascular system	24
Respiratory system	20
Gastrointestinal system	18
Renal system	12

(Note: Marks for Renal & Gastrointestinal system can be interchanged. Figures shown in parentheses are weightage of marks recommended for the different topics)

PAPER - II

Subjects	Marks
Endocrine	20
Special senses	18
Reproduction	12
Central Nervous system	28
Muscle-Nerve	16
Skin & Body Temperature	06

(Note: Marks for Endocrines and Reproduction can be interchanged. Figures shown in parentheses are weightage of marks recommended for the different topics)

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

B. PRACTICALS : 80 Marks

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

Practical I	**:**	**40 Marks**
1. Clinical Examination	-	20 marks
2. Procedures on Human subjects	-	20 marks
Practical II	**:**	**40 Marks**
3. Haematology		
Major	-	20 marks
Minor	-	10 marks
4. Interpretation of case histories/ problems/ charts	-	10 marks

C. VIVA VOCE EXAMINATION: 40 Marks

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

Table 1 - Portions of Paper I - 20 Marks
Table 2 - Portions of Paper II - 20 Marks

Recommended Books, Recent Editions.

1. A K Jain: Text of physiology, Prof A.K. Jain, Vol I & II, Avichal Publishing company
2. Indu Khurana: Medical Physiology for undergraduate students, Indu Khurana, Elsevier Publications
3. G.K.Pal: Text book of medical physiology, Prof G.K.pal, Arya publishing house
4. Bijilani : Understanding Medical Physiology, a Text book for Medical students, R.L.Bijilani, B Manjunatha, 4th edition, Jaypee Brothers Medical Publishers
5. Guyton: Text book of medical physiology, Guyton and Hall, Saunders, Elsevier.

References -Recent Editions:

1. Ganong : Ganong's review of medical physiology, Kim E Barett et.al, Tata M C Graw Hill lange
2. Berne and Levy: Physiology, 6th updated edition- Bruce M. Kaeppari, Berne A. Stanton, MOSBY.
3. Boron: Medical physiology, Walter F.Boron, Emile L.Boulpaep, Saunder's Elsevier

Practical: Recent Editions:

1. A.K. Jain: Manual of practical physiology for MBBS, Prof. A.K. Jain, Arya PublicaL
2. G.K.Pal: text book of practical physiology, G.K. Pal, Universities press Pvt. Ltd.
3. Ghai: A text book of practical physiology, C.L.Ghai, Jaypee Publisher
4. Hutchison's: Hutchison's clinical methods - An integrated approach to clinical Practice, Micheal Swash, Micheael glynn, Elsevier publisher

BIOCHEMISTRY

GOALS

The knowledge acquired in biochemistry should help the students to integrate molecular events with structure and function of the human body in health and disease. Towards this, the department would facilitate:

1. To enable students understand the scientific basis of life processes at the molecular level and orient them towards the application of knowledge acquired in solving clinical problems.
2. To acquire basic practical skills for biochemical investigations in order to support clinical diagnosis of common disorders in the community.
3. To promote research activities for students and staff.

OBJECTIVES

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

1. Enlist and describe the cell organelles with their molecular and functional organization.
2. Delineate structure, function and interrelationships of various biomolecules and consequences of deviation from the normal.
3. Understand basic enzymology and emphasize on its clinical applications wherein regulation of enzymatic activity is disturbed.
4. Describe digestion and assimilation of nutrients and consequences of malnutrition.
5. Describe and integrate metabolic pathways of various biomolecules with their regulatory mechanisms.
6. Explain the biochemical basis of inherited disorders with their associated sequelae.
7. Describe mechanisms involved in maintenance of water, electrolyte and acid base alance and consequences of their imbalance.
8. Outline the molecular mechanisms of gene expression and regulation, basic principles of biotechnology and their applications in medicine.
9. Understand basic immunology involving molecular concepts of body defense mechanisms and their applications in medicine.
10. Outline the biochemical basis of free radical injury and antioxidant action, biochemical basis of cancer and carcinogenesis and environmental health hazards.
11. Continue to learn advancements in biochemistry and the application of same in medical practice.
12. Understand different types of biomedical waste, their potential risks and their management.

SKILLS

1. Conduct conventional and selected special investigations.
2. Analyse and interpret laboratory data.
3. Demonstration skills for solving clinical problems to arrive at diagnosis using laboratory data.

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 disease.

Teaching methods

1. Lecture
2. Demonstration
3. Tutorials
4. Seminar
5. Problem based learning
6. Small group discussion

Safety Precautions to be followed in the undergraduate laboratory

1. Careful handling of reagents, especially with corrosives
2. No mouth pipetting
3. Careful handling of burner and flame
4. Test tubes should be facing away while heating
5. Aprons should be full and long enough
6. Working table should be kept clean
7. Instructions should be followed properly

THEORY

1. Introduction 1 hour

Importance and scope of medical biochemistry in prevention, diagnosis and therapeutics of diseases

2. Cell Biology 3 hours

a. Cell membrane - structure and composition
b. Functions of cellular structures
c. Transport across the cell membrane
i. Facilitated diffusion
ii. Passive transport
iii. Active transport
iv. Receptor mediation
v. Endocytosis and exocytosis

3. Chemistry of Carbohydrates 4 hours

a. Definition, classification and their biological importance
b. Monosaccharides - structure, classification and properties (along with important derivates of monosaccharides and reactions of carbohydrates)
c. Isomerism and stereoisomerism
d. Disaccharides & oligosaccharides-structure, properties & importance
e. Polysaccharides - homo and heteropolysaccharides - structure, distribution and functions
f. Dietary fibres

4. Chemistry of amino acids, peptides and proteins 6 hours

a. Amino acids - Structure, types, various classifications and properties
b. Peptides - structure and functions of biologically important peptides e.g. Glutathione, oxytocin and vasopressin, ANP and BNP
c. Proteins - definition, classifications, functions, properties (physical and chemical), structural organization, structure-function relationship with reference to hemoglobin
d. Separation techniques - electrophoresis and chromatography

5. Chemistry of lipids 4 hours

a. Definition, classification, properties and biological importance
b. Simple lipids - Structure, distribution and functions
c. Compound lipids - phospholipids, sphingolipids, glycolipids - composition, distribution and functions
d. Derived lipids - fatty acids, steroids, eicosanoids - chemistry, distribution, classification and functions

6. Chemistry of nucleic acids 4 hours

a. Purines and pyrimidines - structure, structural analogues and their clinical applications
b. Nucleoside, nucleotide and other biologically important nucleotides
c. Nucleic acids - definition, types
d. DNA - structure, types of DNA and functions
e. RNA - structure, types and functions

7. Enzymology 8 hours

a. Definition, classification, properties
b. Coenzymes and cofactors (apenzyme, holoenzyme, cofactors and activators)
c. Mechanism of enzyme action
d. Factors affecting enzyme activity and Km, its significance (derivation not required)
e. Enzyme inhibition - types with Lineweaver-Burk plots and clinical importance
f. Enzyme regulation - modes, mechanism and importance

g. Isoenzymes - definition, chemistry, separation and clinical importance
h. Diagnostic and therapeutic importance of enzymes
i. Proenzymes, multienzyme complex and metalloenzymes
j. RIA and ELISA

8. Vitamins 10 hours

a. Definition and classification
b. Chemistry, sources, absorption and transport, biochemical role, RDA, and deficiency, antivitamins and hypervitaminosis of fat and water soluble vitamins

9. Minerals 4 hours

a. Classification, sources, absorption, transport, fate, metabolism, biochemical functions, excretion, regulation, RDA, deficiency manifestations of the following: calcium, phosphorous, iron, copper, iodine, zinc, fluoride, magnesium, manganese, selenium, sodium, potassium and chloride.

10. Bioenergetics and Biological Oxidation 4 hours

a. Redox potential, concept of bioenergetics in relation to thermodynamics
b. High energy compounds
c. Enzymes involved with special reference to oxygenases
d. Shuttle mechanisms
e. Components and organization of respiratory chain in mitochondria
f. Oxidative phosphorylation
g. Formation of ATP and its regulation
h. Inhibitors and uncouplers (Brown adipose tissue and thermogenesis)

11. Digestion and absorption 3 hours

a. Carbohydrate
b. Lipids
c. Proteins
d. Malabsorption syndromes and other related disorders

12. Metabolism of carbohydrates 10 hours

a. Glucose transporters
b. Glycolysis
c. Oxidation of pyruvate
e. Gluconeogenesis, Cori's cysle
f. Metabolism of glycogen (glycogenesis, glycogenolysis, storage disorders)
g. HMP shunt pathway
h. Metabolism of fructose, galactose, uronic acid pathway, inborn errors associated with them
i. Blood glucose regulation
j. Diabetes Mellitus - etiology, metabolism in DM, biochemical basis of acute and

chronic complications, laboratory diagnosis and monitoring (Glycated Hb, Fructosamine)

k. Glucose tolerance test and glucose challenge test

13. Metabolism of amino acids and proteins 10 hours

a. Dynamic state of body proteins, protein turnover, nitrogen balance
b. Cellular reactions of amino acids
c. Formation, transport and disposal of ammonia (urea cycle)
d. Metabolism of amino acids - glycine, serine, aromatic amino acids, sulphur containing amino acids, histidine, arginine, glutamic acid, branched chain amino acids (first three steps) and metabolic disorders associated with them along with laboratory diagnosis.
e. Specialized products obtained from amino acid metabolism and their importance (Polyamines, creatine, nitric oxide)*

14. Metabolism of lipids 10 hours

a. oxidation of fatty acids - alpha, beta, omega - beta oxidation of odd chain and even chain fatty acids along with disorders
b. Formation and utilization of ketone bodies and ketosis
c. De novo synthesis of fatty acids, elongation and desaturation
d. Phospholipids (lecithin and cephalin only) and triglycerides - formation and breakdown
e. Lipid storage disorders
f. Synthesis of cholesterol (only crucial intermediates), Fate of cholesterol and other compounds derived from cholesterol
g. Lipoproteins - classification, metabolism, functions and disorders
h. Atherosclerosis and role of PUFA in preventing atherosclerosis
i. Eicosanoids
j. Metabolism in adipose tissue, fatty liver and lipotrophic factors

15. Metabolism of nucleic acids 3 hours

a. Biosynthesis and breakdown of purine and pyrimidine nucleotides
b. Salvage pathways and disorders

16. Intermediary metabolism 2 hours

a. Integration of carbohydrate, protein and lipid metabolism
b. Regulation by hormones in starvation, well fed state and diabetes mellitus
c. Methods of study of intermediary metabolism

17. Hemoglobin metabolism 3 hours

a. Biosynthesis of heme, regulation and porphyrias

b. Degradation of hemoglobin
c. Biochemical basis of jaundice and distinguishing features of different types of jaundice
d. Hemoglobin variants and Hb derivatives
e. Abnormal hemoglobins, hemoglobinopathies and thallasemia

18. Genetics and Molecular biology 10 hours

a. DNA replication
b. Transcription, post transcriptional modifications, reverse transcriptase
c. Genetic code, translation, post translational modifications
d. Regulation of gene expression, mutation, PCR, recombinant DNA technology, gene therapy, blotting techniques, RFLP, DNA fingerprinting

19. Nutrition 5 hours

a. Nutrients, Calorific value of food, BMR, SDA, respiratory quotient and its applications
b. Balanced diet based on age, sex and activity, biological value of proteins, nitrogen balance
c. Protein energy malnutrition - kwashiorkor and marasmus
d. Biochemistry of starvation and obesity
e. Dietetics, Total parenteral nutrition, dietary fibres

20. Acid base balance 3 hours

a. Basic concepts of acids, bases, buffers, pH, H ion concentration, derivation of Henderson- Hasselbach equation with its applications
b. pH of blood and its regulation
c. Anion gap and its importance
d. Acidosis, alkalosis, assessment of acid-base status

21. Water and electrolyte balance 2 hours

a. Body water compartments, Donnan membrane equilibrium, osmolality, electrolytes concentration in body fluid compartments, water balance, regulation of water balance
b. Electrolyte balance, regulation and its disorders

22. Function tests 4 hours

a. Liver function tests
b. Renal function tests
c. Thyroid function tests

23. Endocrinology 3 hours

Classification of hormones, mechanism of hormone action, Mechanism of action of insulin, glucagon, epinephrine and steroid hormones

24. Plasma proteins 2 hours

a. Classification, site of synthesis, functions, electrophoretogram in health and disease

b. Acute phase proteins

c. Immunoglobulins - structure, types, functions and associated disorders

25. Metabolism of Xenobiotics 1 hour

26. Radioisotopes and their application in medicine 1 hour

27. Biochemistry of cancer 2 hours

a. Carcinogens

b. Oncogenes

c. Growth factors

d. Tumor markers

28. Myocardial Infarction 1 hour

a. Causes

b. Cardiac markers

c. Lipid profile

29. Free radical and antioxidants 1 hour

30. Quality control 1 hour

31. Biomedical waste management 1 hour

PRACTICALS

1. Introduction
2. Demonstration - reactions of carbohydrates
3. Reactions of glucose, fructose and xylose
4. Reactions of lactose and maltose
5. Reactions of sucrose and starch
6. Identification of unknown carbohydrate
7. Demonstration - Precipitation reactions of albumin and casein
8. Precipitation reactions of albumin and casein
9. Demonstration - colour reactions of proteins
10. Colour reactions of albumin
11. Colour reactions of casein
12. Identification of unknown protein
13. Demonstration and practical - reactions of NPN substances
14. Identification of substance of physiological importance
15. Demonstration - Analysis of normal urine
16. Analysis of normal urine
17. Demonstration - analysis of abnormal urine

18. Analysis of abnormal urine
19. Spectroscopic examination of hemoglobin derivatives and preparation of hemin crytals
20. Spot test for PKU, alkaptonuria, homocystinuria
21. Spotters
22. Estimation of blood glucose and interpretation
23. Estimation of blood urea and interpretation
24. Estimation of urinary creatinine and calculation of creatinine clearance and interprettion
25. Estimation of serum inorganic phosphate and interpretation
26. Estimation of serum total protein, albumin and A:G ratio and interpretation
27. Interpretation of charts and case reports
28. Principles of colorimetry
29. Paper chromatography
30. Electrophoresis
31. GTT and OGCT
32. Determination of ALT and AST
33. Estimation of serum cholesterol
34. Principles of flame photometry and ISE
35. Estimation of serum bilirubin
36. Determination of glucose and proteins in CSF
37. Estimation of albumin in urine and tests for Bence Jones proteins in urine

SEMINARS

Each student will be allotted a short topic already covered in the lecture as a seminar topic. Maximum marks allotted shall be 10 marks which will be added to the best of two internal assessment marks

TOTAL TEACHING - 240 HOURS

Lectures - 120 hours

Practicals/ Demonstration - 80 hours

Tutorials - 20 hours

Seminars/monthly tests/internal assessment/revision classes - 20 hours

SCHEME OF EXAMINATION- BIOCHEMISTRY

THEORY INTERNAL ASSESSMENT

* Minimum 3 examinations to be conducted
* Maximum marks for each theory internal assessment shall be **60 marks** and **20% IA marks shall include MCQs**
* Average marks secured out of best of two notified in internal examinations shall be calculated & forwarded to the university

PRACTICAL INTERNAL ASSESSMENT

* Minimum 3 examinations to be conducted
* **Maximum marks for each practical internal assessment shall be 80 marks which shall be reduced to 20 marks and forwarded to the university**
* **Distribution of marks**

Sl. No.	Particulars	Marks Allotted
1	University Examination Theory	200 100x2
2	University Examination Practicals	80
3	University Examination Viva-Voce	40
4	Internal Assessment Theory	60
5	Internal Assessment Practicals	20
Total marks		400

1. Pattern of theory question paper

	Theory Paper I			Theory Paper II			
Type of Questions	Number of Questions	Marks for each question	Total	Type of Questions	Marks for each question	Number of Questions	Total
Long Essay	2	10	20	Long Essay	2	10	20
Short Essay	10	5	50	Short Essay	10	5	50
Short Answer	10	3	30	Short Answer	10	3	30
Total Marks			**100**	**Total Marks**			**100**

Weightage of marks in university examination

Paper I

Sl. No.	**Topic**	Approximate Weightage of Marks
1	Cell structure and function, sub cellular organnelles, cell mebranes, transport across the membranes	5
2	Chemistry, Digestion & Absorption & metabolism of carbohydrates. Intermediary metabolism	15
3	Chemistry, Digestion & Absorption & metabolism of Lipids.	15
4	Biological Oxidation	10
5	Nutrition and energy metabolism	10
6	Enzymes	15
7	Vitamins	15
8	Mineral metabolism	15
9	Cardiac Markers	5
10	Endocrine function	10
11	Detoxification and Xenobiotics	5
12	Free radicals and antioxidants, Radio-isotopes,	5

Paper IITopic

Sl. No.	**Topic**	Approximate Weightage of Marks
1	Chemistry, Digestion & Absorption & metabolism of Amino acids & Proteins	15
2	Nucleotides and Nucleic acid metabolism	10
3	Protein Biosynthesis, DNA repair mechanism & related disorders, Mutation, Molecular genetics, regulation of gene expression, recombinant DNA technology, PCR, blotting techniques, Human Genome Project & gene therapy	15
4	Heme metabolism, normal and abnormal hemoglobins, with associated disorders	15
5	* Plasma proteins and immunoglobulins	10
6	* Acid - base balance, Water and Electrolyte balance,	15
7	Liver function tests, Kidney function tests, Thyroid Function tests	15
8	Biochemistry of cancer, oncogenes and tumour markers	10
9	Bio-medical Waste management & disorders	5
10	Clinical chemistry, SI Units, quality control, interpretation and reference values and analysis	10

PRACTICAL EXAMINATION: 80 MARKS

The practical examination consists of two exercises. Practical I & II, each of 2 hours duration and each exercise carrying 40 marks

Exercise I - Two hours, 40 marks

1. Quantitative estimation - Every candidate shall perform one given procedure
   a. Principle and procedure for the estimation asked in the question should be written by the candidate in the first five minutes 10 marks
   b. After collecting the papers correct procedure for the estimation is given and practical examination is done. Total marks would be 15 and the distribution of marks would be
      i. results (values)
      ii. calculations and reporting
      iii. for interpretation of results & application of the estimation

      } 20 marks
   c. Case studies, graphs and charts - discussion 1 x 10 = 10marks

Exercise II - Two hours, 40 marks

2. Qualitative analysis - Every candidate shall perform one qualitative analysis such as identification of carbohydrates, proteins, Non-protein nitrogenous substances of physiological importance, analysis of normal urine, analysis of abnormal urine, distributions of marks would be
   - For selection of appropriate reactions 10 marks
   - For reasoning of analysis and correct reporting 10 marks
   - For interpretation of results and application of the estimation 10 marks

3. Ten Digital spotters/ biochemical techniques - 2 x 5 = 10 marks

Chromatography, Electrophoresis, Osazone preparation, Biochemical tests and reagents

VIVA VOCE - 40 marks

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

Viva Voce Examination :

The viva voce examination shall carry 40 marks and all the examiners will conduct the viva examination. The distribution of topics may be done as follows:

i. Cell structure & functions, transport across cell membrane, chemistry of carbohydrates, digestion & absorption of carbohydrates, carbohydrate metabolism, intermediary metabolism & Biological Oxidation, acid base alance, water and electrolyte balance
ii. Chemistry of Proteins, digestion & absorption of proteins, protein metabolism, enzymes & clinical enzymology, function tests, endocrinology, plasma proteins, hemoglobin metabolism

iii. Chemistry of Lipids, Digestion & absorption of Lipids, Lipid metabolism, biochemistry of cancer, free radicals & antioxidants, xenobiotics, myocardial infarction and radio-isotopes

iv. Nutrition, vitamins, minerals, nucleic acid chemistry, purine and pyrimidine metabolism, genetics & molecular biology, biochemical waste, SI Units & quality control

Recommended Text Books, Recent Editions.

1. Murray (Robert.K.K), Harpers Biochemistry. Published by Lange Medicals
2. D.M.Vasudevan & Shreekumari.S Textbook of Biochemistry for Medical students, published by Jaypee Medical Publishers Ltd, New Delhi
3. Champe, Harvey & Ferrier. Lippincots Illustrated reviews of Biochemistry Published by Lippincott, Williams and Wilkins
4. Dinesh Puri, Text book of Medical Biochemistry, Published by Elseiver.
5. A R Aroor, Medical Biochemistry, Published By Jaypee Medical Publishers Ltd, New Delhi
6. Rafi M.D. Text book of Biochemistry for Medical Students, Published by University Press (India) Pvt.Ltd.,

Reference Books, Recent Editions

1. Chatterjea & Shinde. Text book of Medical Biochemistry. Published by Jaypee Medical Publishers, New Delhi
2. Lehninger (Albert) et.al. Principles of Biochemistry. LBS Publishers, New Delhi
3. Stryer (Lubert), Biochemistry Published by Freeman & Co.
4. Devlin (Thomas M). Biochemistry with Clinical Correlations. Published by Wiley Liss, New York.
5. Burtis (Carl.A) & Ashwood (Edward.R). Tietz Text book of Clinical Chemistry. Published by Saunders/Harcourt India.

PATHOLOGY

GOALS & OBJECTIVES

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

Understand the concepts of cell injury and changes produced thereby in different tissues and organs and the body's capacity for healing.

Understand the normal homeostatic mechanisms, the derangements of these mechanism and the effects on human systems.

Understand the etiopathogenesis, the pathological effects and clinico-pathological correlation of common infectious and non-infectious diseases.

Correlate normal and altered morphology (Gross and Microscopic) of different organ systems in different diseases to the extent needed for understanding of disease processes and their clinical significance.

Have knowledge of common immunological disorders and their resultant effects on the human body. Have an understanding of the common haematological disorders and the investigations necessary to diagnose them and determine their prognosis.

Know the principles of collection, handling and dispatch of clinical samples from patients in a proper manner.

Perform and interpret in a proper manner the basic clinical pathology procedures.

COURSE CONTENTS

THEORY

General Pathology

1. Introduction

a) Introduction and scope of Pathology

b) Brief resume of Historical Aspects, present state of the art and future

c) Ethical aspects of Pathology practice

2. Cell Injury

a) Cell injuries : Aetiology and Pathogenesis with a brief recall of important aspects of normal cell structure.

b) Reversible cell injury: Types, Sequential changes, Cellular Swellings, Vacuolation, Hyaline changes, Mucoid changes.

c) Irreversbile cell injury: Types of Necrosis & Gangrene, Autolysis.

d) Pathologic calcification: Dystrophic and Metastatic

e) Intracellular Accumulations - Fatty changes, Protein Accumulations, Glycogen Accumulations, Pigments - Melanin/ Hemosiderin
f) Extracellular accumulations: Amyloidosis - Classification, Pathogenesis. Pathology including special stains.
g) Ochronosis, Porphyria, Lipofuscin Pigment.

3. Inflammation and Repair

a) Acute inflammation: Features, causes, vascular and cellular events.
b) Morphologic variants of acute inflammation
c) Inflammatory cells and Chemical Mediators
d) Chronic inflammation: Causes, Types, classification nonspecific and granulomatous inflammation with examples.
e) Repair, Wound healing by primary and secondary union, factors promoting and delaying the process.
f) Healing at specific sites including bone healing.

4. Immunopathology

a) Immune system: General concepts
b) Hypersensitivity: type and examples, antibody and cell mediated tissue injury with examples.
c) Secondary immunodeficiency including HIV infection
d) Auto-immune disorders: Basic concepts and classification, SLE, Scleroderma
e) AIDS-Aetiology, Modes of transmission, Diagnostic procedures, handling of infected material and health education.

Desirable to know

a) Primary immunodeficiency.
b) Autoimmune diseases: organ specific and non organ specific such as polyarterits nodosa, Hashimoto's disease, Sjogren's Syndrome, Polymyositis, Dermato-Myositis.
c) Organ transplantation: immunologic basis of rejection and graft versus host reaction.

5. Infectious Diseases

a) Mycobacterial disease: Tuberculosis, Leprosy
b) Bacterial disease: Pyogenic, Typhoid, Diphtheria, Gram negative infection, Bacillary dysentery & Syphilis
c) Viral disease: Poliomyelitis, Herpes, Rabies, Measles, Rickettsia, Chlamydia infection, HIV infection
d) Fungal disease and opportunistic infections.
e) Parasitic disease: Malaria, Filaria, Amoebiasis, Kala-azar, Cysticerosis, Hydatid cyst.

6. Circulatory Disturbances

a) Hyperemia/ Ischemia and Haemorrhage.
b) Edema: Pathogenesis and types
c) Chronic venous congestion: Lung, Liver, Spleen, Systemic
d) Thrombosis and Embolism : Formation, Fate and effects
e) Infarction : Types, common sites, Gangrene
f) Shock: Etio pathogenesis, types, morphologic changes.

7. Growth Disturbances and Neoplasia

a) Atrophy, Hypertrophy, Hyperplasia, Aplasia, Hypoplasia, Metaplasia, Malformation, agenesis, dysplasia.
b) Precancerous lesions.
c) Neoplasia: classification, Histogenesis, Biological Behaviour: Differences between Benign and Malignant tumors.
d) Malignant tumors: Grades and Stages, Local & Distant spread
e) Carcinogenesis: Environmental Chemical, Viral, Occupational, Radiational, Pathogesis of cancer. Heredity and cellular oncogenes and prevention of cancer.
f) Benign & Malignant epithelial tumours Eg. Squamous papilloma, Squamous cell carcinoma, Malignant melanoma. Benign & Malignant mesenchymal tumours Eg.: Fibroma, Lipoma, Neurofibroma, Fibrosarcoma, Liposarcoma, Rhabdomyosarcoma, Teratoma
g) Diagnostic methods - Biopsy, Exfoliative Cytology, FNAC, Cryostat

Desirable to know

a) Tumour and Host interactions: Systemic effects including paraneoplastic syndromes, tumour immunology.
b) Detailed procedures of Laboratory diagnosis, Cytology, Biopsy, Tumour markers, flow cytometry (basic concepts) PCR
c) Tumour like lesions of soft tissues.

8. Nutritional & Other Disorders

a) Protein energy Malnutrition: Marasmus, Kwashiorkor and Vitamin deficiency disorders, classification with specific examples.
b) Disorders of pigment and metabolism such as bilirubin, melanin, hemosiderin.
c) Exogenous pigments.
d) Mineral disorders : Copper, Zinc and Calcium.
e) Environmental Pathology

9. Genetic Disorders

a) Basic concepts of Genetic Disorders and some common examples and congenital malformation

b) Specific Diseases - Down's syndrome, Turner's syndrome, Klinefelter's Syndrome, Storage Disorders.

SYSTEMIC PATHOLOGY

10.Haematology

a) Constituents of blood and bone marrow, Regulation of hematopoiesis.
b) Anaemia : Classification and clinical features & lab. Diagnosis
c) Nutritional anaemias: Iron deficiency anemia, Folic acid & Vitamin B12 deficiency anemia including pernicious anemia.
d) Hemolytic Anaemias: Classification and Investigations

1 Hereditary hemolytic anaemias; Thalassemia, Sickle cell anemia, Spherocytosis and Enzyme deficiencies.

2) Acquired hemolytic anaemias

(i) Alloimmune, Autoimmune

(ii) Drug induced, Microangiopathic

e) Pancytopenia - Aplastic anemia
f) Hemostatic disorders, vascular and platelet disorders & lab diagnosis.
g) Coagulopathies - (i) Inherited (ii) Acquired with lab. diagnosis.
h) Leukocytic disorders : Leukocytosis, Leukopenia, Leukemoid reaction.
i) Leukemia : Classification, clinical manifestation, pathology and Diagnosis.
j) Multiple myeloma and disproteinemias.
k) Blood transfusion: Grouping and cross matching, transfusion transmissible infections including HIV & Hepatits, Blood-components & plasmapheresis, transfusion reactions, Rhtyping, Erythroblastosisfetalis.

Desirable to know

a) Myelodysplastic syndrome - Basic concepts
b) Myeloproliferative disorders; polycythemia, Myeolofibrosis - Basic concepts

11. Cardiovascular Pathology

a) Congenital Heart disease: Atrial septal defect, Ventricular septal defect, Fallot's tetralogy, Patent ductus arteriosus.
b) Endocarditis.
c) Rheumatic Heart disease
d) Vascular diseases: Atherosclerosis, Monckeberg's Medical calcification, Aneurysm and Arteritis and tumors of Blood vessels.

e) Ischemic Heart Diseases: Myocardial infarction
f) Hypertension and hypertensive Heart Disease.

Desirable to know

a) Cardiomyopathy - basic concepts
b) Tumours of Heart

12. Respiratory Pathology

a) Chronic obstructive lung diseases - Emphysema, Chronic bronchitis, bronchial asthma, Bronchiectasis
b) Pneumonias, Lung abscess, Fungal and viral lesions of respiratory system.
c) Pulmonary tuberculosis: Primary and Secondary, Morphologic types including Pleuritis.
d) Tumours of the lung & Pleura
e) Atelectasis and Hyaline membrance disease, ARDS.
f) Occupational lung disorders: Pneumoconiosis.

13. Pathology of Kidney & Urinary Tract

a) Glomerular diseases - nephritic & nephrotic, and glomerulonephritides
b) Tubulo interstitial disease: Acute tubular necrosis & pyelonephritis.
c) Renal vascular disorders, kidney changes in hypertension.
d) Renal tumours : Renal cell carcinoma, Nephroblastoma
e) Urolithiasis & Obstructive Uropathy, Hydronephrosis.
f) Ureteric lesion : Inflammatory lesions and tumours.
g) Urinary bladder inflammatory lesions and tumours.

14. Pathology of the Alimentary Tract

a) Oral Pathology: Ulcers, leukoplakia: Precancrous lesions Carcinoma of the oral cavity.
b) Diseases and Tumour of salivary gland.
c) Diseases of Oesophagus and precancerous lesions, inflammatory and functional disorders and tumours.
d) Stomach: Gastritis, Ulcer & Tumours.
e) Inflammatory diseases of small and large intestine: Typhoid, Tuberculosis, Crohn's and Ulcerative colitis, Appendicitis, Malabsorption syndromes and Hirschsprung disease.
f) Tumours and tumour like condition of the small and large Intestine: Polyps, Carcinoid, Carcinoma andLymphoma.
g) Pancreatitis and pancreatic tumours : i) Exocrine, ii) Endocrine
h) Neuroendocrine Carcinomas.

15. Hepato-Biliary Pathology

a) Jaundice: Types, aetio-pathogenesis and diagnosis
b) Hepatitis: Acute, Chronic, neonatal
c) Alcoholic liver disease
d) Cirrhosis: Postnecrotic, Alcoholic, Metabolic & Portal hypertension
e) Liver abscesses - Pyogenic, Parasitic and Amoebic
f) Tumours of Liver
g) Diseases of the gall bladder: Cholecystitis, Cholelithiasis, Carcinoma

16. Lymphoreticular System/ Spleen

a) Lymphadenitis - Non specific and granulomatous
b) Causes of Lymph Node enlargements. Reactive Hyperplasia, Primary Tumours- Hodgkins and Non Hodgkins Lymphomas, Metastatic Tumours

17. Reproductive System (Male & Female)

a) Diseases of Vulva-Bartholin's cyst, Condyloma accuminata and tumours.
b) Diseases of cervix: cervicits & cervical carcinoma
c) Diseases of Uterus: Normal, Hormonal changes in the endometrium, endometritis, endometrial hyperplasia and carcinoma, adenomyosis, smooth muscle tumours, Endometriosis, Classification
d) Trophoblastic disease: Hydatidiform mole, Choriocarcinoma and laboratory diagnosis.
e) Diseases of ovary & Fallopian tubes: Endometriosis, Ectopic pregnancy & Tumours
f) Prostate: Nodular hyperplasia and carcinoma
g) Inflammatory lesions and tumours of testis
h) Diseases of penis - inflammatory, premalignant and tumours.
i) Diseases of Breast- Mastitis, abscess, fibrocystic disease, neoplasms, fibroadenoma, duct papilloma, Phyllodes tumor, gynaecomastia and carcinoma,

18. Diseases of musculoskeletal System

a) Osteomyelitis, acute, chronic, tuberculous, mycetoma
b) Metabolic diseases: Rickets/ Osteomalacia, osteoporosis, Hyperparathyroidism, Paget's disease.
c) Tumours : Classification: Benign, Malignant and Metastatic.
d) Arthritis: Suppurative, Rheumatoid, Osteoarthritis, Gout, Tuberculous.

19. Endocrine Pathology

a) Diabetes Mellitus : Types, Pathogenesis, Pathology
b) Non-neoplastic lesions of Thyroid: Iodine deficiency goiter, autoimmune Thyroiditis, Thyrotoxicosis, myxedema, Hashimoto thyroiditis.
c) Tumours of Thyroid: Adenoma, Carcinoma: Papillary, Follicular, Medullary, Anaplastic.

d) Adrenal diseases: Cortical hyperplasia, atrophy, tuberculosis, tumours of cortex and medulla.
e) Parathyroid hyperplasia.
f) Parathyroid Tumours, Pituitary Tumours.

20. Neuropathology

a) Inflammations and Infections: TB Meningitis, Pyogenic Meningitis, Brain Abscess.
b) Tuberculosis, Cysticercosis
c) CNS Tumours: Astrocytoma, Neuroblastoma, Meningioma, Medullablastoma.

21. Dermato Pathology

a) Skin Tumours - Naevi, Basal Cell Carcinoma, Squamous Cell Carcinoma

22. Ocular Pathology

a) Inflammation or infections of conjunctiva and Lacrymal Glands. Tumours eg. Retinoblastoma

Practicals

I. Haematology - Hemoglobin estimation & red cell indices, PCV, ESR, Peripheral Blood Smear examination, Blood Grouping

II. Clinical Pathology - Urine examination including demonstration by Uristix method, Charts for discussion & interpretation

III. Histopathology - Minimum number of slides to be shown:

1. Necrosis and Acute Inflammation - 2
2. Chronic Inflammation - 6
3. Intracellular Accumulation and Calcification - 4
4. Circulatory Disturbances - 4
   - Chronic Venous Congestion - Spleen
   - Chronic Venous Congestion - Liver
   - Chronic Venous Congestion - Lung
5. Neoplasia -
   - Benign epithelial tumours - 2
   - Malignant epithelial tumours - 3
   - Benign Mesenchymal tumours - 4
   - Malignant Mesenchymal tumours - 2

6. Systemic Pathology

CVS - Atherosclerosis	- 3
Monckeberg's calcific sclerosis	
Myocardial Infarction	
Respiratory system:	- 4
Renal system	- 3
GIT	- 4
Liver	- 2
Reproductive system & breast	- 10
Lymph nodes	- 3
Endocrine system	- 4
Musculoskeletal system	- 4
CNS & Peripheral Nervous system	- 4

Corresponding specimens to be included for demonstration.

For Examination: A minimum of 40 histopathology slides & 50 specimens will be available for spotters, discussion and viva-voce.

Teaching Hours

Theory : Total 120 Hrs

i) General Pathology Total 40 Hrs

The History and Scope of Pathology

1. Cell injury
2. a) Inflammation and repair
   b) Chronic inflammation
   c) Wound healing
3. Immunopathology
4. Circulatory disturbances
5. Infectious diseases
6. Growth disturbances and Neoplasia
7. Nutritional disorders
8. Genetic disorders

ii) Clinical Pathology Including Clinical Hematology 10 hrs

1. Sample collection of various haematological and Clinico-pathological Investigations, Anti Coagulants
2. Theoretical aspects of Hb-estimation, Blood indices, ESR, PCV, Reticulocyte, Normal values in haematology.

3. Study of Bone Marrow and Marrow transfusion
4. Blood Grouping: Concept of Blood Groups, Selection of Donor, Major and Minor Cross Matching. Blood Transfusion reactions, diseases transmitted by blood transfusion, Coomb's Test and Blood components.
5. Automation in hematology
6. CSF Analysis
7. Semen Analysis
8. Exfoliative cytology, FNAC and FNAB
9. Body fluids: Pleural, Peritoneal, Synovial, Pericardial fluids.
10. Liver Function Tests, Renal FunctionTests and Thyroid Function Tests.

iii) Systemic Pathology	**72 Hrs**
1. Haematology:	10 hrs
2. Cardio Vascular system	6 hrs
3. Respiratory System	6 hrs
4. Renal System	8 hrs
5. Alimentary Tract	6 hrs
6. Hepato Biliary Pathology	5 hrs
7. Lymphoreticular System	4 hrs
8. Reproductive System	9 hrs
9. Osteo Pathology	4 hrs
10. Endocrine Pathology	5 hrs
11. Neuropathology	2 hrs
12. Dermato Pathology	2 hrs
13. Ocular Pathology	1 hrs
14. Breast	4 hrs

Practicals: **144 hrs**

The students of Pathology are to be trained in Practical Laboratory work including the basics in clinical Pathology, Haematology and Histopathology including morbid anatomy.

1. The students should be conversant with the organization and functioning of the laboratories and should be aware of the safety precautions to be taken in the laboratories.
2. The students should be conversant with the use of compound microscope and should also be conversant with the application and use of special microscopes like polarizing microscope, phase contrast microscope, dark-ground microscope, dissecting microscope and fluorescent microscope.

3. They should be conversant and be able to perform and interpret the routine laboratory investigations.
4. The students should be aware of the common methods of collection of samples for haematological and bio-chemical investigations and anticoagulants to be used. They should be conversant with methods of collection of body fluids and for cytological examinations and the preservatives to be used.
5. The clinico-pathological exercises include the physical and chemical examinations of urine including the microscope & the application of the tests in diagnosis of diseases.
6. The haematology exercises include the Haemoglobin estimation, E.S.R., peripheral smears study, P.C.V. and cell counts (R.B.C., W.B.C., Eosinophil) and haematological indices, total and differential count, reticulocyte count, blood grouping and techniques and interpretation of bone marrow preparations to be demonstrated.
7. The students should also be conversant with the method and collection and transportation of biopsy specimens to the laboratory including the preservatives used. They should have the knowledge of method of processing of samples and common histological techniques including H & E stain and a few special stains like PAS, Verhoeff stains, Perl's Prussian stain, MTS and Papanicolaou etc.
8. The students should also have the knowledge of application of frozen section and museum techniques.
9. The students should be able to identify as spotters the common histopathological, haematological & cytological slides and specimens & charts and their interpretations.
10. The students should be able to correlate the history & identify the common histopathological & haematological slides & specimens & discuss the relevant diagnosis
11. The student should have the knowledge of rapid diagnostic methods and principle and use of Auto Analysers.
12. The students should maintain the practical record book and keep it up-to-date and submit on time for valuation.

SCHEME OF EXAMINATION

Internal Assessment

Theory: 60 Marks

* Minimum of three examinations shall be conducted. Average of best two of three is taken into consideration. Maximum marks for each theory internal assessment shall be 60 marks and 20% IA marks shall include MCQs

Practicals: 20 Marks

Minimum three practical examinations shall be conducted. Average of best two of three is taken into consideration. The total marks will be reduced to 20 marks and sent to the University.

UNIVERSITY EXAMINATION

There shall be two theory papers of 100 marks each.

Paper-I : General Pathology including Clinical Pathology and Haematology.

The distribution of marks for different topics/ chapters would be as follows:

1. General Pathology 50 marks
2. Haematology 20 marks
3. Clinical Pathology 15 marks
4. Clincial Haematology 15 marks

Paper-II : Systemic Pathology Max: 100 marks

1. Cardiovascular System — 20 marks
2. Respiratory System
3. Alimentary System including diseases of Liver & Gall bladder & Exocrine Pancreas
4. Male Genital system — 40 marks
5. Female Genital system
6. Lymphoreticular system
7. Endocrine system
8. Breast — 20 marks
9. Skin
10. Nervous system
11. Musculoskeletal system — 20 marks
12. Urinary system

C. VIVA-VOCE EXAMINATION

The oral examination shall carry 40 marks and all the examiners will conduct the oral examination.

1. General Pathology
2. Clinical Pathology
3. Systemic Pathology-I (C.V.S., R.S., G.I.T., Hepatobiliary)
4. Systemic Pathology-II — 40 marks (Renal system, Bones & joints Male & Female Reproductive system, Endocrinology, Skin & C.N.S., Lymph node & Spleen)

Practical Examination - Total 80 Marks

1. Spotters: Including slides, specimens, instruments & charts	20 Marks
2. Urine analysis and interpretation - sample given with clinical history	15 Marks
3. Stained smear given with clinical history for reporting and interpretation	15 Marks
4. Chart: Clinical Pathology, Haematology and Cytology for interpretation	10 Marks
5. Hemoglobin estimation / Blood grouping	10 Marks
6. Histopathology slide interpretation- Histopathology slide provided with clinical history	10 Marks

A. List of Haematology slides and instruments recommended for spotters.

a. Haematology Slides

1. Microcytic Hypochromic anemia
2. Macrocytic anemia
3. Dimorphic anemia
4. Normocytic Hypochromic Anemia
5. Eosinophilia
6. Reticulocytes
7. Acute myeloblastic leukemia
8. Chronic myeloid leukemia
9. Acute lymphoblastic leukemia
10. Chronic lymphatic leukemia
11. Multiple myeloma - Bone marrow
12. Microfilaria
13. Malaria parasite
14. Immune thrombocytopenic purpura Bone marrow
15. Megaloblastic Bone marrow

b. Instruments

1. Lumbar puncture needle
2. Liver biopsy needle
3. Bone marrow aspiration needle
4. Wintrobes Tube
5. Westergren's E.S.R. Tube and Stand
6. Urinometer
7. Blood bag
8. Haematocrit Tube and Stand (PCV)
9. R.B.C. Pipette
10. W.B.C. Pipette
11. Sahli's Haemoglobinometer
12. Albuminometer
13. Neubauer's Counting Chamber
14. Haemoglobin Pipette

B. List of Slides and Specimen for Undergraduates (Histopathology

Topic	Slide	Specimen
1. Necrosis and Acute inflammation	Myocardial infarction, tuberculosis lung, Acute appendicitis lobar pneumonia	Tuberculosis lung, Acute appendicitis lobar pneumonia Gangrene- intestine
2. Chronic inflammation	Tuberculosis of Lymph node, Lepromatous Leprosy Tuberculoid Leprosy Actinomycosis Rhinosporidiosis	Tuberculosis of Lymphnode Fibrocaseous TB Lung
3. Intracellular accumulation	Fatty liver Monckeberg's scelrosis	Fatty liver
4. Circulatory disturbances	CVC Lung CVC Liver CVC Spleen	CVC Liver CVC Spleen Infarction-Lung Infarction-Spleen
5. Neoplasia - Benign	Capillary haemangioma Cavernous haemangioma Lipoma & Leiomyoma Intradermal nevus	Lipoma & Leiomyoma
6. Neoplasia - Malignant	Squamous Cell Carcinoma Malignant Melanoma Basal Cell Carcinoma	Squamous Cell Ca-Skin Squamous Cell Ca-Penis
Systemic Pathology		
7. Cardiovascular system	Atheroma- Aorta Myocardial infarction	Atheroma - Aorta
8. Respiratory System	Tuberculosis - lung Lobar pneumonia Bronchogenic Carcinoma	Tuberculosis - Lung Secondaries - Lung Bronchogenic Carcinoma Bronchiectasis
9. Gastrointestinal system	Pleomorphic adenoma Rectal polyp Adenocarcinoma- intestine	Peptic ulcer - Stomach Multiple polyposois- colon Carcinoma - Stomach Carcinoma - Colon
10. Hepatobiliary system	Cirrhosis - Liver Hepatocellular carcinoma	Cirrhosis - Liver Hepatocellular carcinoma Chronic cholecystitis with Gall bladder
11. Renal system	Chronic pyelonephritis Renal cell carcinoma Wilm's tumor	Contracted kidney Polycystic kidney Hydronephrosis with staghorn calculi Renal cell carcinoma Wilm's tumor

12. Male genital system	Seminoma Benign prostatic hyperplasia	Seminona - Testis
13. Female genital system	Proliferative phase - Endometrium Secretory phase- Endometrium Cystoglandular hyperplasia Serous cyst - Ovary Mucinous cystadenoma ovary Teratoma, Vesicular mole	Carcinoma - Cervix Serous cyst - Ovary Mucinous cystadenoma ovary Benign cystic teratoma
14. Breast	Fibroadenoma Infiltrating duct carcinoma	Carcinoma breast
15. Bones	Osteosarcoma Osteoclastoma Chondrosarcoma	Sequestrum Osteosarcoma Osteoclastoma
16. Endocrine system	Follicular adenoma Papillary carcinoma - Thyroid Multinodular goiter	Colloid goiter Papillary carcinoma Thyroid Follicular adenoma
17. Lymphoreticular system	Hodgkin's lymphoma Non-Hodgkin's lymphoma	Non-Hodgkin's lymphoma

C. Clinical Pathology

Charts for discussions - with history

1. Haematology
2. Fine needle aspiration study
3. Body fluids
4. Urine analysis

Recommended Text Books - Recent Editions.

1. Robbins (Stanley L) Et. al., Pathologic Basis of Diseases.
2. Ritchie (AC), Body's Text Book of Pathology.
3. Mohan (Harsh), Text Book of Pathology.
4. Firkin (Frank) etal, deGruchy's Clinical Haematology in Medical Practive.
5. Walter (JB) and Israel (MS), General Pathology.
6. Govan (Alasdair) Et al, Pathology, Illustrated.
7. SOOD (Ramnik) Medical Laboratory Technolgy.

Reference Books- Recent Editions.

1. McGee (Jaures) Et al, Oxford Text book of Pathology.
2. KISSANE (John) Anderson's Pathology.
3. Curran (RC), Colour Atlas of Histopathology.
4. Moic Sween (Roddie) and Whaley (Keith), Muir's Text Book of Pathology.
5. Dacie (Sir John) and Lewis (SM), Practical Haematology.
6. Rubin (Emanuel) and Faber (John), Pathology.
7. Symmers (WSTC), Systemic Pathology.
8. Jones (Howond) & Jones (Georgeanna), Novak's Text book of Gynecology.
9. Rosai (Juan), Ackermann's Surgical Pathology.
10. Raphael (Stanley), Lynch's Medical Laboratory Technology.
11. Lee (Richard) Et al, Wintrobe's Clinical Hematology.
12. Henry (John): Clinical Diagnosis and Management by Laboratory Methods.

MICROBIOLOGY

GOAL & OBJECTIVES

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

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

COURSE CONTENTS

1. General Microbology

a) General concepts of infectious diseases prevalent in India (Mortality, Morbidity data)

b) Significant milestones in history of infectious diseases

c) Definitions pertaining to infectious diseases (eg:- endogenous, exogenous, transmission, routes, source, reservoir etc)

d) Classification of Microbes from clinical point of view eg: Organism causing UTI, RTI, etc

e) Normal Microbial flora in humans and its importance in health and diseases

f) Bacterial cell anatomy, Physiology and genetics

g) Sterilization, Disinfection and standard precautions in patient care and disease prevention

h) Antimicrobials- mode of action, mechanism of resistance, testing, interpretation of results and rational use

2. Immunology

a) Immune apparatus, lymphoid organs, Immunobiology
b) Antigen, antibody and compliment
c) Ag+Ab- reactions and interpretation of serological tests in clinical practice
d) Cell and humoral immunity in health and disease
e) Hypersensitivity
f) Tumor immunity and Transplantation immunity
g) Auto-immunity and approach to diagnosis
h) Immunodifficiency disorder and approach to diagnosis
i) Immunotherapy

3. Systematic Bacteriology

a) Gram positive/negative cocci/bacilli associated with human infections.
b) Vibrio, Campylobacter, Helicobacter
c) Mycobacteria
d) Anaerobic bacterial infections and approach to diagnosis
e) Spirochaetes
f) Chlamydia, Rickettsiae, Mycoplasma
g) Miscellaneous bacteria of clinical importance
h) Legionella, Listeria etc

4. Virology

a) General properties, structure, replication, classification
b) Antiviral agents and their use in clinical practice
c) General concepts in laboratory diagnosis of viral infections of CNS, RS, GIT, RTIs
d) DNA and RNA viruses of Medical importance
e) Viral vaccines
f) Slow viruses, Oncogenic viruses, Prions

5. Parasitology

a) General concepts and definitions of key terms, infections of National prevalence
b) Protozoal infections prevalent in India
c) Helminths (Intestinal and Tissue) prevalent in India
d) Cestodes
e) Trematodes
f) Nematodes

6. Mycology

a) General properties and classification of fungal diseases, approach to laboratory diagnosis (sample collection, Identification)
b) Antifungal agents, uses and resistance

7. Applied Microbiology

a) Diarrhoeal diseases (including food poisoning)
b) Respiratory tract infections (Upper and Lower)
c) UTI
d) Wound infections
e) Skin and soft tissue infections
f) Eye and ear infections
g) Sexually transmitted infections
h) Female genital tract infections
i) Infections in immuno-compromized individuals
j) Bone and joint infections
k) CNS infections: Acute and chronic meningitis, encephalitis and brain abscess
l) PUO/FUO: Infective and non-infective causes and approach to diagnosis
m) Hospital associated infections and its prevention
n) Zoonotic diseases
o) National programmes of Communicable diseases
p) Investigations of outbreaks and notification
q) Collection of relevant clinical samples: Blood culture, serological tests, Urine for culture, Swabs for Microscopy, culture, Pus for microscopy and culture and other body fluids
r) Storage and transport of clinical specimens
s) Preparation of smears of clinical material

8. Automation in Microbiology.

9. Role of molecular methods in the diagnosis of Infectious diseases.

10. Biomedical waste management

SKILLS

1. Microscopic examination- Grams stain, ZN stain
2. Stool for Ova and cyst
3. Modified ZN stain for M.leprae
4. India ink for Cryptococci
5. KOH for fungal elements
6. Standard precautions (Hand wash, asepsis, and antiseptics)
7. Interpretation of Microbiology reports: Serology, VDRL, Hepatitis, ASO, RF, Widal test
8. Antibiotic sensitivity : Rational use of antibiotics

Method of assessment
Modified essay questions, Microscopic examination, short answer questions, MCQs, problem solving exercises, records review and oral viva-voce.

Teaching and learning methods
Structured interactive sessions, Small group discussions, Role play, Practical including demonstrations, problem based exercises, video clips, written case scenarios, self learning tools, Interactive learning and E-module.

Time of evaluation
At the end of 5th semester and formative assessment in middle of 3rd, 4th and 5th semester and summative assessment at the end of 5th semester.

SCHEME OF EXAMINATION

INTERNAL ASSESSMENT

Theory: 60 Marks

* Minimum of three examinations shall be conducted. Average of best two of three is taken into consideration. Maximum marks for each theory internal assessment shall be 60 marks and 20% IA marks shall include MCQs

Practicals: 20 Marks

Minimum three practical examinations shall be conducted. Average of best two of three is taken into consideration. The total marks will be reduced to 20 marks and sent to the University.

UNIVERSITY EXAMINATION
A. Theory : 200 Marks
There shall be two theory papers of 100 marks each and duration of each paper will be of 3 hours. The pattern of questions would be of three types.

B. PRACTICAL EXAMINATION : 80 Marks
It shall carry 80 marks. The distribution of marks for different components are:-

Spotters **	-	10
Gram's stain	-	15
Special (ZN or Alb) stain	-	15
Parasitology (Stool Examn)	-	15
Clinical Bacteriology	-	15
Clinical Virology (charts) or Clinical Mycology (slide & culture)	-	10

Clinical Microbiology can be kept together as charts or culture and slide

List of Spotters recommended and distribution of marks of each Spotter

**Spotter	Marks
Slides	2 + 2
Media	3
Instrument	1
Specimen	1
Animal	1
Total Marks	**10**

The distribution of topics & weightage of marks for University examination is as under:

Paper I : 100 Marks

General Bacteriology	20 Marks
Immunology	30 Marks
Systematic Bacteriology	50 Marks

Paper II : 100 Marks

Type of Questions	Number of questions	Marks of each
Virology	40 Marks	
Parasitology	40 Marks	2
Mycology	10 Marks	10
Applied Microbiology	10 Marks	10
Long Essay		
Short Essay		
Short Answer		

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

C. VIVA VOCE EXAMINATIION : 40 Marks

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

Distribution of Topics & Marks

General Bacteriology & Immunology	10 Marks
Systematic Bacteriology	10 Marks
Virology & Mycology	10 Marks
Parasitology	10 Marks
Total	**40 Marks**

Recommended Books and Reference Books, Recent Editions

Learning resource materials

Textbooks, reference books, practical note books, internet resources and video films etc

Suggested horizontal integration 20 hours to be made compulsory

1. PUO
2. Diarrhoea
3. Tuberculosis
4. Wound infections
5. Eye and ear infections
6. CNS infections
7. Zoonotic diseases
8. Congenital infections
9. Female and male genital tract infections
10. Respiratory tract infections

Suggested books in Microbiology

1. Medical microbiology and Immunology, Examination and board review by Warren Lewinson.
2. Text book of Microbiology by Anantha narayan & Paniker.
3. Text book of Microbiology by CP Baveja.
4. Text book of Parasitology by Paniker.
5. Text book of Microbiology by Jawetz.

PHARMACOLOGY

GOAL

The broad goal of the teaching of undergraduate students in pharmacology is to inculcate a rational and scientific basis of therapeutics.

OBJECTIVES

KNOWLEDGE

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

1) Describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs.
2) List the indications, contraindications, interactions and adverse reactions of commonly used drugs.
3) Indicate the use of drug of choice and alternatives in a particular disease with consideration to its cost, efficacy and safety for individual needs. mass therapy under national health programme.
4) Describe the pharmacokinetic basis, clinical presentation, diagnosis and management of common poisonings.
5) List the drugs of addiction liability and their management.
6) Indicate causations in prescription of drugs in special medical situations such as pregnancy, lactation, infancy and old age.
7) Know the concept of rational drug therapy in clinical pharmacology.
8) State the principles underlying the concept of 'Essential Drugs'
9) Evaluate the ethics and modalities involved in the development and introduction of new drugs.

SKILLS

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

1) Prescribe drugs for common ailments.
2) Recognize adverse reactions and interactions of commonly used drugs.
3) Observe and interpret the data of experiments designed for study of effects of drugs, bioassay
4) Scan information on common pharmaceutical preparations and critically evaluate drug formulations.

INTEGRATION

Practical knowledge of use of drugs in clinical practice will be acquired through integrated teaching with clinical departments and pre clinical departments.

SYLLABUS

THEORY

1. General Pharmacology:

a) Definition and scope of Pharmacology and its different branches, route of administration of drugs, advantages and disadvantages of different routes.

b) General principles of drug action.

c) Basic principles of pharmacokinetics and its relevance to rational therapeutics.

d) Biotransformation of drugs and factors affecting it.

e) Basic mechanisms of drug interactions.

f) Various types of adverse effects that can occur with therapeutic use of drugs. Concept of therapeutic index and margin of safety.

g) Mechanism of drug action; factors modifying drug action and dosage including dose response relationship.

h) Drugs and drug combinations that are banned in India

i) Bio-availability and bio-equivalence of drugs.

j) Clinical Pharmacology: definition, purpose and scope.

k) Molecular mechanisms of drug action

l) Modern drug delivery system and principles underlying them.

2. Autonomic Nervous System

a) General principles of autonomic neurotransmission with reference to cholinergic and adrenergic systems: various types and sub-types of receptors and their agonists and antagonists.

b) Therapeutic indications, common side effects and contraindications of cholinomimetics (including anit-cholinesterases) and cholinergic blocking (antimuscarinic) drugs. Steps in the pharmacotherapy of organphosphorus and atropine poisonings, pharmacotherapy of glaucoma and myasthenia gravis.

c) Therapeutic indications, common side effects and contraindications of alpha 1, alpha 2, Beta 1 and 2 selective and non-selective adrenoreceptor agonist and antagonists.

d) Skeletal muscle relaxants: names, pharmacological actions, side effects. The pharmacology of dantrolene and centrally acting skeletal muscle relaxants like diazepam, carisoprodol and baclofen.

e) Drugs used in Parkinsonism.

f) Molecular and biochemical mechanisms of action of cholinergic drugs, adrenergic drugs and their blockers.

3. Cardio-Vascular System

a) i) Pharmacological actions of cardiac glycosides and the basis of their use in congestive heart failure (CHF) and arrhythmias.

ii) Pharmacokinetics, drug interactions, adverse effects and contra indications of digoxin; treatment of digoxin toxicity.

iii) Approaches to the treatment of CHF and the status of diuretics, digitalis and vasodilators in its management.

b) i) Classification of antihypertensive drugs. Mechanism of action, adverse effects, drug interaction and basis of combining commonly used agents like Beta blockers, diuretics, ACE inhibitors, calcium channel blockers, clonidine.

ii) Management of hypertensive emergencies.

c) Classification of drugs used in angina pectoris, Nitrates : pharmacological actions, mechanisms of beneficial effect in angina, adverse effects and phenomenon of nitrate tolerance.

d) Calcium channel blockers : pharmacological actions, adverse effects & indications

e) Approaches to the treatment of myocardial infarction.

f) Drug treatment of shock and peripheral vascular diseases.

4. Diuretics

a) Classification of diuretics: site of action of diuretics of different classes and pattern of electrolyte excretion under their influence.

b) Short term side effects and long term complications of diuretic therapy.

c) Therapeutic uses of diuretics.

d) Anti diuretics

e) Diabetes insipidus

5. Drugs affecting Blood and Blood Formation

a) Haematinics

i) Mechanisms of iron absorption from gastrointestinal tract and factors modifying it. Bioavailability, adverse affects and indications of oral and parenteral iron preparations. Treatment of iron deficiency anemia. .

ii) Indications of folic acid, Vit B 12, Vit K

b) Classification of anticoagulants. Mechanisms of action of heparin and oral anticoagulants. Drug interactions with oral anticoagulants and treatment of bleeding due to their overdose.

c) Drugs inhibiting platelet aggregations, their indications and precautions in their use.

d) Disadvantages of 'shot gun' anti-anemia preparations.

e) Name & indications of fibrinolytics and antifibrinolytics.

f) Hypolipidemic drugs : mechanisms of action, adverse effects and indications.

g) Plasma Expanders

6. Autocoids and Related Drugs

a) Definitions of autocoids and their difference from hormones.

b) Pharmacological actions of the autocoids and their pathophysiological roles.

c) The subtypes of histamine receptors and the actions mediated through each.

d) Histamine H1 receptor antagonists : classification, pharmacological actions, adverse effects and therapeutic uses.

e) Angiotensin converting enzyme inhibitors: pharmacological actions, pharmaco-kinetics, adverse effects, drug interactions and therapeutic uses.

f) Established and potential therapeutic uses of prostaglandins and their analogues.

g) Eicosanoids and Platelet Activating factor

h) Analgesics, Antipyretics and anit-inflammatory drugs.

i) Drugs used for Rheumatoid arthritis and Gout.

j) Drugs which release histamine in the body and clinical implications of this property.

k) The sub types of 5-HT receptors and drugs, which act by modifying the serotonergic system, therapy of migraine.

l) Antioxidants

7. Respiratory System

a) Drugs used in management of asthma, common side effects and precautions to be taken during their use. Principles governing the selection of drugs of asthma.

b) Classification of antitussives based on their mechanism of actions, pharmacological actions, indications, contraindications and common side effects of antitussives.

c) Expectorants and mucolytic agents: out line their mechanisms of action, indications, common side effects and precautions to be taken during their use. Principles of choosing appropriate combination of cough remedies.

8. Gastro-Intestinal System

a) Drugs for peptic ulcer

   i) Drugs used in the treatment of peptic ulcer and outline the pharmacological basis of the use for each.

   ii) Side effects, contraindications and precautions for the use of the various drugs used in peptic ulcer.

b) Antiemetic drugs and outline their mechanism of action.

c) Drugs used in diarrhoea

i) Symptomatic management of diarrhoea giving the pharmacological basis for the use of each drug/ measure.

ii) Oral rehydration powder

iii) Indications for the use of anti microbials, anti-motility agents and antisecretory drugs.

d) Indications, limitations and hazards of purgatives.

e) Drugs used in therapy of ulcerative colitis outlining the pharmacological basis for their use. Side effects, contraindications and precautions during use of these agents.

9. Endocrine Pharmacology

a) Hormones of thyroid: physiological and pharmacological actions, indications, contraindications and common side effects of thyroid hormones used for replacement and for pharmacotherapy. Anti-thyroid drugs: pharmacological actions, adverse effects.

b) Hormones of the islets of Langerhans : Drugs used for pharmacotherapy of diabetes mellitus, their contraindications, precluding their use and common side effects. Management of iatrogenic hypoglycemia and diabetic ketoacidosis.

c) Sex hormones: synthetic analogues and antagonists, uses in replacement and pharmacotherapy outlining the rationale for such use, contraindications and common side effects.

d) Pharmacological approaches to contraception, side effects, precautions during use & contraindications for the various modalities of drug induced contraception.

e) Uterine stimulants & relaxants: their indications, contraindications and important side effects.

f) Hormones of adrenal cortex and their synthetic analogues : pharmacological actions, therapeutic uses, contraindications, precautions during their use and common side effects. General principles governing the pharmacotherapy of glucocorticoids.

g) Hormones and drugs affecting calcium metabolism, their therapeutic indications, contraindications and common side effects.

h) Importance of drug induced alterations in prolactin levels.

i) Pharmacology of Anterior Pituitary hormones.

10. Central Nervous System

a) Drugs used in epilepsy; selection of appropriate drugs for the various types of epilepsy and adverse effects of the drugs.

b) Sedatives-Hypnotics used currently in clinical practice with indications, contraindications, adverse effects and drug interactions of benzodiazepines and barbiturates.

c) Opioid analgesics: pharmacological actions, indications, contraindications and adverse effects of commonly used analgesics.

d) Aspirin and Aspirin like (NSAID's) drugs, their relative advantages and disadvantages, indications, adverse effects and drug interactions.

e) Agents used in the treatment of acute and chronic gout.

f) Role of disease modifying agents in the treatment of rheumatoid arthritis.

g) Pharmacological effects of ethanol in methanol poisoning.

11. Psychopharmacology

a) Drugs used for psychosis, anxiety, depression and maniac depressive illness.

b) Names of hallucinogens: actions and abuse potential of cannabis indica, cocaine and opioids.

12. Drugs in Anaesthetic Practice

a) General Anesthetics

i) Cardinal features of general anesthesia.

ii) Merits and demerits of commonly used anaesthetic agents.

iii) Properties of thiopentone sodium as an inducing agent and the basis of its short duration of action, other I.V. General Anesthetics

iv) Complications of general anesthesia and drug interactions with general anesthetics.

b) Preanesthetic adjuvants: Names of drugs used in pre-anesthetic medication and the purpose of using each of them.

c) Local Anesthetics:

i) The pharmacological basis of local anaesthetic action and of combination of local anaesthetic agents with adrenaline.

ii) Common adverse effects of local anesthetics.

iii) Indications and the complications of spinal anesthesia.

13. Chemotherapy

a) General principles of chemotherapy, indications for prophylactic and combined use of chemotherapeutic agents. Chemotherapeutic agents in the order of their choice for various infections and infestations, common side effects, contra indications and precautions.

b) Antiseptics and disinfectants and their uses based on their Pharmacological properties.

c) Anticancer drugs: mechanisms of action, use, common side effects, contraindication and precautions during use of various anticancer drugs.

d) Chemotherapy of drugs used in tuberculosis, leprosy, malaria, filaria, amoebiasis, kala-azar, enteric fever, worm infestation.

e) Anti fungal agents: Systemic & Topical.

f) Chemotherapy of viral infections including possible approaches to treatment of viral infections like AIDS.

g) Methods to circumvent toxic / side effects of chemotherapeutic agents wherever possible.

14. Miscellaneous

a) Immunomodulators, gene therapy

b) Vitamins

c) Vaccines and sera

d) Drugs acting on skin and mucous membrane

e) Ectoparasiticides

15. Toxicology

a) General principles of treatment of poisoning.

b) Heavy metal toxicity and heavy metal antagonists.

c) Management of over dosage with commonly used therapeutic agents.

16. Clinical Pharmacology and Rational Drug use

a) Principles of prescription writing.

b) Prescriptions of common disorders.

c) Essential drug concept

d) Drugs in children and pregnancy (perinatal pharmacology)

e) Drugs in geriatrics

f) Drug-drug interactions (with specific examples)

g) Drug resistance

h) ADR monitoring and reporting.

i) Therapeutic drug monitoring

j) Clinical use of drugs in hepatic and renal failure.

17. Bio-medical waste: Types, potential risks and their safe management.

SKILLS

1. Plan and institute a line of treatment which is need based, cost effective and appropriate for common ailments taking into consideration
   a) Patient
   b) Disease
   c) Socioeconomic status
   d) Institutional / governmental guideline
2. Identify irrational prescriptions and explain their irrationality.
3. Persuade patients to stick to therapeutic recommendations especially with reference to dosage and duration of therapy and monitor compliance.
4. Warn patients about important side effects of drugs without alarming them.
5. Recognise drug induced untoward effects and take appropriate steps to all of them.

Common areas for integrated teaching of pharmacology

Sl.No.	Area	Collaborating Department
1	Drugs in anesthetic practice	Anesthesiology
2	Drug therapy of psychiatric disorders	Psychiatry
3	Principles of rational use of drugs	Medicine, Pediatrics, Surgery, OBG
4	The concept of essential drugs	Preventive & Social Medicine
5	Therapy of hypertension including Diuretics	Medicine and Physiology
6	Therapy of diabetes	Medicine and Physiology
7	Therapy of peptic ulcer	Medicine, Physiology & Surgery
8	Therapy of CCF	Medicine
9	Therapy of Asthma	Medicine
10	Therapy of Malaria	Medicine and Microbiology
11	Therapy of tuberculosis	Medicine and Microbiology
12	Therapy of Leprosy	Medicine and Microbiology

TEACHING HOURS

Theory: 120 - 130 hours

Theoretical coverage of various aspects of pharmacology could be covered in lectures tutorials, group discussions, seminars, etc., suitably spread over the three terms course for 1½ years. Stress is given for the basic principles and pharmacotherapeutic basis for clinical use of drugs. The term wise distribution of topics is a suggestion, the teaching can be adjusted to the local feasibility.

UNIT I (3rd Term)

a General Pharmacology: History, Definitions and Routes of administration of drugs. Basic principles and clinical application of pharmacokinetics and Pharmco dynamics. Rational approach to therapy: Concepts of essential drugs and rational drug prescribing and adverse drug reactions, cost benefits, therapeutic drug monitoring. Drug monitoring, Drug toxicity, Drug interactions, principles of assay of drugs: Bioassay, radio immunoassay etc., Principles of drug development and clinical evaluation of drugs.

b Pharmacology of ANS including parkinsonism

c Pharmacology of CVS including pharmacotherapy of shock & Hypolipidemic agents

d Drugs acting on blood and blood forming organs.

UNIT II (4th Term)

a Pharmacology of CNS including psychopharmacology and drug dependence.

b Pharmacology of local anaesthetics

c Diuretics and anti-diuretics

d Endocrine glands : Hormones of pituitary. Thyroid and antithyroid agents, adrenal corticoids, pancreatic hormones and antidiabetic agents, sex hormones including contraceptives. Drugs influencing calcium metabolism.

e Biogenic amines and polypeptides.

UNIT III (5th Term)

a Chemotherapy: Sulfonamides and Synthetic drugs, Antibiotics, Chemotherapy of bacterial, parasitic, fungal, viral infections, Chemotherapy of malignancy. Drug therapy of scabies, pediculosis and other skin infections.

b Antiseptics and disinfectants

c Pharmacology of Respiratory system

d Pharmacology of Gastrointestinal system

e Drugs acting on uterus

f Miscellaneous: a) Chelating agents b) Vitamins c) Immuno-suppressants and Immunostimulants d) Drugs used in gout and rheumatoid arthritis e) Therapeutic gases and enzymes.

g Concept of essential drugs and rational use of drugs.

h WHO guide to Good prescribing.

PRACTICALS

The practical training is made need based. It is relevant to the future function of a basic doctor as well as make the student to understand some of the theoretical knowledge

imparted to them through lectures. Animal experiments are demonstrated through simulators and experimentative and data analysis is executed by the students through computer simulators.

UNIT I

PRACTICAL PHARMACY

Mixtures, percentage solutions, ointments, paints, paste, powders, liniments etc. Atleast one exercise on each of these types of preparations is taught to the students. Exercises done in these are to be asked as practical exercise at the qualifying examination.

1. The students should be trained to identify, handle and explain the use of various dosage forms to the patient.
2. Students should be trained to interpret the label of commercial preparations.
3. Dosage forms : I, II and III
4. Calculating dosage and percentage of solutions
5. Counselling for different dosage forms

UNIT II

EXPERIMENTAL PHARMACOLOGY

Experiments designed to elucidate and demonstrate some basic principles like mechanism of drug action, drug antagonism, drug interaction etc., are demonstrated through animal experiment simulator software.

Some of the exercises listed below may be suitably utilized or modified for the above purpose:

1. Frog heart preparation to show effect of autonomic drugs on ions.
2. Frog rectus preparation to show neuromuscular drugs action
3. Mammalian smooth muscle (rabbit, guinea pig, rat etc) to show drug effects and drug antagonism
4. Mydriatic and miotic effects on rabbit pupil.
5. Drug action on ciliary movement of frog oesophagus.
6. Demonstration of animal experiment using computer aided demonstrations is included as part of experimental pharmacology. Experiments on whole animals is included in place of isolated tissue wherever feasible.

   Eg : Effect of drugs on rabbit eye.
   Sleeping time in mice
   Effects of drugs on spontaneous motor activity & exploratory behavior
   Skeletal muscle relaxants
   Effects of analgesics.

UNIT III

1. Clinical pharmacology:
   a. Clinical problem solving exercise oriented toward drug interaction, rational drug therapy etc.,

b. Prescription writing for common clinical conditions
c. Criticise, correct and rewrite the given prescriptions (Therapeutics and drug interactions oriented).
d. Analysis of rationality of fixed dose combinations
e. Critical evaluation of promotional drug literature
f. Getting conversant with source of drug information
g. Cost comparison of branded preparations.
h. Drug stations which includes various drugs used in the therapy of different diseased conditions.

SCHEME OF EXAMINATION

Internal Assessment

Theory: 60 Marks

Minimum of three examinations shall be conducted. Average of best two of three is taken into consideration. The total marks will be reduced to 60 marks and sent to the University.

Practicals: 20 Marks

* Minimum three practical examinations shall be conducted. Average of best two of three is taken into consideration. Maximum marks for each theory internal assessment shall be 60 marks and 20% of IA marks shall include MCQs

UNIVERSITY EXAMINATION

A. THEORY : 200 Marks

There shall be two theory papers of 100 marks each. Each question paper will be of 3 hours.

Type of questions	Number of questions	N
Essay type questions	02	
Short Essay type questions	10	
Short answer questions	10	

Distribution of chapters/ topics for Paper I and II with weightage of marks for University Examination is given below*:

Paper I :	**100 marks**
1. General Pharmacology including clinical pharmacology	15 marks
2. Central Nervous System & Local Anasthetics	25 marks
3. Autonomic Nervous System including Parkinsonism Skeletal Muscle Relaxants	25 marks
4. Cardio Vascular System	20 marks
5. Blood and Pharmacotherapy of shock	
6. Diuretics and Antidiuretics	15 marks

Paper II **100 marks**

1. Chemotherapy 40 marks
2. Endocrines (Hormones) 20 marks
3. Gastro Intestinal System 10 marks
4. Autocoids 10 marks
5. Respiratory System 10 marks
6. Chelating agents
7. Immunosuppressants
8. Drugs used in gout & Rheumatoid Arthritis
9. Vitamins 10 marks
10. Enzymes in Therapy
11. Drugs acting on Uterus
12. Antiseptic and Disinfectants

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

B. PRACTICAL : **80 Marks**

Distribution of Marks for Practical Examination

PRACTICAL : I **Two Hours**	**40 Marks**
Spotters	10 marks
Prescriptions (2)	10 marks
Practical Pharmacy Exercise	
(i) Viva on dosage forms and commercial labels	10 marks
(ii) Preparations of dilutions	10 marks
PRACTICAL : II Two Hours	40 Marks
*Experimental Pharmacology	
In place of animal experiments the following is done;	
(i) Discussion of fixed dose combination	10 marks
(ii) Discussion of commercial preparation	10 marks
* Experimental Pharmacology Graph Discussion	10 marks
* Clinical problem discussion	10 marks

C. VIVA-VOCE EXAMINATION: **40 Marks**

All the four examiners will examine all the candidates

Distribution of Marks for Viva voce Examination

1. General Pharmacology, CNS, local anesthetics, Biogenic amines and Polypeptides, Gout and Rheumatoid arthritis. 10 marks

2.	ANS, Parkinsonism, CVS, Blood and Blood forming organs, Hypolipidemic agents, Diuretics	10marks
3.	Endocrines, GIT, Uterus, Respiratory System	10 marks
4.	Chemotherapy, Antiseptics and Disinfectants, Chelating Agents, Vitamins, Immunopharmacology	10 marks

Recommended Books, Recent Editions.

1. R.S.Satoskar, S.D.Bhandarkar, S.S.Ainapure, Pharmacology &Pharmacotherapeutics, Single Volume, M/s. Popular Prakashan, 350, Madan Mohan Marg, Tardeo, Bombay.
2. K.D. Tripathi, Essentials of Medical Pharmacology, M/s. Jaypee Brothers, Post Box, 7193, G-16, EMCA House, 23/23, Bansari Road, Daryaganj, New Delhi.
3. Laurence and Bennet, Clinical Pharmacology, ELBS Edition,
4. Katzung, Basic and Clinical Pharmacology, Lange Medical Books, McGrawHill Medical Publishing Division
5. S.D. Seth Textbook of Pharmacology, B.I. Churchil Livingstone.

Reference Books, Recent Editions

Goodman & Gillman, The Pharmacological basis of Therapeutics, (International Edition) Toel G., Hardman Lee E. Limbird.

1. R.D. Budhiraja, Manual of Practical Pharmacy, M/s. Popular Prakashana, Bomboy 34, Pages: 101
2. S.K. Kulkarni, Practical Pharmacology
3. B.P.Jaju, Pharmacology Practical Exercise Book, Jayapee Brothers, P.B. No. 719 G-16 EMCA house, 23/23, B. Ansari Road, Daryaganj, New Delhi.
4. Ravinder Rao, Hand Book of Practical Pharmacology.

FORENSIC MEDICINE

PRINCIPLES

* Reduce information overload - stop students from learning unnecessary detail.
* Define contents which have relevance even in the future with a focus for the next decade.
* Improve on traditional teaching methods - replace traditional "didactic" teaching with problem-based learning.
* Give students control over their own learning - let students determine what they need to know (and what they wish to be examined in)
* Make undergraduate training a platform for lifelong learning - becoming a Medical Practitioner is only the first stage of continuing medical education of a lifelong career.
* Improve Medical Practitioners interpersonal communication skills-train students to be empathic and relate better to the patients and their relatives, and their problems.

LEARNING OBJECTIVES

At the end of the course in, Undergraduate Medico Legal curriculum (Forensic Medicine & Toxicology), the learner shall be able to:-

1. Identify, examine and prepare report or certificate in medico-legal cases/situations in accordance with the law of land with particular emphasis to
    a) maintenance of medico-legal register like accident register,
    b) issuance of wound certificate,
    c) issuance of drunkenness certificate,
    d) issuance of death certificate
    e) issuance of sickness and fitness certificate
    f) estimation of age by physical, dental and radiological examination and issuance of certificate
    g) Examination of victims and accused and issuance of certificates in sex related offences.
2. Perform medico-legal post-mortem examination and reasonably interpret autopsy findings and results of other relevant investigations to logically conclude the cause, manner and time since death-especially in accidents, hanging, burns, drowning and poisoning.
3. Preserve and dispatch specimens and other concerned materials in medico-legal/ post-mortem cases to the appropriate Government agencies for necessary examination and report.
4. Understand and observe medical ethics, etiquette, duties, rights, medical negligence,

medico-social and legal responsibilities of the physicians towards patients, profession, State and society at large.

5. Be aware of relevant legal / court procedures applicable to the medico-legal/medical practice.
6. Deal with basic aspects of diagnosis and management of poisoning (acute & chronic), and develop competence to deal with medico social and medico legal issues arising there from.
7. Recognize and deal with the general principles of environmental, occupational, and preventive aspects of toxicology.
8. Manage medico legal and medico social issues related to Mass disaster including bioterrorism.

In other words the focus is on:

(a) KNOWLEDGE

1. Identify Medico Legal cases
2. Define responsibilities of physician both medico legal and socio-medical
3. Appreciate physician's responsibilities in criminal matters
4. Describe principles of analytical toxicology
5. Diagnose, manage & document acute/chronic poisonings

(b) SKILLS

1. Perform, make observations in post mortems/make logical inferences,
2. Prepare proper certificates related to Death, Age, wounds, Fitness and Sickness
3. Describe and testify as an expert witness in the Court of Law
4. Problem based learning

(c) INTEGRATION

1. To provide integrated approach with other allied disciplines of medicine like pathology, radiology, hospital administration, emergency medicine, dentistry, microbiology, medicine, pharmacology and psychiatry.
2. To impart training regarding medico legal responsibilities of physicians at all levels of health care.

COURSE CURRICULUM

Unit I (3rd Term) - 20 hours

Themes and Topics

1. Legal procedures
2. Inquest
3. Identification

4. Death and its medico legal aspects
5. Post mortem changes
6. Medico legal autopsy
7. General Toxicology

Unit II (4th Term) - 35 hours

Themes and Topics

1. Medical law and ethics
2. Chemical Toxicology
3. Pharmaceutical Toxicology
4. Mechanical injuries and wounds
5. Regional injuries
6. Transportation injuries
7. Injuries/Death from Heat, Cold, Electricity, Lightning, Injuries due to Firearms, Explosives & Radioactive substances

8. Medico legal management of mass disaster including bio-terrorism

9. Mechanical asphyxia

Unit III (5th Term) - 30 hours

Themes and Topics

1. Virginity, pregnancy and delivery
2. Sexual offences
3. Abortion
4. Infant and childhood deaths
5. Laboratory investigation in medico legal practice & trace evidence
6. Emerging technologies in Forensic Medicine
7. Forensic Psychiatry
8. Bio Toxicology
9. Socio-medical Toxicology

UNIT I (Total 20 hours)

Topic	Time in hours
1. Legal Procedures	
* Define Courts in India and their powers: - Supreme Court, High Court, Sessions Court, Magistrate's Court, Labour Court, Family Court, Executive Magistrate Court, Labour Court, Juvenile Court * Describe Court procedures - Summons, conduct money, oath, affirmation, types of witnesses, recording of evidence, conduct of Medical Practitioner/Medical Officer in witness box * Outline Offences in Court: - Perjury: Court strictures vis-à-vis Medical Officer	2
2. Medical certification	
* Demonstrate Medical certification and medico-legal reports * Explain importance of documentation in Medical practice - maintenance of patient case records, discharge summary, prescribed registers to be maintained in health centres - maintenance of medico-legal register like accident register, - issuance of wound certificate, - issuance of drunkenness certificate - issuance of sickness and fitness certificate - Procedure for issuance of death certificate - Medical Certification of Cause of Death - Form No.4 and 4A - Estimation of age by physical, dental and radiological examination and issuance of certificate Dying Declaration	2
3. Inquest	
* Inquest by Police * Inquest by Magistrate	1
4. Identification	
* Define 'Identification' and enlist the medico-legal aspects related to age * Outline the principles involved in the methods of **identification** of a unknown living person, dead bodies and remains of a person by age, sex, stature, scars, moles, tattoos, dactylography, foot prints, hairs, poroscopy,	

DNA typing and personal beloIdentificationnging including photographs and Superimposition techniques, dental examination including Forensic odontology. * Outline the procedure and medico-legal formalities of exhumation * Develop skills in examination of mutilated human remains and skeletal remains.	4
5. Death and its medico legal aspects	
* Define death and its types somatic, cellular and brain-death. * Enlist Natural and unnatural deaths; Brainstem reflexes * Explain issues related to Sudden natural deaths; anaesthetic & Operative deaths * Outline the salient features of the Organ transplantation and The Human Organ Transplant Act 1994. Discuss the ethical issues * Describe and exemplify the conditions of suspended animation.	3
6. Post mortem changes	
* Describe Cooling of body, lividity, rigor mortis cadaveric spasm cold stiffening and heat stiffening * Describe Putrefaction, mummification, adipocere and maceration, Forensic entomology * Estimate time of death.	4
7. General Toxicology	
* Describe the general principles of diagnosis and management of * Common poisons encountered in India, General symptoms of poisoning, simple bedside tests to detect poison/drug in a patient's body fluids, Basic Methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination, etc., * Explain the medico-legal considerations in case of suspected poisoning - Procedure of intimation of suspicious cases or actual cases of foul play to the police, maintenance of records, preservation and dispatch of relevant samples for laboratory analysis. * Outline the general principles of Analytical Toxicology & give a - Brief description of analytical method available for toxicological analysis: Charomatography - thin layer chromatography, Gas chromatography, Liquid chromatography and Atomic Absorption Spectoroscopy.	4

UNIT II (Total 35 hours)

Topic	Time in hours
1. Medico legal autopsy	
* Define medico-legal and clinical/pathological autopsies * Describe the objectives, procedures and formalities of medico-legal autopsies including National Human Rights Commission Protocol Negative & Obscure autopsy	2
2.	
a. Medical law and ethics	
* Definition of Forensic Medicine and Medical Jurisprudence. * Explain Medical NeglMedical law and ethicsigence; civil and criminal negligence, contributory negligence, vicarious liability, res ipsa loquitor, prevention of medical negligence and defences in medical negligence litigations. * Explain Indian Medical Council (MCI) and State Medical Councils (SMC); Provisions in the Medical Council of India Act 1956; Registration of a medical practitioner - procedure: Functions and disciplinary control of MCI and SMC. * Describe the Consumer Protection Act, 1986; Medical Indemnity Insurance; Civil litigations and Compensations * Describe the legal and ethical aspects of - Euthanasia - HIV and Law - Stem Cell research and cloning	3
b. Social aspects and stress management in dealing medico-legal cases	
* Outline the social aspects of Medico-legal cases with respect to victims of rape, attempt suicide, homicide, domestic violence, dowry related cases * Outline the Challenges in Managing medico legal cases - Develop skills in Relationship management - Human behaviour, communication skills, conflict resolution techniques - Outline the principles of handling Pressure - definition, types, causes, sources and skills for managing the pressure while dealing medico-legal cases by the Medical practitioner/Medical Officer	1

c. Bioethics	
* Define Medical Ethics and enlist its Historical Emergence * Explain Ethical Principles: Respect for autonomy, non-malfeasance, beneficence, justice * Explain Oath - Hippocrates, Charaka and Sushruta; Modified declaration of Geneva and its relevance; Procedure for administration of Oath - Code of Medical Ethics 2002; * Describe codes of conduct, Professional conduct, Etiquette and Ethics in medical practice * Enumerate rights and privileges and explain duties of a registered medical practitioner, disciplinary proceedings and penal erasure. * Explain Medical Practitioner/Medical Officer - patient relationship * Professional secrecy, privileged communication. * Rights of a Patient * Explain the legal issues of informed consent: - Types of consent and ingredients of informed consent - Age in relation to consent - In relation to mental illness and alcohol intoxication - Emergency and consent. * Ethical dilemmas in medical profession in relation to consent, treatment and death	1
d. Clinical research & Ethics	1
* Human experimentation including clinical trials * Ethical committees * Ethical Guidelines for Biomedical Research on Human Subjects & Animals	
3. Mechanical injuries and wounds	4
* Define, classify and differentiate - Abrasion, contusion and laceration * Differentiate simple from grievous injuries * Describe stab wound, incised wound, defence cut, hesitation cuts, self inflicted injuries and fabricated wounds * Differentiate between accidental, suicidal and homicidal injuries. * Identification of the weapon Mechanical injuries and woundsby interpretation of the wound	

* Explain the causes of death in mechanical injuries * Determine the age of injury * Explain the medico legal aspects of wounds * Torture and Human Rights - Define Torture - Identify injuries caused by torture and its sequalae - Management of torture survivors - Outline the National Human Rights Commission guidelines and protocols.	
4. Regional injuries	3
* Injuries of Head, Neck, thorax, Abdomen, Pelvis, Genitalia, Vertebral column and Bones. - Enumerate types of skull fracture - Explain coup and counter coup injuries, intra-cranial haemorrhage and injury to brain - Outline the injuries to: spine and spinal cord, thoracic, abdominal and pelvic viscera, bones and joints and their medico legal importance	
5. Transportation injuries	2
* Road, Rail & Aviation - State the importance of primary and secondary impact, crush syndrome, Outline the medico legal importance of investigation in road, railway accident and aircraft accident.	
6. Explain injuries or death due to Heat, Cold, Electricity, Lightening, Explosives & Radioactive substances	1
7. Explain the medico legal management of mass disasters including Bioterrorism	4
8. Mechanical asphyxia	
* Define, state causes, enumerate types and describe post-mortem appearances and medico-legal significance of hanging, strangulation, suffocation, traumatic asphyxia and drowning.	3
9. Systemic Toxicology * Describe the clinical features, fatal dose, fatal period, management, post mortem appearance and medico legal aspects of poisoning by: i) Caustics - Inorganic - Sulphuric, nitric, & hydrochloric acids - Organic - Carbolic acid (phenol), oxalic, and acetylsalicylic acids	3

ii) Inorganic Elements- Phosphorus, Iodine, Barium iii) Heavy Metals Arsenic, lead, mercury, copper, iron, cadmium, thallium iv) Alcohols, Ethanol, methanol, ethylene glycol v) Hydrocarbons and Pesticides - Kerosene, petrol, benzene, methane, turpentine - Organophosphates, carbonates, organochlorines, pyrethroids, paraquat, aluminium and zinc phosphide vi) Toxic Gases - Ammonia, carbon monoxide, hydrogen cyanide & derivatives, methyl isocyanate, tear (riot control) gases and War gases	
10. Pharmaceutical Toxicology	
* Describe the clinical features, fatal dose, fatal period, management, post mortem appearance and medico legal aspects of poisoning by: i) Antipyretics - Paracetamol, salicylates ii) Anti - Infectives - Common antibiotics - an overview iii) Neuropsychotoxicology - Barbiturates, benzodiazepines, phenytoin, lithium, haloperidol, neuroleptics, tricyclics iv) Narcotic Analgesics, Anesthetics, and Muscle Relaxants v) Cardiovascular Toxicology - Cardiotoxic plants - oleander, odollam,. Aconite, digitalis vi) Gastro-Intestinal and Endocrinal Drugs - Insulin	**3**
11. Forensic ballistics	**4**
UNIT III (Total 30 hours)	**4**
1. Virginity, pregnancy and delivery	
* Describe Sexual and Reproductive Rights of Women in India * Describe medico legal aspects of virginity, pregnancy and delivery * Explain legitimacy and medico legal aspects of pregnancy and delivery including IN Vitro fertilization and Surrogacy	**4**

* Outline Law on Reproductive Medicine - Impotency - Infertility - Male and Female - Assisted pregnancies and legal problems, surrogate motherhood, hormone replacement therapy and postmenopausal pregnancies. * Explain Protection of women from Domestic Violence and Domestic Violence Act 2005 * Describe Pre Conception and Pre Natal Diagnostic Techniques (PCPNDT) (Prohibition of Sex Selection) Act-2003.	
2. Sexual offences	
* Describe the medico legal aspects of Sexual offences and outline sexual paraphilias * Explain the objectives and procedure for examination of victim and accused in case of sexual offence.	**4**
3. Abortion	
* Define and classify abortion. * Describe Medical Termination of Pregnancy Act, 1971 with amendment * Enumerate complications of criminal abortion * Outline investigative procedure in deaths due to criminal abortion	**2**
4. Infant and childhood deaths	
* Define still born, dead born and live born child * Describe the signs of still born, dead born and live born child * Describe the estimation of age of foetus * Describe sudden infant death syndrome * Explain Child sexual abuse and its medico legal implications	**2**
5. Laboratory investigation in medico legal practice:	
* Different types of specimen and tissues to be collected both in the living and dead. - Body fluids- blood, urine, semen, vaginal smear, saliva, viscera, skull, specimen for DNA, specimen for histopathological examination, blood grouping and DNA finger printing in disputed paternity & maternity * Methods of sample collection, preservation, labeling, dispatch, and interpretation of reports. * Trace evidence	**3**

6. Emerging technologies in Forensic Medicine	
* Outline the principle and medico legal importance of: - DNA profiling - Polygraph (Lie Detector) - Narco analysis, - Brain Mapping, - Digital autopsy, - Virtual Autopsy, - Imaging technologies	**2**
7. Forensic Psychiatry	
* Classify common mental illnesses including post traumatic stress disorder (PTSD) * Define, classify and exemplify - Delusions, hallucinations, illusion, lucid interval and obsessions. * Describe the civil and criminal responsibilities of a mentally ill person * Differentiate true insanity from feigned insanity. Who can certify 'Insanity' * Comment on delirium tremens. * Explain testamentary capacity and restraint of an insane. * Outline the Indian Mental Health Act, 1987 with special reference to admission, care and discharge of a mental ill person.	**5**
8. Bio Toxicology	
* Describe the clinical features, fatal dose, fatal period, management, post mortem appearance and medico legal aspects of poisoning by: - Poisonous Plants Castor, croton, calotropis, abrus, datura, strychnos - Food Poisoning & Food Adulterants Bacterial, Viral, Chemical food poisoning, toxic mushrooms and fish, Argemone - Venomous Bites and Stings nakebite, scorpion sting, bee & wasp sting, spider bite.	**2**
9. Socio-medical Toxicology	
* Describe the clinical features, fatal dose, fatal period, management, post mortem appearance and medico legal aspects of poisoning by: - Substances of Dependence and Abuse Tobacco, cannabis, amphetamines, cocaine, hallucinogens, designer drugs & solvent abuse * Enlist salient features of NDPS Act.	**2**
Total Hours	**30**

PRACTICALS

1. AUTOPSY POSTINGS FOR 2 WEEKS DURATION IN 4TH TERM

Observing of ten medico-legal autopsies and enter the reports in practical record is mandatory

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

a) Perform medico-legal post-mortem examination and reasonably interpret autopsy findings and results of other relevant investigations to logically conclude the cause, manner and time since death-especially in accidents, hanging, burns, drowning and poisoning.

b) Preserve and dispatch specimens and other concerned materials in medico-legal/ post-mortem cases to the appropriate Government agencies for necessary examination and report.

PRACTICAL TIME TABLE FOR 5th TERM

Each practical class will be of two hours duration

Total Practical Hours - 36 hours

	Topics
	Introduction to Practicals
	Sex Determination by Skull, Mandible & Humerus
	Sex Determination by Pelvis & Femur
	Revision
	Age Determination by Skull, Mandible & Humerus
	Age Determination by Pelvis & Femur
	Revision
	Skeletal Remains
	Revision
	Age Estimation by Radiological Examination of Elbow, Wrist & Shoulder
	Revision
	Age Estimation by Radiological Examination of Pelvis, Knee & Ankle joint
	Revision
	Age Estimation by subject examination
	Revision
	Revision
	Revision
	Revision

SKILLS TO HANDLE MEDICO LEGAL ISSUES

Skills	Able to perform independently	Able to perform under guidance	Assist	Observe
1. Prepare proper certificates of birth and death	+			
2. Prepare dying declarations	+			
3. Give evidence in a court of law as an expert witness	+			
4. Collect and do proper labeling preservation and dispatch of medico-legal specimens	+			
5. Diagnose and manage common acute and chronic poisonings	+			
6. Perform the medico-legal duties in case of poisoning and log 5 cases in the record book	+			
7. Observing of ten medico-legal autopsies* and enter the reports in practical record				+
8. Age estimation from bones, x-rays and dentition		+		
9. Examination of injuries, weapons and report writing, Draft informed consent form	+			
10. Examination of an alcohol intoxication person & report writing	+			
11 Examination of victim & accused in sexual offences and report writing	+			
12. Study of specimens of poisons		+		
13. Perform simple bedside tests in poisoning	+			
14. Study of wet specimens during autopsy	+			

Course Regulations

Course duration

A total teaching time of 120 hours may be allotted for transacting the Medico Legal Curriculum (Forensic Medicine & Toxicology).

Course Schedule

The Principle of integration is the basis for scheduling the course contents. The topics and the timing of Medico Legal Curriculum (Forensic Medicine & Toxicology) teaching should integrate with the knowledge the students have with respect of Anatomy, Physiology, Pathology General Medicine, General Surgery and Obstetrics and Gynaecology.

Methods of instruction:

1. This course is operated on a lecture, discussion, practical including demonstration and student participation format.

2. Students may be required to present selected materials to the class.
3. Structured problem based exercises may be provided to simulate specific case examples.
4. Audio visual material and/or printed handouts will supplement reading and class-room instruction.
5. Exposure visit to:

Mandatory:

a. Court -
   i. Criminal (expert testimony of homicides)
   ii. Consumer (medical negligence cases)
   b. Casualty department

Desirable:

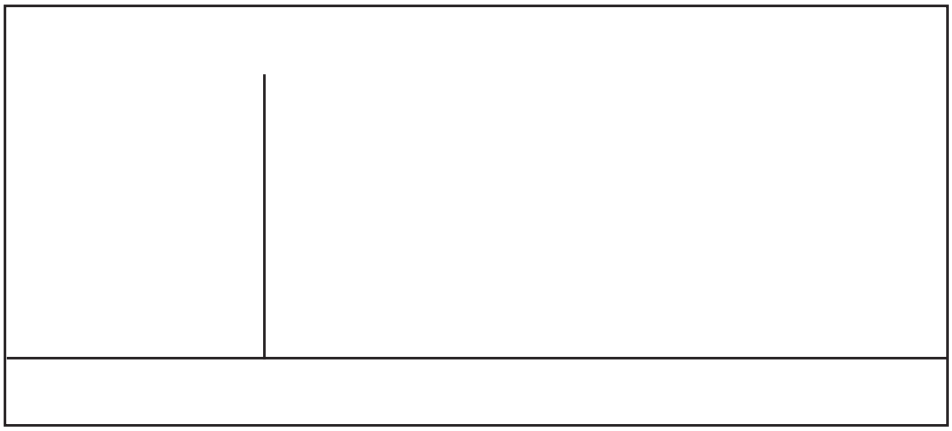
a. Forensic Science laboratory - toxicology and ballistics
b. Crime Scene
c. Exhumation
d. Prison

Methods of learning:

a) Read and study assigned and/or recommended readings.
b) Participate in class discussion.
c) Participate in group interaction and ask questions of lectures.
d) Seminars by students
e) Complete required assignments.
f) Practicals - hands on laboratory work
   * Fingerprinting
   * Clinical Forensic Medicine cases
   * Moot courts
   * Documentation: Clinical examination of patients/victims
   * Visit to Crime scenes: Inquest by police, Magistrate,
   * Collect, Pack, Label, Transport evidences
   * Visit to Casualty: Poisoning cases (Emergency Management) Documentation of 5 poisoning cases
   * Visit to Casualty/Inpatient wards

UNIVERSITY EXAMINATION:

1.Pattern of theory question paper



Sl. No.	Topic	Approximate Weightage of Marks
1	Introduction of Forensic Medicine & Toxicology Legal procedure	05
2	Identification , DNA Finger printing	10
3	Thanatology M.L. Autopsy (Theoretical aspect)	10
4	Mechanical injuries. Medico Legal aspects of wounds Thermal deaths	15
5	Starvation death Regional injuries Sexual Jurisprudence	05
6	Forensic Ballistics	05
7	Forensic Psychiatry	05
8	Asphyxial deaths	05
9	Medical Law and Ethics	10
10	General consideration of poisons	05
11	**Systematic toxicology** Agricultural poisons Corrosives Irritants Metallic poisons Vegetable & animal poisons Medical Law & Ethics Sexual Jurisprudence Forensic Ballistics Forensic Psychiatry (Mental Health Act-1987) Euthanasia Torture Medicine	20

Theory Paper - I

Type of Questions	Number of Questions	Marks for each Question	
Long Essay	2	10	
Short Essay	10	5	
Short Answer	10	3	
			Total Marks

LEARNING RESOURCE MATERIALS

Suggested textbooks for Forensic Medicine and Toxicology

1. Principles of Forensic Medicine, Apurba Nandy, New Central Book Agency (P) Ltd., Recent Editions.
2. Parikh's Text book of Medical Jurisprudence, Forensic Medicine and Toxicology for Class room and Court room, CK Parekh, CBS Publishers and Distributors, Recent Editions.
3. Textbook of Forensic Medicine & Toxicology - Kishan Vij, Elsevier Publication, New Delhi
4. The Essentials of Forensic Medicine & Toxicology, K.S.Narayana Reddy, K Suganadevi, Malakpet, Hyderabad, Recent Editions.
5. Text book of Forensic Medicine and Toxicology, V.V.Pillay, Paras Medical Publishing, Hyderabad, Recent Editions.
6. Fundamentals of Forensic Medicine and Toxicology, R.Basu, Publishers-Books and Allied (P) Ltd., Kolkota
7. Text book of Forensic Medicine, Toxicology and medical Jurisprudence, Dr.B.V.Subrahmanyam, Modern Publishers, Gulba Bhawan, 6 Bahadur Shah Zafar Marg, New Delhi - 110 002.

Reference Books Recent Editions.

1. Text Book of Forensic Medicine, J.B.Mukherjee Vol 1 & 2
2. Cox's Medical Jurisprudence & Toxicology, Bernard Knight et al
3. Modi's Medical Jurisprudence and Toxicology, K.Mathiharan and A.K.Patnaik, Easten Book Company, Lucknow
4. Knight's Forensic Pathology, Pekka Saukko and Bernard Knight Arnold Publication London, Co-published by Oxford Publications, USA
5. Taylor's Principles & Practice of Medical Jurisprudence, A. Keith Mant, Churchill Livingstone
6. Indian Medical Council (Professional Conduct, Etiquette and Ethics) Regulations
7. Lyorn's Medical Jurisprudence and Toxicology, Dr. Dogra, T et al.
8. Comprehensive Medical Toxicology, VV Pillay. Paras Medical Publisher, Hyderabad

COMMUNITY MEDICINE

GOALS

Faculty of Department of Community Medicine will strive towards preparing medical students to function as Community and Primary Health Care Physicians. This concerted effort would ensure students at the end of the course to :

1. Know physical, social, psychological, economic and environmental aspect of health and diseases.
2. Apply the clinical skills to recognise and manage common health problems including their physical, emotional and social aspects at the individual, family and community levels and deal with public health emergencies.
3. Define and manage the health problems of community he/she serves.

OBJECTIVES

To attain the above mentioned goals, students are guided in the following situations:

1. To organize elementary epidemiological studies to assess the health problems in the area. (Includes designing a study, collecting data, applying statistical tests, make a report for further action).
2. Prioritise the most important health problems and help formulate a plan of action to manage them under National Health Programme guidelines including population control and Family Welfare Programme.
3. Demonstrate knowledge of principles of organizing prevention and control of Communicable and Non-Communicable Diseases.
4. Organize health care services for special groups like mothers, infants, under-five children, school children, handicapped, adolescents, geriatrics in rural, tribal and urban slum dwellers.
5. Organize health care services in case of calamities.
6. Inculcate values like compassion, empathy to poor, rationale and ethical practice, honesty sincerity and integrity to ensure quality professional practice.
7. Able to work as an effective leader of health team with in the primary health care set-up.
8. Able to co-ordinate with and supervise other members of the health team.
9. Able to plan and implement health education programmes.
10. Able to perform administrative functions of health centres.
11. Able to promote community participation especially in areas of disease control, health education and implementation of National Programmes.
12. Aware of national priorities and the goals to be achieved to implement primary health care including Health for all, Millennium Development Goals.

COURSE CONTENT

THEORY **245 hours**

1. Evolution of Public Health and Concepts of Health -5 hours

a) Evolution of Public Health

b) Definition of Health, changing concept of health, dimensions of health, concept of well-being, determinants of health.

c) Characteristics of agent, host and environmental factors in health and disease and the multifactorial aetiology of disease.

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

e) Indicators of health.

2. Basic Epidemiology - 12 Hours

a) Epidemiology: Definition, approach, measures in epidemiology, tools of measurement-(Rate,Ratio,Proportion)

b) Concepts of epidemiology and its role in health and disease

c) Rate Standardization techniques - direct and indirect

d) Use of basic epidemiological tools to make a community diagnosis of the health situation in order to formulate appropriate intervention measures

e) Measurement of morbidity : Incidence and Prevalence

f) Epidemiological methods- to understand the steps, analysis, advantages, disadvantages and uses of descriptive epidemiology, Case Control study, Cohort study, Randomized Control trial, Interventional studies

g) Concept of association and causation of disease

h) Definition of the terms used in describing disease transmission and control

i) Modes of transmission and measures for prevention and control of communicable and non-communicable diseases

j) Cold chain, immunizing agents, National Immunisation Schedule, Adverse Effects Following Immunisation, Chemoprophylaxis

k) Definition,calculation and interpretation of the measures of frequency of diseases and mortality

l) Health advice to travellers

3. Screening - 3 Hours

a) Concept of screening, need and uses of screening tests.

b) Accuracy and clinical value of diagnostic and screening test(sensitivity, specificity, predictive values)

c) Evaluation of a screening test

4. Epidemiology of specific Communicable and Non-Communicable Diseases-

The specific objectives of selected Communicable and Non-Communicable diseases of public health importance for which national disease control/eradication programmes have been formulated are described here. For other diseases the individual teacher would formulate the objectives while drawing the lesson plans. The idea of formulating the objectives for few diseases here is to highlight their importance and emphasise certain learning outcomes.

a) Extent of the problem, epidemiology and natural history of the disease

b) Relative public health importance of a particular disease in a given area

c) Influence of social, cultural and ecological factors on the epidemiology of disease

d) Prevention and control of Communicable and Non-Communicable Disease by diagnosing and treating a case and in doing so demonstrate skills in clinical methods, use of essential laboratory techniques, selection of appropriate treatment regimens, follow up of cases

e) Principle of planning, implementing and evaluating, prevention and control measures for the disease at the community level, bearing in mind the relative importance of the disease

f) Institution of programmes for the education of individuals and communities

g) Investigating the disease epidemic and the principles of measures to control the disease epidemic

h) Awareness of National Disease Control Programme

Communicable diseases: 30 Hours

a) Respiratory infections- Small pox, Chicken Pox, Measles, Rubella, Mumps, Meningococcal meningitis, Influenza, Diphtheria, Whooping Cough, Acute espiratory Infection, SARS, Tuberculosis

b) Intestinal Infections- Poliomyelitis, Viral Hepatitis, Acute Diarrhoeal Diseases, Cholera, Typhoid Fever, Food Poisoning, Amoebiasis, Ascariasis, Hook Worm Infestation

c) Arthropod-Borne Infections- Dengue Syndrome, Malaria, Lymphatic Filariasis

d) Zoonosis-

a.) Viral: Rabies, Yellow Fever, Japanese Encephalitis, Kyasanur Forest Disease, Chikungunya Fever

b) Bacterial- Brucellosis, Leptospirosis, Plague, Human Salmonellosis

c. RickettsialDiseases- Rickettsial Zoonosis

d. Parasitic diseases- Taeniasis, Hydatid disease, Leishmaniasis, Dracunculiasis

e) Surface infections- Tetanus, Leprosy, Sexually Transmitted Disease, Acquired Immuno Deficiency Syndrome, Trachoma, Yaws

f) Emerging and Re-emerging infectious diseases

g) Hospital Acquired Infections

Non-communicable diseases: 10 Hours

Coronary heart diseases, Stroke, Hypertension, Rheumatic heart disease, Cancers, Diabetes, Mental illness, Blindness and Accidents.

5. Health programmes in India -15 Hours

The student should have a knowledge about the objectives, strategies and implementation at Primary Health Centre of the following national programmes.

a) National Vector Borne Disease Control Programme(NVBDCP)

b) National Leprosy Eradication Programme(NLEP)

c) Revised National Tuberculosis Control Programme(RNTCP)

d) National AIDS Control Programme(NACP)

e) Universal Immunization Programme(UIP)

f) National Rural Health Mission(NRHM)

g) Reproductive and Child Health Programmes- Janani Suraksha Yojana(JSY), Janani Shishu Suraksha Karyakram(JSSK), Integrated Management Of Neonatal And Childhood Illness (IMNCI), Navjat Shishu Suraksha Karyakram(NSSK).

h) National Programme For Prevention Of Cardiovascular Disease, Diabetes, Stroke And Cancer(NPCDCS)

i) Tobacco Control Legislation (COTPA 2003)

j) Integrated Child Development Scheme(ICDS)

k) Integrated Disease Surveillance Project(IDSP)

l) Iodine Deficiency Disease Control Programme

m) Mental Health Programme

6. Essential Medicines and Counterfeit Medicines - 1 Hour

Concepts, National list of Essential Medicines, problems and measures to address Counterfeit Medicines, Quality control in drug sector in India

7. Demography - 4 Hours

a) Definition of demography

b) Stages of demographic cycle and their impact on the population, concept of Demographic Gap and Population Explosion

c) Fertility Related Statistics

d) Reasons for rapid population growth in India and Population Dynamics

e) Need for population control measures and National Population Policy 2000

8 Family planning- 7 Hours

a) Definition, scope of family planning services, concept of eligible couple, Couple Protection Rate
b) Identify and describe the different Family Planning methods and their advantages and short comings
c) Demonstrate skills in motivating a couple for selecting an appropriate family planning method
d) Evaluation of Contraceptive Methods , Pearl Index
e) Community Needs Assessment Approach (CNAA)
f) Evaluation of Family Planning
g) Medical Termination of Pregnancy Act(MTP act)

9. Preventive medicine in Obstetrics, Paediatrics, Adolescence and Geriatrics-20 Hours

a) Concept of Social Obstetrics, Paediatrics ,Adolescence and Geriatrics
b) Need for specialized services for all the above mentioned groups
c) Antenatal care, intranatal care, post natal care, neonates, identification of at risk infants: low birth weight
d) Feeding of infants, breast feeding, Baby Friendly Hospital Initiative
e) Local customs and practices during pregnancy, child birth and lactation, complementary feeding
f) Growth and development (definition, determinants), methods of assessing using growth charts
g) Indicators of maternal and child health - Maternal Mortality Rate, Perinatal Mortality Rate, Neonatal Mortality Rate, Infant Mortality Rate(definition, incidence, causes and approaches to reduce them)
h) Girl child and Gender bias, Child Abuse, Child Labour
i) Health problems of specially abled children
j) Juvenile delinquency
k) Adolescent health issues
l) Health problems of the aged , National Policy on Older Persons
m) Relevant national programmes
n) School health programme- objectives and activities

10. Nutrition and Health -14 Hours

a) Common sources of various nutrients and nutritional profile of principle foods and special nutritional requirements according to age, sex,activity,physiological condition.

b) Nutritional assessment of individual families and the community by selection and using appropriate methods such as Anthropometry,Clinical,Dietary and Laboratory Techniques.

c) Plan and recommend a suitable diet for the individuals and families bearing in mind the local availability of food, economic status etc.

d) Common Nutritional disorders - Protein Energy Malnutrition, Vitamin A Deficiency, Iodine Deficiency, Anaemia, Fluorosis, Food Toxin diseases: Control and management.

e) Nutritional - surveillance, education, rehabilitation.

f) Food hygiene, food-borne diseases,food adulteration, food toxicants and food fortification

g) National programmes in nutrition.

11. Medical Sociology -12 Hours

a) Conduct of a Clinico-social evaluation of individual in relation to economic and cultural aspects,educational and residential background:attitude to health,disease and to health services at the individual, family and community level

b) Assessment of barriers to good health,recovery from sickness and to lead a socially and economically productive life

c) Concepts in Sociology: Society, Community, Social Structures, Customs, Culture, Acculturation, Social Pathology, Social Defence mechanisms, Social Service

d) Concepts of Psychology:Dynamics Of Behaviour (Health, Illness, Treatment), Motivation, Incentives, Attitudes, Opinions, Belief, Interest, Learning, Habits, Defence Mechanism, Personality, Intelligence

e) Concepts of Social Psychology - Group behaviour, social interaction, social organisation, family (types, functions, family life cycle, role of family in health and disease)

f) Concepts of culture, custom, tradition ,taboos and its role in health and disease

g) Concept of community, structure, social class, occupational classification, socio-economic scale, Wealth index

h) Concept of hospital sociology - Social structure of hospital, Doctor-Patient relationship, sick role, Medico-Social Worker, Medical ethics to Social ethics

i) Consumer Protection Act

j) Operational Research

k) Social agencies , Social security and measures

l) Economics-Gross National Income, Per-Capita Income, GDP

12. Environment and Health -15 Hours

a) Water : Concept of safe and wholesome water ; Sources of water ;Methods of purification of water on small & large scale; WHO water quality standards; water related diseases; surveillance of drinking water quality; Hardness of water; Swimming pool sanitation; Rain water harvesting

b) Air: Composition, Indices of Thermal Comfort, Air Pollution, Indoor Air Pollution, Monitoring, Prevention and Control of Air Pollution

c) Concepts of standards and types of ventilation

d) Light: Natural and Artificial light

e) Noise: Properties,sources,noise pollution and its control

f) Radiation: types,sources,biological effects and protection

g) Meteorological environment: concepts of air,temperature, humidity

h) Hazards of Global Warming on health

i) Problems in disposal of refuse,sullage, human excreta and sewage and its remedies

j) Awareness of standards of housing and the effect of poor housing on health

Medical entomology -14 Hours

a) Role of vectors in causation of diseases

b) Identifying features of and mode of transmission of vector borne diseases.

c) Method of vector control with advantages and limitations of each.

Insecticides

Types, Mechanism of action, Dosage and application for control of insects

Rodents

Rodents and its importance in disease, along with anti-rodent measures

13. Occupational health-12 Hours

a) Concept of Ergonomics

b) Occupational environment, occupational diseases- lead poisoning, occupational cancers, occupational hazards in agricultural workers, sickness absenteeism, health problems due to industrialization

c) Identification of the physical, chemical, biological and social hazards to which workers are exposed to, while working in a specific occupational environment.

d) Influence of physical factors like heat, humidity, cold, radiation and noise on the health of individual and community

e) Prevention of occupational diseases

f) Legislations: Factory Act 1948, Employees State Insurance Scheme

14. Hospital waste management - 3 Hours

Definition, sources, health hazards, categories of bio-medical waste, colour coding, treatment and disposal.

15. Disaster Management - 2 Hours

Definition, fundamental aspects of disaster management, personal protection in different types of emergencies, Man-Made disasters.

16. Genetics and Health- 2 Hours

a) Concepts of chromosomes, genes, genotype and phenotype, chromosomal disorders, genes, Mendelian diseases

b) Advances in molecular genetics - DNA technology, human genome project.

c) Preventive measures for genetic diseases.

17. Mental Health -3 Hours

a) Burden of mental diseases, types of mental diseases, causes and warning signals, mental health services with mentioning of national mental health programmes

b) Burden and prevention of alcoholism

18. Health Education and Communication/IEC/BCC - 10 Hours

a) Communication: Communication process, types of communication, barriers of communication, functions of communication.

b) Health education: definition, aims and objectives, approaches to health education, health education versus propaganda, models of health education, contents and principles

c) Health education material:Audio-Visual aids

d) Methods in communication -Individual approach, Group approach, Mass approach

19. Health information systems and Basic medical statistics -25 Hours

a) Sources - Census, Registration of vital events, SRS, NFHS etc., components, uses of Health Information Systems

b) Introduction to Bio-Statistics, Types of data, Presentation of data in the form of tables and graphs, various types of graphs, measures of central tendency, measures of variation, normal distribution,concepts of sample and sampling, various sampling techniques, tests of significance(t-test, z-test and chi-square test), concept of correlation and regression.

20. Health planning and management - 8 Hours

a) Concepts of health needs, demands, Resources, Objectives, Target, Goals, Plan, programme, schedule, policy

b) Planning cycle

c) Management techniques : Methods based on behavioural sciences and quantitative methods

d) National Health Policy 2002
e) Role of various committees of health for health planning in India
f) Five Year Plans: health thrust areas pursued during Eleventh Five Year Plan

21. Health care of the community - 10 Hours

Health system in India

a) At the Centre: Union Ministry of Health And Family Welfare, Directorate General of Health Services, Central Council of Health
b) At the State Level: State Heath Administration (State Ministry Of Health, State Health Directorate)
c) At District Level: Sub-Divisions, Tahsils, Community Development Blocks, Municipalities And Corporation, Villages, Panchayats

Health care system

Definition, Principles and elements of Primary Health Care.

The student should have a knowledge about the staffing pattern, organisational set up, functions and IPHS standards of CHC, PHC, Sub-centre.

Job Responsibilities of village level workers- ASHA, Anganwadi worker.

Concept of Health Insurance in Public and Private Health Sectors

22. International Health - 5 Hours

a) WHO : Objectives, structure, functions
b) UNICEF : Objectives, structure, functions
c) International Health Regulations (IHR) 2005
d) Role of some important International Health Agencies like USAID, Ford foundation, International Red cross
e) Importance of World Health Day along with themes for past 3 years

SKILLS

Part1: General Skills

The student should be able to

a) Elicit clinico-social history to describe the agent,host and environmental factors that determine and influence health
b) Recognize and assist in management of common health problems of the community
c) Apply elementary principles of epidemiology in carrying out simple epidemiological studies in the community
d) Work as a team member in rendering health care
e) Carry out health education activities effectively for the community

Part2: Skills in relation to specific topic

a) Communication:the student should be able to communicate effectively with family members at home,patients at clinics or homes;individuals,family or a group of health education peers at scientific forums

b) Team activity - work as a member of the health team:in planning and carrying our field work like school health

c) Environmental sanitation - collect water and stool sample for microbiological evaluation

d) Communicable and Non-Communicable diseases

Eliciting clinico-social history and examining patient for diagnosis, lab investigations and knowing proper management and treatment of important communicable and non-communicable disease

e) Maternal and child health

i. Antenatal examination of mother,application of the risk approach in antenatal care

ii. Post natal - assessment of the mother and the new born, advice on appropriate family planning methods, promotion of breast feeding, advice on weaning

iii. Assessment of growth and development of the child, use of growth charts: immunization to child, identifying high risk infants

iv. Skills in vaccine administration and cold chain maintenance.

f) Statistics

i. Sampling techniques ,types of data, appropriate test of significance

ii. Presentation of data in the form of tables and graph

iii. Calculation of various health indices

iv. Calculation of relative and attributable risk

v. Calculation of sensitivity, specificity and predictive values of screening test

g) Nutrition

i. Conducting a diet survey

ii. Community survey and clinical diagnosis of nutritional deficiencies

iii. Balanced diet: additional requirement during lactation, pregnancy and for growing children

h) Occupational health

i. Inspection of work sites

ii. Recommendations in improving work sites

iii. Supervision of workers and programmes

i) Health management
   i. Be an effective team leader
   ii. Guide and train health workers
   iii. Supervision of health workers and implementation of national health programmes

PRACTICALS

a) Spotters related to Nutrition, Environmental health, Medical entomology, helminths and parasites, occupational health, MCH and FP devices, Insecticides and disinfectants, Immunizing agents, commonly used drugs, charts on statistics, instruments used in public health will be taught during the practical hours.
b) Problem solving exercises including epidemiology and biostatistics
c) Clinicosocial case studies of common communicable and non-communicable diseases, maternal and child health.

Integrated Teaching for 4th, 6th, 7th Term Students will be Carried out during the posting and practical classes in the following topics.

		Lifestyle related diseases with preventive aspects	*Communicable diseases with national health programmes*	*Oth*
		• Cardio Vascular diseases • Diabetes • Hypertension • Stroke • Obesity • Cancers	• HIV/AIDS • Tuberculosis • Malaria • Polio • Diarrheal diseases • Leprosy • Zoonotic diseases • Dengue • Hepatitis	

Field visits

Visit to places of Public Health Importance

a) Primary Health centre
b) Sub-centre
c) Urban health centre
d) Anganwadi Centre
e) District Tuberculosis Centre
f) Integrated Counselling and Testing Centre
g) Epidemic Disease hospital
h) Water purification plant

i) Milk diary

j) Bharath Hospital and Institute of Oncology

k) Old age home

During the fourth term, Clinical postings for six weeks in the morning hours, Family Health Advisory Survey will be carried out in a selected village of the Rural Field Practice Area of the Department.

During the seventh term, Clinical postings for six weeks in the morning hours, Medico-social case discussions for the important Communicable, Non-Communicable Diseases and MCH will be carried out.

Teaching Hours:

Term	Theory (in hours)	Practicals(in hours)	Postings(in weeks)
3rd	20	---	---
4th	20	40	6
5th	---	40	---
6th	40	40	---
7th	60	80	6
TOTAL	**140**	**200**	**12**

Theory

3rd Term - 20hours

a) Introduction to Community Medicine and Evolution of Public Health

b) Concept of Health & Disease

c) Sociology - Concepts of Family and its role in Health and Disease

d) Demography

e) Statistics- Types of data, Preparation of tables and various types of Charts

f) Environment and Health

g) Nutrition

4th Term - 20hours

a) Principles of Epidemiology and epidemiological methods

b) Screening for disease

c) Health Education

d) Health Information System

e) Bio Medical Waste Management

f) Disaster Management
g) Mental Health Problems
h) Genetics and Health

6th Term - 40hours

a) Epidemiology of communicable and non-communicable diseases

7thTerm - 60hours

a) Preventive Medicine in Obstetrics, Paediatrics, Adolescence and Geriatrics
b) OccupationalHealth
c) National Health Programmes
d) Health Planning and Management
e) Health Care of the Community
f) Health System in India
g) Health Insurance
h) Sociology
i) Essential Medicine
j) International Health

PRACTICALS

4th Term - 40hrs

a) Practical exercises related to Entomology, Nutrition, Antiseptics and Disinfectants, Insecticides, Instruments, drugs of public health importance, Statistical diagrams, Immunizing agents and Family Planning devices.
b) Water Purification, Chlorine Estimation

5thTerm - 40 hours

Statistical Problems and Solving Exercises- Measures of Central Tendency, Variance, Tests of Significance

6th Term (40hrs)and7th term (80hrs)

Problem Solving Exercises and Tutorials

POSTINGS

4th Term (6 weeks postings: 3hours/day)

Family Health Advisory Survey in a rural field practice area, field visits to places of public health importance

7th Term (6 weeks postings: 3hours/day)

Clinicosocial Case Presentation and Studies in Hospital(to study the role of Social and Economic factors in relation to diseases like Malaria, Dengue, Typhoid, Tuberculosis, Leprosy, AIDS, Diabetes, Hypertension, Rheumatic Heart Disease, Cancer)

SCHEME OF EXAMINATION

Internal assessment

THEORY: 60 MARKS

* Minimum of three examinations shall be conducted. Average of best two of three is taken into consideration.30marks are allotted for theory examinations..The 30 marks are allotted for day to day activities such as block postings(10 marks),family care programmes (10 marks) and 10 marks for participation in seminars assignments, projects and other activities. The total marks will be reduced to 60 marks and sent to the university.

*Internal assessment based on multiple choice questions will be used for the evaluation of the students in the internal assessment for 20 marks and added to the total 60 marks

PRACTICALS: 20 MARKS

Minimum of three practical examination shall be conducted and average of best two of three is taken into consideration. Maintenance of practical records will be given 5 marks. The total marks will be reduced to 20 marks and sent to the university.

UNIVERSITY EXAMINATION

Total marks: 320 (theory 200, viva-voce 40 and practical 80)

A. Theory: 200 marks

There shall be two papers each carrying 100 marks. Each paper shall be of three hours duration.

Pattern of questions would be three types

* Long essay question -10 marks X 2
* Short essay question - 05marks X 10
* Short answer question -03marks X 10

B. Practical: 80 marks

The distribution of different components shall be:

a) Problem solving exercises (problems based on epidemiology, biostatistics, demography, environmental health,nutrition and health care of the community): 35 marks
b) Clinicosocial case presentation : 35 marks
c) Spotters : 10 marks

Weightage of marks in university examination
MBBS Phase III Part 1 - PAPER 1

Sl.No	Topics	Weightage of Marks
1	Evolution of Public Health with Public Health Personalities	05
2	Concept of Health and Disease	15
3	Environment and Health	10
4	Health Education and Communication	10
5	Nutrition and Dietetics	15
6	Occupational Health	15
7	Sociology -Medical Sociology	10
8	Mental Health	05
9	Genetics and Health	05
10	Principles of Epidemiology and Epidemiological Methods	15
11	Screening for Disease	10
12	Health Information System	10
13	Demography and Family Welfare	10
14	Biostatistics and Research Methodology	15

**The Question Paper must include Questions from Epidemiology, Biostatistics, Screening for Disease and Health Information System with 30marks weightage being given to these topics*

PAPER II

1	Epidemiology of Communicable Diseases	20
2	Epidemiology of Non-Communicable Diseases	15
3	Preventive Medicine in Obstetrics, Paediatrics and Geriatrics	20
4	School Health Services	05
5	Disaster Management	05
6	Hospital Waste Management	05
7	Health System in India	15
8	Health Care Delivery System	20
9	Health Planning and Management	15
10	National Health Programme	20
11	Essential Medicine and Counterfeit Drugs	05
12	International Health Organisation	05
13	Role Of NGOs In Healthcare	05
14	Health Insurance	05

Recommended Books- Recent Editions.

Theory

a) K. Park. Textbook of Preventive & Social Medicine. M/s Banarsidas Bhanot Publishers, Premnagar, Jabalpur - 482 001.
b) Sunderlal, Adarsh and Pankaj. Textbook of Community Medicine. CBS Publishers and Distributors, Daryaganj, New Delhi -110 002.
c) Roy Rabindranath, SahaIndranil. Mahajan & Gupta's Textbook of Preventive and Social Medicine. Jaypee Brothers Medical Publishers (P) Ltd., Daryaganj, New Delhi
d) AH Suryakantha. Community Medicine with Recent Advances. Jaypee Brothers Medical Publishers (P) Ltd., Daryaganj, New Delhi.
e) BK Mahajan. Methods in Biostatistics for Medical students and research workers. Jaypee brothers Medical Publishers (P) Ltd., Daryaganj, New Delhi
f) N. S. N. Rao, N. S. Murthy. Applied Statistics in Health Sciences. Jaypee brothers Medical Publishers (P) Ltd., Daryaganj, New Delhi.

Practical

a) G.K. Rathnaswamy, A Hand Book of Medical Entomology and Elementary Parasitology. S.Vishwanathan Printers and Publishers Pvt.Ltd., Chetput, Chennai.
b) DK Mahabalaraju. Essentials of Community Medicine Practicals. Jaypee Brothers Medical Publishers (P) Ltd., Daryaganj, New Delhi - 110 002.
c) P S S Sundar Rao And J. Richard. Introduction to Biostatistics and Research Methods. Prentice Hall of India, New Delhi.
d) Gopalan et al., Nutritive Value of Indian Food Stuffs - NIN/ICMR, Hyderabad.

Reference Books, Recent Editions

a) Rajvir Bhalwar. Textbook of Preventive and Social Medicine. United India Periodicals Pvt. Ltd., New Delhi.
b) J.S. Mathur. A Comprehensive Textbook of Community Medicine : Preventive and Social Medicine. CBS Publishers & Distributors, New Delhi.
c) Detels R, Beaglehole R, Lansang M A and Gulliford M. Oxford Textbook of Public Health. New York: Oxford University Press.

Websites

a. WHO-www.who.int/en
b. RNTCP -www.tbcindia.nic.in/rntcp.html
c. NACO -www.naco.gov.in
d. NRHM -nrhm.gov.in/
e. NVBDCP -nvbdcp.gov.in
f. RCH -www.childlineindia.org.in
g. IARC -www.iarc.org.in/
h. CDC -www.cdc.gov
a) UNICEF -www.unicef.org/india/

E N T

GOALS

The broad goal of teaching the undergraduates in otorhinolaryngology is to impart adequate knowledge and skills to identify and treat common disorders and emergencies in otorhinolaryngology and to teach the principles of rehabilitation of the hearing impaired individuals.

OBJECTIVES

2. To enable the student to familiarize himself with the common problems related to the subject of ENT.
3. To enable the student to be competent to evaluate the symptoms, analyze the findings, diagnose the disease and suggest and implement the treatment modalities to treat the common ENT conditions.
4. To make the student competent to perform emergency life saving procedures commonly seen in ENT practice.
5. To make the student aware of the program on prevention of deafness and have knowledge of methods for screening for early detection of hearing loss.
6. To make the student understand the rational use of pharmaco-therapeutic agents used in treating ENT diseases and have the knowledge of the common side effects and interactions of commonly used drugs.

(a) KNOWLEDGE

* History taking in relation to common complaints encountered in ENT
* Examination of ear, nose, oral cavity, oropharynx, larynx, neck
* Causes of pain in the ear
* Wax
* Otomycosis
* Otitis externa
* ASOM
* CSOM
* Causes of ear discharge
* CSOM-safe
* CSOM-unsafe
* Complications of CSOM
* Causes of hearing loss

* Diagnosis of hearing loss
* Types of hearing loss
* Otosclerosis
* Sudden SNHL
* Noise induced hearing loss
* Causes of facial nerve paralysis
* Bells palsy
* Traumatic lesions of the facial nerve causes of vertigo
* Causes of vertigo
* Difference between central and peripheral vertigo
* Meniere's disease
* Tinnitus
* Causes of nasal obstruction
* Deviated nasal septum
* Nasal polyps
* Adenoids
* Causes of nasal discharge
* Allergic rhinitis
* Vasomotor rhinitis
* Acute and chronic rhinitis
* Epistaxis: causes and management
* Angiofibroma
* Acute and chronic sinusitis
* Carcinoma of maxilla
* Carcinoma of nasopharynx
* Diseases of the salivary glands
* Ludwigs angina
* Causes of dysphagia
* Acute and chronic tonsillitis
* Acute and chronic abscess in relation to pharynx
* Causes of hoarseness
* Acute and chronic laryngitis
* Benign lesions of the vocal cord
* Malignancy of the larynx and hypo pharynx
* Causes of stridor
* Laryngeal paralysis

* Foreign bodies in the air and food passages
* Emergency management of the airway
* HIV manifestations in ENT
* Basic principles of surgeries of ENT
* Acoustic neuroma
* Tumors of the middle ear and mastoid
* Electro diagnostic tests for facial nerve
* Tests of malingering
* Trauma to the face and neck
* Neoplasm of the sinuses(other than maxilla)
* Diagnosis of voice disorders
* Perforation of oesophagus
* Corrosive burns of oesophagus
* Motility disorders of oesophagus
* Anatomy and physiology of ear, nose, throat
* Oesophagoscopy, bronchoscopy
* Diagnostic nasal endoscopy
* Cochlear implants
* Thyroid Gland and its Disorders
* Lymph Nodes of Head and Neck
* Midline Swellings in the Neck

(b) SKILLS

The student should be adept at the:

* skill of using a head mirror and know to focus the light
* skill of using the different instruments in the ENT OPD as diagnostic tools e.g. tongue depressor, nasal speculum, ear probe, laryngeal mirror, posterior nasal mirror, ear speculum, tuning fork etc
* skill of doing the various tuning fork tests viz Rinnie's Weber's and absolute bone conduction tests
* skill to identify and palpate the anatomical landmarks in ENT
* skill to examine ear, nose, throat and neck
* skill to clean the ear
* skill of doing ear syringing
* skill of performing routine OPD procedures used for diagnostic and therapeutic methods
* Skill to distinguish the types of hearing loss by learning the analysis of the tuning fork test and audiograms

* Skill of performance of maneuvers like valsalva's etc
* Skill of testing the functions of various cranial nerves
* Skill to check for spontaneous nystagmus
* Skill for doing the tests for nasal patency
* Skill to be able to perform maneuvers to maintain and establish the airway in case of emergency
* Skill to suction a tracheostomy
* Remove wax
* Perform indirect laryngoscopy and posterior rhinoscopy
* Remove foreign bodies from the ear and nose
* Perform anterior nasal packing
* Tracheostomy
* Septoplasty
* Tonsillectomy and adenoidectomy
* Myringoplasty
* Myringotomy
* Mastiodectomy
* Oesophagoscopy
* Pure tone audiometry

(c) INTEGRATION

The undergraduate training in ENT will provide an integrated approach to various departments like neurosciences, ophthalmology, orofaciomaxillary surgery, general medicine, general surgery, oncology, speech and hearing etc.

SYLLABUS

THEORY:	6th Term	Teaching Hours	: 50 Hours	Clinical-4 weeks in 6th term
	7th Term	Teaching Hours	: 20 Hours	-7 weeks in 7th term
			Total	**: 70 Hours**

1. DISEASES OF EAR

a) Diseases of external ear
b) Eustachian tube and its disorders
c) Acute suppurative otitis media
d) Non suppurative otitis media
e) Cholesteatoma and chronic suppurative otitis media

f) Complications of chronic suppurative otitis media
g) Otosclerosis
h) Meniere 's disease
i) Acoustic neuroma
j) Rehabilitation of the hearing impaired
k) Disorders of vestibular system
l) Facial nerve and its disorders
m) Temporal bone fractures
n) Tumors of external ear, middle ear, mastoid

2. DISEASES OF NOSE
a) Diseases of external nose and vestibule
b) Nasal septum and its diseases
c) Acute and chronic rhinitis
d) Granulomatous diseases
e) Foreign bodies and Rhinolith
f) Nasal myiasis
g) Nasal synechia
h) Choanal atresia
i) CSF rhinorrhoea
j) Allergic rhinitis
k) Vasomotor rhinitis
l) Nasal polypi
m) Epistaxis
n) Trauma to nose and face
o) Neoplasm of nose

3. DISEASES OF PARANASAL SINUSES:
a) Acute and chronic sinusitis
b) Complications of sinusitis
c) Neoplasm of paranasal sinuses

4. DISEASES OF ORAL CAVITY:
a) Ulcers of oral cavity
b) Oral submucous fibrosis
c) Ankyloglossia
d) Premalignant conditions and neoplasms of oral cavity

5. DISEASES OF SALIVARY GLANDS:
   a) Acute and chronic sialadenitis
   b) Salivary calculi
   c) Neoplasms of salivary gland

6. DISEASES OF PHARYNX:
   a) Adenoiditis
   b) Thornwaldt's disease
   c) Head and neck space infections
   d) Acute and chronic tonsillitis
   e) Acute and chronic pharyngitis
   f) Neoplasms of nasopharynx, oropharynx and hypopharynx
   g) Styalgia
   h) Zenker's diverticulum
   i) Differential diagnosis of Neck Masses

7. DISEASES OF LARYNX:
   a) Acute and chronic inflammations of larynx
   b) Stridor : causes and management
   c) Congenital lesions of larynx
   d) Laryngeal paralysis
   e) Tumors of larynx
   f) Larngotracheal trauma
   g) Tracheostomy and other procedures for airway management
   h) Foreign bodies in upper aerodigestive tract

8. DISEASES OF OESOPHAGUS:
   a) Strictures of esophagus
   b) Motility disorders of esophagus
   c) Dysphagia : causes and management
   d) Tumors of esophagus

9. THYROID GLAND AND ITS DISORDERS
10. LYMPH NODES OF HEAD AND NECK
11. RECENT ADVANCES:
   a) Laser and cryosurgery in ENT
   b) Radiotherapy and chemotherapy in head and neck cancer

12. OPERATIVE SURGERY:

a) Myringotomy and grommet insertion
b) Tympanoplasty
c) Cortical and radical mastiodectomy
d) Stapedectomy and stapedotomy
e) Septal surgeries (septoplasty and submucosal resection)
f) Antral lavage
g) Caldwell luc's operation
h) Functional Endoscopic Sinus Surgery
i) Direct laryngoscopy
j) Bronchoscopy
k) Oesophagoscopy
l) Tonsillectomy
m) Adenoidectomy
n) Laryngectomy and Neck dissection
o) Maxillectomy

Note:

Students are required to know the indications, contraindications, principles and instruments required for above surgeries.

Students must know anatomy and basic physiology of ear, nose and throat.

PRACTICALS

Students should know the symptoms and signs of common diseases in otorhinolaryngology.

DISEASES OF EAR:

a) External ear conditions like - wax, foreign body, furunculosis, otitis externa, otomycosis
b) Acute suppurative otitis media
c) Chronic suppurative otitis media
d) Secretary otitis media
e) Deafness
f) Traumatic ear disorders
g) Evaluation of giddiness
h) Benign and malignant conditions of ear

DISEASES OF NOSE:

a) Vestibulitis
b) Furunculosis
c) Acute and chronic rhinitis
d) Allergic rhinitis
e) Evaluation of epistaxis
f) Deviated nasal septum
g) Acute and chronic sinusitis
h) Nasal polyps
i) Benign and malignant conditions of nose and paranasal sinuses
j) Adenoid enlargement
k) Tumors of nasopharynx

DISEASES OF THROAT

a) Acute and chronic tonsillitis
b) Infections of deep spaces of face and neck
c) Oral submucosal fibrosis
d) Premalignant conditions of oral cavity
e) Swellings floor of mouth
f) Acute and chronic pharngitis
g) Eagle's syndrome ,Glossopharyngeal neuralgia
h) Tumors of oropharynx and hypopharynx
i) Plummer Vinson syndrome
j) Causes and management of dysphagia
k) Esophageal strictures
l) Causes and management of hoarseness of voice
m) Causes for stridor
n) Tracheostomy

SCHEME OF EXAMINATION

Internal Assessment

Theory: 30 Marks

* Minimum of two examinations shall be conducted. 20% IA marks shall include MCQs. Average of the two is taken into consideration. The total marks will be reduced to 30 marks and sent to the University.

Practicals: 20 Marks

Minimum two practical examinations shall be conducted. Average of the two is taken into consideration. The total marks will be reduced to 20 marks and sent to the University.

THEORY: **100 marks**

Type, Number of questions & distribution of marks for written paper

Type of questions	No of questions	Marks for each question
Essay type questions	02	10
Short essay type questions	10	05
Short answer questions	10	03

Weightage of marks for University examination

Sl No.	Topics	Weightage of marks
1	Diseases of Ear	20
2	Diseases of Nose	15
3	Diseases of Paranasal Sinuses	10
4	Diseases of Oral Cavity	10
5	Diseases of Salivary Glands	05
6	Diseases of Pharynx	10
7	Diseases of Larynx	10
8	Diseases of Oesophagus	05
9	Recent Advances	05
10	Operative Surgery	10

B. PRACTICALS**: 80 marks**

2 Cases **80 marks**

C. VIVA VOCE : **20 marks**

DISTRIBUTION OF MARKS

A. Theory

1. Written paper. No. of papers & maximum marks for each paper 1 x 100 = 100
2. Viva- Voce (Oral Examination) 20
3. Internal Assessment (Theory) 30

Total Theory 150

B. Practical / Clinical

1. Practical / Clinical 80
2. Internal Assessment (Practical) 20

Total Practical / Clinical 100

Grand Total 250

Recommended Text Books, Recent Editions.

1. Text book of Ear, Nose, Throat, Head & Neck diseases: P Hazarika, Dr Nayak Balakrishna.
2. A short practice of otolaryngology: K K Ramalingam.
3. Diseases of the Ear, Nose and Throat: B K Roy Choudry.
4. Logan Turner's text book of Otolaryngology.
5. Fundamentals of Ear Nose Throat diseases and Head and Neck Surgery: Dr Shyamal Kumar De.

Reference Books, Recent Editions

1. Diseases of Ear by Mawsan.
2. Diseases of otorhinolaryngology by Scott and Brown.
3. Otorhinolaryngology: Head and Neck surgery: John Jacob Ballenger, James B Snow.
4. Medical teaching CD.

OPHTHALMOLOGY

OBJECTIVES

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

1) Identify common diseases of the eye.
2) Diagnose and treat common diseases of the Anterior segment eg stye,Conjunctivitis, Extra ocular foreign body, Corneal abrasion, Vitamin A deficiency.
3) Recognise and initiate treatment for sight threatening diseases like Corneal ulcer, Keratomalacia, Glaucoma, Ocular trauma, Chemical injuries.
4) Demonstrate knowledge of blindness and its causation and be able to actively participate in the implementation of the National programme for control & prevention of blindness.

COURSE CONTENT- **Teaching hours - 100 hrs**

Clinical Postings - 4 weeks in 6th term
- 7 weeks in 7th term

BASIC SCIENCES

a) Anatomy: Including development, Coats of the eye, Extra ocular muscles, Blood & Nerve supply & Visual Pathway.
b) Physiology: of vision, Tear's, and Aqueous humor.
c) Pharmacology: Ophthalmic preparations & Routes of administration, Antibiotics, Antiviral & Antifungal, Cycloplegics, Anti glaucoma drugs Steroids, Ocular toxicity of some systemic medications.
d) Pathology: Histopathology of Retinoblastoma, Malignant melanoma, Squamous cell carcinoma, Basal cell carcinoma.
e) Elementary optics: Donders eye, Sturm's conoid.

1. DISEASES OF THE EYE

CONJUNCTIVA

Conjuctivitis :

Bacterial including Ophthalmia neonatorum & Membranous conjunctivitis
Chalamydial - Trachoma, Inclusion conjunctivitis
Viral
Allergic, Simple, Phlyctenular, Vernal

Degenerations : Pingecula, Pterygium, Concretions

Dry Eye : Xerosis, Bitots spots, Keratoconjunctivitis Sicca

Limbal Nodule: D/D

Sub conjunctival haemorrhage : Causes

Chemosis

Chronic Conjunctivitis

Mucocutaneous diseases affecting conjunctiva

CORNEA

Corneal Pathology - Opacity, Edema, Keratic Precipitates, Hypopyon

Corneal Ulcer - Bacterial, Fungal, Viral, Parasitic

Immunologically Mediated Disease - Phlyctenular Keratitis, Chronic Serpiginous ulcer, Interstitial Keratitis, Disciform Keratitis

Miscellaneous - Vit A deficiency, Exposure Keratitis, Neurotropic Keratopathy, Photophthalmia

Degenerations, Dystrophies, Ectatic conditions

Eye Banking including eye donation & Keratoplasty (Basic)

Refractive Surgery (Basics)

SCLERA

Scleritis, Episcleritis including DD, investigation & Treatment

Staphyloma

Blue Sclera

UVEA

Uveitis: Including classification - Anatomic, Pathologic, Aetologic

Anterior Uveitis: Clinical Features, complications, D/D

Intermediate Uveitis

Posterior Uveitis : Investigations & Treatment

Purulent Uveitis - Endophthalmitis, Panophthalmitis.

Coloboma

Ocular Albinism

LENS

Cataract Classification

Senile cataract aetiology, clinical features, Evaluation management including Phaco emulsification, Aphakia, Optical Rehabilitation, Complications of cataract surgery

Congenital Cataract - types, Amblyopia assessment & early referral, Management

Complicated Cataract, Cataract associated with systemic diseases, Traumatic Cataract, Metabolic Cataract, Toxic Cataract, (Short description).

VITREOUS

Hemorrhage - causes & treatment

Vitreous surgery (Basics)

GLAUCOMA

Classification

Primary open angle glaucoma

Primary angle closure glaucoma

Paediatric glaucoma

Secondary Glaucoma

Management of Glaucoma

RETINA

Vascular Retinopathies

- Diabetic Retinopathy
- Hypertensive Retinopathy including toxemia of pregnancy
- Hematological Diseases
- Retinopathy of Prematurity

Vascular disease -CRAO, CRVO, Eale's Disease

Retinal detachment

Retinal degenerations

- Age related Macular degeneration
- Retinitis Pigmentosa

Retinal Inflammations, Toxoplasma, CMV, AIDS

OPTIC NERVE

Papilloedema

Papillitis, Retrobulbar Neuritis

Ischemic Optic Neuropathy

Optic Atrophy

Toxic Amblyopia

INTRA-OCULAR TUMOURS

Retinoblastoma

Malignant Melanoma

SQUINT

The Motor Apparatus of the Eye

Fixation and Binocular Vision

Classification of Squint

Comitant Vs Incomitant

General Principles of Management of Strabismus

Amblyopia early Referral

ORBIT

Common causes of Proptosis

Orbital Cellulitis Including Cavernous Sinus Thrombosis

LACRIMAL SYSTEM

Causes of Epiphora

Dacryocystitis- Congenital, Acquired, Acute, Chronic

Causes of Dry Eye, Diagnosis and Management

LIDS

Inflammations - Blepharitis, Hordeolum, Chalazion

Anomalies of position - Entropion, Ectropion, Trichiasis, Ptosis, Lagophthalmos, Symblepharon, Ankyloblepharon

REFRACTIVE ERRORS

Myopic, Hypermetropia, Astigmatism, Anisometropia

Presbyopia

TRAUMA

Mechanical Injuries

Superficial Foreign Body

Concussion Injuries

Penetrating Injuries

Retained IOFB

Sympathetic Ophthalmitis, Endophthalmitis

Chemical Injuries, focus on first aid

Medico legal aspects

SURGERY

Enucleation, Evisceration

Other Surgeries covered in respective chapters

Preventive Ophthalmology

Definition, types, causes of blindness

Development of Eye Health Sciences

Specific Blinding Disorders

MISCELLANEOUS

Systemic Opthalmology

Diseases of the Nervous System with Ocular Manifestations

Visual Pathway & its Disorders - Hemianopia

Ocular Manifesttations of Systemic Disorders

Immunopathological Processes & the Eye

EXAMINATION SKILLS

Skills	Able to perform Independently	Able to Perform under Guidance	Assist	Observe
1) Visual Acuity test and Use of pinhole (including light perception, projection)	✓			
2) Colour Vision test		✓		
3) Visual field by confrontation	✓			
4) Hirschberg test to detect obvious squint	✓			
5) Examination of ocular movements	✓			
6) Assessment of corneal sensation	✓			
7) Flourescien staining to identify corneal abrasion		✓		
8) Assessment of Anterior chamber depth	✓			
9) Pupillary size and reaction	✓			
10) Distant direct ophthalmoscopy on dilated pupils to diagnose lens opacities		✓		
11) Method of Direct ophthalmoscopy		✓		
12) Schiotz's Tonometry	✓			
13) Regurgitation for NLD Block	✓			
14) Syringing				✓
15) Instillation of eye drops/ ointment	✓			
16) Irrigation of conjunctiva	✓			
17) Applying of patching	✓			
18) Epilation of cilia				✓
19) Eversion of upper eye lid	✓			
20) Use of lid retractors to examine the eye of a child			✓	
21) Digital tonometry	✓			
22) Removal of corneal foreign body				✓
23) Entropion surgery				✓
24) Cataract surgery				✓
25) Glaucoma surgery				✓
26) Keratoplasty				✓
27) Chalazion/Stye				✓
28) Tarsorraphy			✓	
29)Phoria, Tropia / BSV, preliminary knowledge of cranial nerves II, III, IV, VI.	✓			
30)Assessment of Opacity in the media	✓			

SCHEME OF EXAMINATION

Internal Assessment : Minimum of two examinations shall be conducted. **20% IA marks shall include MCQs.** Average of the two is taken into consideration. The total marks will be reduced to 30 marks and sent to the University

Practicals: 20 Marks

Minimum two practical examinations shall be conducted. Average of the two is taken into consideration. The total marks will be reduced to 20 marks and sent to the University

THEORY **100 marks** **2 exams** **Reduced to 30**

CLINICAL **20 marks** **End of each posting (2 Exams)** **Reduced to 20**

UNIVERSITY EXAMS

Theory 1 Paper 3 Hrs, Max Marks 100

Type of questions	No of questions	Marks for each question
Essay type questions	02	10
Short essay type questions	10	05
Short answer questions	10	03

Weightage of Marks for University Theory examination

Sl No.	Topics	Weightage of Marks
1	Conjunctiva	10
2	Cornea Degenerations Dystrophies, Ectatic Conditions Kerato-refractive Surgery (basics)	15
3	Sclera	3
4	Uvea	5
5	Lens	10
6	Vitreous	3
7	Glaucoma	10
8	Retina	5
9	Optic Nerve	3
10	Intra - Ocular Tumours	3
11	Squint	3
12	Orbit	3
13	Lacrimal System	3

14	Lids	5
15	Refractive Errors	5
16	Trauma	3
17	Surgery	3
18	Community Ophthalmology	5
19	Miscellaneous	3

CLINICAL
2 Cases 80 marks

DISTRIBUTION OF MARKS

A. Theory

4. Written paper. No. of papers & maximum marks for each paper	1 x 100 = 100
5. Viva- Voce (Oral Examination)	20
6. Internal Assessment (Theory)	30
Total Theory	**150**

B. Practical / Clinical

1. Clinical	80
2. Internal Assessment (Practical)	20
Total Practical / Clinical	**100**
Grand Total	**250**

Recommended Text Books, Recent Editions.

1. Parson's Diseases of the Eye
2. Text of Ophthalmology by Khurana
3. Clinical Ophthalmology by Kanski
4. Systemic Ophthamlology by Kanski
5. Text book of Ophthalmology by Prof. H.V. Neam

MEDICINE AND ALLIED SUBJECTS

MEDICINE

GOALS

The broad goal of teaching of undergraduate students in Medicine is to have the knowledge, skills and behavioral attributes to function effectively as the first contact physician.

OBJECTIVES:

(a) KNOWLEDGE

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

1. Diagnose common clinical disorders with special reference to infectious diseases, nutritional disorders, tropical and environmental diseases.
2. Outline various modes of management including drug therapeutics especially dosage, side effects, toxicity, interactions, indication and contra-indications.
3. Propose diagnostic and investigative procedures and ability to interpret them.
4. Provide first level management of acute emergencies promptly and efficiently and decide the timing and level of referral, if required.
5. Recognise geriatric disorders and their management.

(b) SKILLS

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

1. Develop clinical skills (history taking, clinical examination) to diagnose various common medical disorders and emeregnecies.
2. Refer a patient to secondary and/ or tertiary level of health care after having instituted primary care.
3. Perform simple routine investigations like haemogram, stool, urine, sputum and biological fluid examinations.
4. Assist the common bedside investigative procedures like pleural tap, lumbar puncture, bone marrow aspiration / biopsy and liver biopsy.

(c) INTEGRATION

a) With Community Medicine and Physical Medicine and Rehabilitation to have the knowledge and be able to manage important current national health programmes, also to be able to view the patient in his/ her total physical, social and economic milieu.

b) With other relevant academic inputs which provide scientific basis of clinical medicine e.g. anatomy, physiology, biochemistry, microbiology, pathology and pharmacology.

Departmental Objectives

At the end of clinical postings in General Medicine, the medical student will:

* Be able to evaluate each patient as a person in society and not merely as a collection of organ systems.
* Have developed an interest in and care for all types of patients.
* Be able to discern the hopes and fears of patients, which inevitably underlie the symptom complexes and know how to handle these emotions, both in himself and in others.
* Possess adequate knowledge in the Sciences of Medicines and be able to elicit a good clinical history and physical finding, elucidate the clinical problems based on these and discuss the means of solving the problems by the use of differential diagnosis.
* Requisition for relevant laboratory tests and perform common side lab procedures.
* Outline the principles of management of various diseases.
* Have an open attitude to the developments in Medicine so as to be aware of the need to keep abreast of new knowledge.
* Learn to be adaptable to new ideas and new situations where resources may be limited.
* Possess knowledge of and perform certain procedures.
* Understand the ethical and legal implications of his / her medical decisions.

COURSE CONTENTS

Knowledge

1. Clinical methods in the practice of medicine
   a) Clinical approach to the patient: The art of medicine, doctor patient relationship, communication skills and doctor's responsibilities.
   b) Clinical approach to disease and care of patient; Diagnostic possibilities based on interpretation of history, physical findings and laboratory investigations and principles of rational management.

2. Common symptoms of disease

   a) Pain: Pathophysiology, clinical types, assessment and management
   b) Fever: Pathophysiology of heat regulation, its disturbances, clinical types, clinical assessment and management.
   c) Cough expectoration and hemoptysis.
   d) Dyspnoea, tachypnea and cyanosis.
   e) Common urinary symptoms including dysuria, oliguria, nocturia, polyuria, incontinence and enuresis.

f) Edema and Anasarca
g) Shock and cardiovascular collapse.
h) Cardiac murmurs: functional and organic.
i) Anorexia, nausea and vomiting.
j) Constipation and diarrhoea
k) Hematemesis, melena and hematochezia.
l) Jaundice and hepatomegaly.
m) Abdominal swelling and ascites.
n) Weight loss and weight gain
o) Fainting, syncope and seizures; headache, dizziness and vertigo.
p) Paralysis, movement disorders and disorders of gait
q) Coma and other disturbances of consciousness
r) Pallor and bleeding
s) Enlargement of lymphnodes and spleen
t) Joint pain and pain in the extremities and back.

3. Nutrition / Exposure to Physical and Chemical Agents

a) Nutrition and dietary management.
    i) Nutritional requirements.
    ii) Protein calorie malnutrition in adults.
    iii) Obesity
    iv) Vitamin deficiency and excess.
b) Fluid and electrolyte balance, acidosis and alkalosis in particular relevance to vomiting, diarrhoea, uremia and diabetic ketoacidosis.
c) Poisoning: Phenobarbitone, organophosphorous compounds, sedative/ hypnotic and other common poisons in the locality.
d) Acute and chronic effects of alcohol and their management.
e) Venoms, stings, insect bites: poisonous snakes, insects and scorpions.
f) Disturbances of temperature: heat stroke, heat exhaustion and cold exposure.
g) Drowning, electrocution and radiation hazards.

4. Infections

a) Approach to infectious diseases, diagnostic and therapeutic principles.

b) General principles of rational use of antibiotics and other chemotherapy against the following:
    i) Common gram positive infections.
    ii) Common gram negative infections.
    iii) Enteric fever
    iv) Cholera, gastroenteritis, food poisoning and dysentery
    v) Influenza and other common viral respiratory infections
    vi) Rabies
    vii) Tetanus
    viii) Herpes simplex and herpes zoster.
    ix) Amoebiasis and worm infestations.
    x) Malaria, filariasis, leishmaniasis
    xi) Common exanthemata
    xii) HIV infections and infections in the immune-compromised conditions.
    xiii) Common sexually transmitted diseases
    xiv) Common fungal infections
    xv) Viral encephalitis
    xvi) Tuberculosis
    xvii) Leprosy
    xviii) Infectious mononucleosis
    xix) Brucellosis

5. Haematology

a) Definition, prevalence, etiological factor, pathophysiology, pathology, recognition, investigations and principles of treatment of:
    i) Anemias: iron deficiency, megaloblastic and common haemolytic anemias (thalassemia, sickle cell and acquired hemolytic anemias)
    ii) Common bleeding disorders (thrombocytopenia and hemophilia)
    iii) Agranulocytosis and aplastic anemia
b) Leukemias
c) Lymphomas
d) Blood group and transfusion: Major blood group systems and histo compatibility complex, concepts of transfusion and component therapy; indications for transfusion therapy, precautions to be taken during blood transfusion, hazards of transfusion and safe handling of blood and blood products.

6. Respiratory System

a) Physiology and diagnostic methods: Sputum examination, X-ray chest, pulmonary function tests and bronchoscopy.
b) Upper respiratory infections.
c) Pneumonias
d) Bronchiectasis and lung abscess
e) Bronchial asthma and tropical eosinophilia
f) Chronic obstructive airway disease and cor pulmonale
g) Acute and chronic respiratory failure
h) Disease of pleura: effusion, empyema, penumothorax
i) Pulmonary tuberculosis
j) Neoplasms of lung
k) Common occupational lung diseases
l) Introduction to critical care medicine - Monitoring & management of critically ill patients, Multiorgan failure, Sepsis & septic shock - Introduction to Mechanical Ventilation

7. Cardio vascular system

a) ECG, X-rays chest with reference to common cardiovascular diseases, ECHO
b) Coronary artery disease
c) Rheumatic fever and rheumatic heart disease
d) Infective endocarditis
e) Hypertension and hypertensive heart disease
f) Acute and chronic heart failure.
g) Common congenital heart disease in adolescents and adults: ASD, VSD, PDA, TOF and Coarctation of aorta
h) Common cardiac arrhythmias
i) Acute and chronic pericarditis, pericardial effusion and cardiac tamponade, Myocarditis
j) Common aortic diseases; peripheral vascular disease: arterial and venous, Cardiomyopathies

8. Gastro-Intestinal Tract and Liver

a) Stool examination, endoscopy in reference to common gastrointestinal diseases
b) Acid peptic disease
c) Malabsorption syndrome

d) Inflammatory bowel disease and irritable bowel syndrome
e) Acute and chronic hepatitis
f) Cirrhosis of liver, Interpretation of liver function tests
g) Abdominal tuberculosis, acute pancreatitis

9. Emergency Medicine

a) Cardiopulmonary resuscitation
b) Acute pulmonary oedema
c) Hypertensive crises
d) Diabetic keto acidosis, Nonketotic hyper osmolar coma and hypoglycemia
e) Status epilepticus
f) Acute severe bronchial asthma
g) Shock and anaphylaxis
h) Acute myocardial infarction
i) Upper GI bleeding and hepatic coma
j) Diagnosis and management of comatose patient
k) Management of unknown poisoning

10. Neurological System - Investigation: Neuroimagining, EEG, NCV and EMG

a) Cerebro vascular diseases
b) Meningitis: viral, bacterial and tuberculous encephalitis
c) Peripheral neuropathy, AIDP (GBS) and CIDP
d) Epilepsy
e) Extra pyramidal diseases
f) Common compressive and non-compressive spinal cord syndromes
g) Motor system disease, motor neuron disease
h) Myasthenia gravis
i) Common myopathies in India
j) Degenerative, nutritional and metabolic diseases of the nervous system.

11. Nephrology and Urinary System

a) Acute renal failure and Renal replacement therapy
b) Chronic renal failure
c) Glomerulonephritis and nephrotic syndrome
d) Urinary tract infections / pyelonephritis
e) Tubulointerstitial diseases and toxic nephropathies.

12. Connective Tissue Disorders

a) Rheumatoid arthritis
b) Degenerative joint disease including cervical spondylosis
c) Systemic lupus erythematosus, systemic sclerosis and other collagen vascular diseases.
d) Gout

13. Endocrines

a) Diabetes mellitus
b) Hypo and hyperthyroidism; Iodine deficiency disorders.
c) Cushing's syndrome and Addison's disease.
d) Pituitary disorders: Acromegaly and Sheehan's syndrome
e) Calcium and phosphorus metabolisum: parathyroid and metabolic bone disease.

14. Geriatrics

Geriatric medicine: general principles of dealing with health problems of the elderly.

15. Medical Ethics

SKILLS

1. Obtain a proper relevant history and perform a humane and thorough clinical examination including internal examinations (per-rectal and per-vaginal) and examination of all organs/ systems.
2. Arrive at a logical working diagnosis after clinical examination.
3. Order appropriate investigations keeping in mind their relevance (need based) and cost effectiveness
4. Plan and institute a line of treatment which is need based, cost effective and appropriate for common ailments taking into consideration:
   a) Patient
   b) Disease
   c) Socio-economic status
   d) Institutional / governmental guidelines.
5. Recognise situations, which call for urgent or early treatment at secondary and tertiary centres and make a prompt referral of such patients after giving first aid or emergency treatment.
6. Assess and manage fluid/ electrolyte and acid-base imbalance.
7. Interpret abnormal biochemical laboratory values of common diseases.
8. Interpret skiagrams of common diseases

9. Identify irrational prescriptions and explain their irrationality.
10. Interpret serological tests such as VDRL, ASLO, Widal, HIV, Rheumatoid factor, Hepatitis and TORCH infections.
11. Demostrate empathy and humane approach towards patients, relatives and attendants.
12. Demostrate interpersonal and communication skills befitting a physician in order to discuss the illness and its outcome with patient and family.
13. Develop a proper attitude towards patients, colleagues and other staff.
14. Maintain an ethical behavior in all aspects of medical practice.
15. Develop a holistic attitude towards medicine taking in social and cultural factors in each case.
16. Obtain informed consent for any examination/ procedure.
17. Appreciate patients right to privacy.
18. Write a complete case record with all necessary details.
19. Write a proper discharge summary with all necessary details.
20. Write a proper referral note to secondary or tertiary centres or to other physicians with all necessary details.
21. Assess the need for and issue proper medical certificates to patients for various purposes.
22. Adopt universal precautions for self protection against HIV and hepatitis and counsel patients.
23. Perform skin sensitivity tests for drugs and serum
24. Record and interpret ECG and be able to identify common abnormalities like myocardial infarction and arrhythmias.
25. Start intravenous line and infusion
26. Give intra dermal, subcutaneous, intra muscular, intra venous injections.

Teaching Hours

Teaching of Medicine and its allied specialties starts from 3rd term and extends to 9th term during phase II and III. Theory is taught for 300 hours starting from 4th term till 9th term as follows:

Phase	Term	No. of classes per week	Total hours
Phase II	4th Term	1	24
Phase II	5th Term	1	24
Phase III	6th Term	1	24
Phase III	7th Term	2	48
Phase III	8th Term	3	72
Phase III	9th Term	3	72
		Total	**264**

Integrated Teaching: 36 hours for group discussions, seminar etc. involving multi-speciality teachers.

Clinical Posting: 6 weeks in 3rd term
7 weeks in 5th term
6 weeks in 8th term
4 weeks in 9th term

Recommended Books, Recent Editions

1. Davidson Principles and Practice of Medicine
2. Kumar and Clark - Clinical Medicine
3. Association of Physicians of India - Text book of Medicine

Reference Books, Recent Editions

1. Harrison's Principles of Internal Medicine
2. Oxford textbook of Medicine

DERMATOLOGY AND SEXUALLY TRANSMITTED DISEASES

GOAL

The aim of teaching the undergraduate student in Dermatology and sexually transmitted diseases (STD) and leprology is to impart such knowledge and skills that may enable him to diagnose and treat common ailment and to refer rare diseases or complications / unusual manifestations of common diseases to the specialist

OBJECTIVES

(a) KNOWLEDGE

At the end of the course of dermatology and sexually transmitted diseases (STD) and leprology the student shall be able to:

1. Demonstrate sound knowledge of common diseases their clinical manifestations including emergent situations and investigative procedures to confirm their diagnosis.
2. Demonstrate comprehensive knowledge of various modes of topical therapy.
3. Describe the mode of action of commonly used drugs, their doses, side-effects/toxicity, indications and contra-indications and interactions.
4. Describe commonly used modes of management including the medical and surgical procedures available for the treatment of various diseases and to offer a comprehensive plan of management for a given disorder.
5. Diagnose and manage emergencies specially recognizing the need for referral when appropriate and necessary.

(b) SKILLS

1. Diseases caused by nutritional and environmental factors
2. Infective disorders: pyodermas, common viral and common fungal infections
3. Melanocyte, pigment metabolism and other disorders of pigmentation
   a) Vitiligo: diagnosis
   b) Albinism
   c) Melsma
4. Allergic disorders
   a) Urticaria,atopic dermatitis and contact dermatitis

COURSE CONTENTS

The student shall be able to:

1) Interview the patient, elicit relevant and correct information and describe the history in chronological order;
2) Conduct clinical examinations, elicit and, interpret physical findings and diagnose common disorders and emergencies.

3) Perform simple, routine investigations and laboratory procedures required for making bedside diagnosis, especially for STD cases: examination of scraping for fungus, preparation of slit smears and AFB Staining for leprosy patients.
4) Take a skin biopsy-for diagnostic purpose.
5) Manage common diseases recognise the need for referral for specialized care in case of inappropriateness of therapeutic response.
    1. Dermatitis and eczema
    2. Vesiculobullous Diseases
        a) Pemphigus
        b) Pemphigoid and Dermatitis herpetiformis
    3. Alopecia and hirsutism
    4. Structure and functions of sebaceous glands and Diseases
        a) Acne
        b) Seborrhoeic Dermatitis
        c) Other Diseases of sebaceous glands
        d) Pityriasis capitis
    5. Structure, function and diseases of sweat glands
        a) Miliaria
        b) Hyperhidrosis
    6. Leprosy
        a) Pathology, clinical features, Diagnosis, Reactions, Management
        b) Deformities and control programme
    7. Psoriasis
    8. Sexually transmitted diseases.
        a) Genital ulcerative diseases
        b) Genital discharge diseases
    9. Dermatological therapy
    10. Lichen Planus

SKILLS

1. Perform skin scrapings and do a KOH preparation for fungal infections.
2. Prepare slit skin and nasal smear for lepra bacilli.

Teaching hours

Theory : 20 hours

Clinical posting : 4 weeks in 6th term

Reference Books :

1. Roxberg Text Book of Dermatology.
2. Leprosy by Jopling.
3. Andrews Text Book of Dermatology
4. Concise Text Book of Dermatology, Vishalakshi.
5. Text Book of STI, V.K. Sharma.

TUBERCULOSIS AND RESPIRATORY DISEASES

GOAL

The aim of teaching the undergraduate student in Tuberculosis and Chest Diseases is to impart, such knowledge and skills that may enable him / her to diagnose and manage common ailments affecting the chest with the special emphasis on management and prevention of Tuberculosis and National Tuberculosis Control Programme.

OBJECTIVES

(a) KNOWLEDGE

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

1. Demonstrate knowledge of common chest diseases, their clinical manifestations, including emergent situations and of investigative procedure to confirm their diagnosis;
2. Demonstrate comprehensive knowledge of various modes of therapy used in treatment of respiratory diseases;
3. Describe the mode of action of commonly used drugs, their doses, side effects/ toxicity, indications and contra- indications and interactions;
4. Describe commonly used modes of management including medical and surgical procedures available for treatment of various diseases and to offer a comprehensive plan of management inclusive of National Tuberculosis Control Programme.

(b) SKILLS

The student shall be able to:

1. Interview the patient, elicit relevant and correct information and describe the history in chronological order;
2. Conduct clinical examination, elicit and interpret clinical findings and diagnose common respiratory disorders and emergencies.
3. Perform simple, routine investigative and office procedures required for making the bed side diagnosis; especially sputum collection and examination for etiologic organisms especially acid fast bacilli (AFB), interpretation of the chest x-rays and respiratory function tests.
4. Interpret and manage various blood gases and pH abnormalities in various respiratory diseases.
5. Manage common diseases recognizing need for referral for specialized care, in case of inappropriateness of therapeutic response.

6. Assist in the performance of common procedures, like laryngoscopic examination, pleural aspiration, respiratory physiotherapy, laryngeal intubation and pneumo- thoracic drainage / aspiration.

(c) INTEGRATION

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

Teaching hours

Theory: 20 hours

Clinical posting: 2 weeks in 4th term

Recommended Books, Recent Editions

Davidson's Principles and Practice of Medicine
Harrison's Principles of Internal Medicine
API Textbooks of Medicine
Crofton and Douglas's Respiratory Diseases

Recommended books for Clinical Examination:
Hutchison's Clinical Methods
Macleod's Clinical Examination

Reference Books:
Murray and Nadel's Textbook of Respiratory Medicine
Fishman's Pulmonary Diseases and Disorders
Tuberculosis (Sharma)
Tuberculosis (William Rom)
Textbook of Pulmonary and Critical Care Medicine (S K Jindal)

PSYCHIATRY

GOAL

The Aim of teaching the undergraduates students in Psychiatry is to impart such knowledge & skills that may enable them to diagnose and treat common Psychiatric disorders. Also, enable them to identify the interface of psychiatry with other branches of medical sciences and seek opinion or refer to a psychiatrist whenever there is necessity.

OBJECTIVES:

a) KNOWLEDGE

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

1. Understand human behaviour and its application in patient care.
2. Understand the concept of motivation, its impact on human behaviour and illness related behaviour.
3. Understand different types of emotions and their impact on health of the individual.
4. Define learning, comprehend different types of learning and conditioning. State methods of effective learning and demonstrate application of learning in treatment.
5. Understand different cognitive processes, comprehend memory process, describe short term memory and differentiate with long term memory., list causes of forgetting, and illustrate methods of improving memory.
6. Comprehend concept of thinking and its application to health care.
7. Understand nature of intelligence, explain growth of intelligence, compare role of heredity and environment in intellectual development. Method of assessment of intelligence.
8. Define personality, list determinants of personality, understand different theories of personality and learn methods of personality assessment.
9. Introducing concept of psychiatric disorders and their classification
10. Awareness of general issues about etiology of psychiatric disorders and methodology used to study aetiology of these disorders.
11. Ability to diagnose and treat common psychiatric disorders like schizophrenia, acute manic episode, depression, anxiety disorders including phobias and OCD, conversion and dissociative disorders.
12. To be able to diagnose severe/suicidal cases of depression and to refer them.
13. Understand the concept of personality disorders.
14. Ability to diagnosis and treat alcohol and drug dependence and withdrawal states.

15. Ability to diagnose common psychiatric disorders in children.
16. To know the role of counseling and psychological therapies in treatment of psychiatric disorders.
17. Demonstrate role of psychological testing in assessment of psychiatric disorders.

b) SKILLS :

Ability to develop communication skills to interview patients, develop rapport, elicit detailed Psychiatry history and assess mental status.
Identify the bio-psycho-social factors that contribute for ill health and incorporate them in diagnoses and treatment of common psychiatric disorders

c) INTEGRATION:

Training in psychiatry shall prepare the students to deliver preventive, promotive, curative and rehabilitative services for the care of patients with psychiatric disorders at all levels (Primary Health Care to Community based services). Also, the students will be able to integrate the knowledge of psychiatry with other branches of medicine so as to appreciate the relevant interface in presentation and management of various disorders.

COURSE CONTENTS

1. Introduction: General introduction to Behavioural Psychology
   What is behavioural psychology, components, individual differences and applications of behavioural sciences in patient care and medical education.
2. Motivation
   Definition of motivation, theories, types-physiological and social motives, Maslow's hierarchy of motives, clinical application
3. Emotion and its application to health
   Theories of emotions, type and impact on health.
4. Learning and conditioning.
   Components of learning, classical conditioning, operant conditioning, cognitive, social, biological and observational learning. Methods of effective learning, behaviour and cognitive therapy.
5. Cognitive process and memory

   Sensation, perception, illusion, memory process, short term and long term memory, causes of forgetting and methods to improve memory.
6. Thinking and problem solving

   Definition of thinking, components of thinking-imagery recollection, language, steps in problem solving, abnormalities in thinking, decision making.
7. Intelligence: General concepts and techniques for assessment.

Theory of intelligence, growth of intelligence, stability of intelligence, determinants of intelligence, assessment of intelligence, extremes of intelligence.

8 Personality (Principles of Personality development) and objective testing of Personality Definition of personality, trait, factors influencing personality development, theories of personality and personality assessment.

9. Introduction and classification of Psychiatric disorders

Concept of psychiatric disorders; need for classification; types of classification e.g. atheoretical, symptom - based; introducing the International Classification of Diseases ((ICD) and the Diagnostic and Statistical Manual (DSM); major categories of psychiatric disorders; diagnosis of organic disorders.

10. Aetiology of Psychiatric disorders

Overview of contribution of different scientific disciplines to psychiatric aetiology-clinical descriptive studies, epidemiology, social sciences e.g. role of life events, stress; genetics; biochemical studies; pharmacology; endocrinology; physiology; neuropathology; psychology.

11. Schizophrenia

Epidemiology, clinical features, subtypes, diagnosis, overview of aetiology, course, treatment - pharmacological, role of ECT.

12. Mood Disorders : Depression,Bipolar disorders, Suicide

Epidemiology, clinical features, diagnosis, overview of aetiology, course, treatment - pharmacological.

13. Anxiety Disorders Like phobia and OCD

Types of anxiety disorders; phobia, OCD, clinical features and epidemiology; diagnosis, differential diagnosis; overview of aetiology; course; treatment - pharmacological and non-pharmacological.

14. Conversion and Dissociative disorders

Epidemiology, clinical picture, diagnosis, differential diagnosis, aetiology, prognosis, treatment.

15. Personality disorders

Concept of personality disorders, epidemiology, classification, assessment, overview of clinical features, aetiology, prognosis.

16. Drug and Alcohol dependence

Concept of abuse and dependence, epidemiology of alcohol and opiate dependence; clinical features,withdrawal symptoms including complicated withdrawal, psychosocial complications, aetiology, outcome, treatment.

17. Psychiatric disorders of childhood and adolescence,

Classification of childhood psychiatric disorders, epidemiology, clinical features, aetiology, assessment.

18. Counselling and psychological therapies
    Counselling process, skills, different counseling approaches, behaviour therapy, cognitive therapy and its applications.
19. Psychological testing
    What are psychological tests, standardization, reliability, validity, intelligence test, personality test, application.

TEACHING AND LEARNING METHODOLOGY
Seminar, Role-play, Bedside Clinics, Case presentation, Tests, Quiz & e-learning Tools
Clinical Posting: 2 weeks in Second Year
Teaching Hours : 20hrs in Final Year
Internship : 2 weeks

Recommended Books - Recent Editions

1. Niraj Ahuja's Text-book on Psychiatry
2. Oxford Short Text Book Psychiatry
3. Pocket Handbook of Psychiatry Kalpan & Saddock

Reference Books - Recent Editions

Kaplan & Saddock Textbook of Psychiatry
Oxford Text Book of Psychiatry

SCHEME OF EXAMINATION

Internal Assessment

Theory: 60 Marks

Minimum of three examinations shall be conducted. 20% IA marks shall include MCQs Average of best two of three is taken into consideration. The total marks will be reduced to 60 marks and sent to the University.

Practicals: 40 Marks

Minimum three practical examinations shall be conducted. Average of best two of three is taken into consideration. The total marks will be reduced to 40 marks and sent to the University.

UNIVERSITY EXAMINATION

Total marks: 400 (Theory 200, Viva-voce 40 and Clinical 160)

Theory (Written paper)

There shall be two papers, each carrying 100 marks. Each paper shall be of 3 hours duration. The pattern of questions would be of three types:

Long essay question	-	2x10= 20 marks
Short essay question	-	10x5= 50 marks
Short answer question	-	10x3= 30 marks

Distribution of subjects in Paper I and Paper II, for the University examination shall be as follows:

Paper I - General Medicine

Paper II - General Medicine including Psychiatry, Dermatology, STD, Tuberculosis and Respiratory Diseases.
(shall contain one question on basic sciences and allied subjects)

Weightage of marks in university examination

Paper I - General Medicine-- Max Marks 100

Paper II - General Medicine-- Max Marks 100

Weightage of marks in university examination

Paper I - General Medicine-- Max Marks 100

Sl No.	Topic	Weightage of marks
1	Nutrition / Exposure to Physical and Chemical Agents	05
2	Infections	15
3	Haematology	05
4	Respiratory System	10
5	Cardio vascular system	10
6	Gastro-Intestinal Tract and Liver	10
7	Emergency Medicine	10
8	Neurological System - Investigation: Neuroimagining, EEG, NCV and EMG	05
9	Nephrology and Urinary System	05
10	Connective Tissue Disorders	05
11	Endocrines	10
12	Geriatrics	05
13	Medical Ethics	05

Paper II - General Medicine- Max Marks 100

Sl No.	Topic	Weightage of marks
1	General Medicine	50
2	Psychiatry	10
3	Dermatology, STD	10
4	Tuberculosis and Respiratory Diseases	30

Clinical: 160 Marks

Clinical examination consists of one long case carrying 80 marks and two short cases of 40 marks each.

Viva-voce: 40 Marks

Consists of oral questions on all aspects of syllabus and also interpretations of X-ray, ECG, prescriptions, specimens and instruments

PAEDIATRICS

GOAL

To acquire adequate knowledge and appropriate skills for optimally dealing with major health problems of children to ensure their optimal growth and development.

OBJECTIVES

The objectives of training the undergraduate students in Paediatrics is to ensure that at the end of the training he / she will be able to:

* Diagnose and appropriately treat common pediatric and neonatal illnesses.
* Identify pediatric and neonatal illnesses and problems that require secondary and tertiary care and refer them appropriately.
* Advise and interpret relevant investigations.
* Counsel and guide patient's parents and relatives regarding the illness, the appropriate care, the possible complications and the prognosis.
* Provide emergency cardiopulmonary resuscitation to newborns and older children.
* Participate in the National programmes effectively.
* Diagnose and effectively treat acute pediatric and neonatal emergencies.
* Discharge medico - legal and ethical responsibilities.
* Perform routine investigative and therapeutic procedures.
* Motivate parents to consent for a diagnostic autopsy as well as for Invasive procedures.

(a) KNOWLEDGE

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

1. Describe the normal growth and development during fetal life, neonatal period, childhood and adolescence and outline deviations thereof.
2. Describe the common pediatric disorders and emergencies in terms of epidemiology, etiopathogenesis, clinical manifestations, diagnosis, rational therapy and rehabilitation.
3. State age related requirements of calories, nutrients, fluids, drugs etc. in health and disease.
4. Describe preventive strategies for common infectious disorders, malnutrition, genetic and metabolic disorders, poisonings, accidents and child abuse.
5. Outline national programmes relating to child health including immunisation programmes

(b) SKILLS

1. Obtain a proper relevant history and perform a humane and thorough clinical examination of all organs / systems in children including neonates.
2. Arrive at a logical working diagnosis after clinical examination.
3. Order appropriate investigations keeping in mind their need, relevance and cost effectiveness.
4. Plan and institute a line of treatment which is need based, cost effective and appropriate for common ailments taking into consideration:
   a) Patient,
   b) Disease,
   c) Socio-economic status,
   d) Institutional / Governmental guidelines.
5. Recognize situations which call for urgent or early treatment at secondary and tertiary centers and make a prompt referral of such patients after giving first aid or emergency treatment.
6. Monitor growth and development of children and differentiate normal from abnormal.
7. Assess and manage fluid / electrolyte and acid - base imbalance.
8. Manage diarrheas / dysenteries: Assess dehydration; prepare and administer oral rehydration therapy (ORT).
9. Detect and institute corrective measures for nutritional deficiency.
10. Write a complete case record with all necessary details.
11. Write a proper discharge summary with all relevant information.
12. Write a proper referral note to secondary or tertiary centers or to other physicians with all necessary details.
13. Organise and give training in first aid.
14. Adopt universal precautions for self protection against HIV and hepatitis and counsel patients.
15. Maintain cold chain for vaccines.
16. Perform and read Mantoux test.
17. Start i.v. line and infusion in children and neonates.
18. Give intradermal / S.C. / I.M. / I.V. injection.
19. Pass a nasogastric tube.
20. Manage hyperpyrexia.
21. Conduct CPR (cardiopulmonary Resuscitation) and first aid in all newborns and children including endotracheal intubation
22. Demonstrate empathy and humane approach towards patients, relatives and attendants.

23. Develop a proper attitude towards patients, colleagues and other staff.
24. Maintain an ethical behavior in all aspects of medical practice.
25. Organise antenatal, postnatal, new born and other clinics.
26. Motivate colleagues, community and patients to actively participate in national health programmes.
27. Observe Insertion and management of C.V.P. line.
28. Observe All Neonatal procedures including exchange transfusion.
29. Observe venous cutdown.

(c) 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 at hospital as part of a team in an integrated form with other disciplines, e.g. Anatomy, Physiology, Biochemistry, Microbiology, Pathology, Pharmacology, Forensic Medicine, Community Medicine and Physical Medicine and Rehabilitation.

SYLLABUS

THEORY- **Teaching hours- 100**

1. VITAL STATISTICS & NATIONAL CHILDHOOD & ADOLESCENT PROGRAMMES
   a) Introduction to Pediatrics with special reference to age related disorders.
   b) Definition of mortality rates and ratios: infant, perinatal, maternal and neonatal.
   c) Causes and prevention of infant, perinatal and neonatal mortality.
   d) ICDS and IMNCI, National programmes on maternal and child health, RCH - I and RCH - II Programmes.

2. GROWTH AND DEVELOPMENT

Anthropometric and developmental assessment, normal and abnormal growth and development patterns, interpretation of growth curves and road to health chart.
Psychological and behavioural problems. Approach to a child with growth retardation and short stature.

3. NUTRITION
   a) Normal requirements of protein, carbohydrate, fat, minerals, vitamins and trace elements for newborns, children, pregnant and lactating mothers.
   b) Exclusive breast feeding, advantages of breast feeding, infant feeding, weaning diets, planning of preterm nutrition, therapeutic diet chart.
   c) Recognition and treatment of nutritional deficiency disorders.

d) Protein energy malnutrition: classification, causes, management including that of complications.
e) National Nutritional and other child health and welfare programmes.
f) Management of problems related to lactation failure.
g) Hyper - vitaminosis.

4. IMMUNIZATION

a) National Immunization programmes.
b) Pulse polio programme.
c) Vaccines and vaccine - preventable diseases.
d) Principles of immunization.
e) Vaccine preservation and cold chain.
f) Indications, contra-indications, adverse reaction and complications.
g) Investigations and reporting of vaccine preventable diseases.
h) Other newer vaccines- Haemophilus Influenza type b, pneumococcal, meningococcal, Varicella vaccine, Hepatitis A & B., Rubella vaccine, Influenza virus vaccine.

5. INFECTIOUS DISEASES

a) Natural history, clinical course, signs, symptoms, investigations, management and prevention of common bacterial, viral, parasitic and fungal infections with special reference to vaccine preventable diseases.
b) Tuberculosis, mumps, rubella.
c) Typhoid, chicken pox and other common childhood exanthematous diseases and parasitic infestations like Giardiasis, Malaria.
d) Intestinal Helminthiasis.
e) Bacterial: Typhoid, Tuberculosis
f) Viral: Chicken Pox, Mumps, Common Childhood exanthematous Fevers like measles.
g) Others: Giardiasis, Amoebiasis, Malaria
h) Leptospirosis - Rubella
- Pediatric HIV
- Dengue viral Fever.
i) Kala Azar.
ii) Filariasis.
iii) Brucellosis.

6. CENTRAL NERVOUS SYSTEM

a) Clinical diagnosis, investigations and treatment of acute CNS infections.
b) Meningitis including tuberculosis.
c) Encephalitis.
d) Seizure disorders.
e) Febrile convulsions.
f) Rheumatic Chorea.
g) Infantile hemiplegia.
h) Cerebral palsy.
i) Mental retardation.
j) Hydrocephalus.
a) Post encephalitic sequelae.
b) Post meningitic sequelae.
c) Microcephaly.
d) Degenerative diseases.

7. GASTROINTESTINAL SYSTEM

Clinical diagnosis, relevant investigations and management of:

a) Gastro - oesophageal reflux.
b) GI bleeding.
c) Common hepatic disorders: Acute & chronic Hepatitis.
d) Acute and Chronic diarrhea and their complications.
e) Hepatosplenomegaly.
f) Obstructive Jaundice.
g) Portal Hypertension.
h) Abdominal tuberculosis.
i) Acute abdomen including surgical causes and paralytic Ileus.
j) Chronic constipation and rectal bleeding.
k) Budd - Chiari syndrome.
l) Metabolic disorders like Wilson's disease.
m) Short gut syndrome.

8. GENITOURINARY SYSTEM

a) Clinical features, investigations, complications and management of acute glomerulonephritis; nephrotic syndrome.
b) Urinary tract infection - acute and recurrent.
c) Acute and chronic renal failure.

9. CARDIOVASCULAR SYSTEM

a) Clinical features, diagnosis, investigation, prevention and treatment of acute rheumatic fever.
b) Rheumatic heart disease and complications.
c) Recognition of congenital acyanotic and cyanotic heart diseases and management of cyanotic spells.
d) Diagnosis and management of congestive cardiac failure.
e) Prevention, recognition and treatment of bacterial endocarditis.
f) Clinical features, diagnosis, prevention and treatment of pericardial effusion and myocarditis.

10. RESPIRATORY SYSTEM

a) Epidemiology, clinical features, investigation and management of acute respiratory infections of upper and lower tract.
b) Diagnosis and management of acute bronchial asthma, status asthmaticus, chronic suppurative lung diseases, Bronchiectasis, Bronchopneumonia, Pneumonitis.
c) Diagnosis and appropriate management of foreign body aspiration.
d) Cystic fibrosis.

11. ENDOCRINE SYSTEM

a) Clinical recognition, causes, laboratory diagnosis, prevention and management of Hypothyroidism (cretinism).
b) Short Stature.
c) Juvenile diabetes mellitus.
d) CAH (Congenital Adrenal Hyperplasia).

12. HAEMATOLOGICAL SYSTEM

a) Recognition of clinical features, diagnosis, laboratory investigations and management of Nutritional and Haemolytic Anaemias.
b) Diagnosis and basic investigations of bleeding and coagulation disorders in newborn and older children.
c) Leukaemia.
d) Lymphomas.

13. NEONATOLOGY

a) Foetal physiology of normal pregnancy. Identification of antenatal, intrapartum and immediate postnatal risk factors.
b) Definition, Identification and classification of high risk neonate, Neonatal resuscitation, Gestational age assessment and Care of the normal newborn.

c) Infection.
d) Haemorrhagic Disease of Newborn.
e) Respiratory distress syndrome.
f) Breast feeding, Baby friendly initiative and Feeding difficulties, Infant & Young child feeding.
g) Birth injuries.
h) Anaemia and Jaundice.
i) CHD (Congenital Heart Diseases).
j) Neonatal seizures.
k) Birth asphyxia.
l) Management of meconium aspiration syndrome.
m) Care of the preterm and low birth weight infant: temperature maintenance, feeding, prevention of complications, appropriate method of transfer to tertiary centre.
n) Identification and referral of neonates with congenital malformations like cleft lip, cleft palate, tracheo-oesophagal fistula, diaphragmatic hernia, anorectal anomalies.
o) IHPS (Infantile Hypertrophic pyloric stenosis.)
p) Management of neonatal problems: Transient metabolic disorders.
q) Minor developmental defects.
r) Infants of diabetic mothers.

14. GENETIC DISORDERS

Common Genetic Disorders like down's syndrome.
Genetic Counseling.

15. EMERGENCY PAEDIATRICS

Clinical features, etiology, laboratory diagnosis, prevention and management of:

1. Status asthmaticus.
2. Status epilepticus.
3. Acute pulmonary edema.
4. Hypertensive emergencies.
5. Peripheral circulatory failure due to dehydration, hemorrhage and shock.
6. Cardiac failure.
7. Cyanotic spells, Scorpion and snake envenomation, and Common poisoning including neem oil, castor oil and accidental kerosene ingestion and RTA in Children.

16. ADOLESCENCE

1. Physical and psychological changes
2. Immunisarion
3. Health problems
4. Life Sklls
5. Counselling

17. ENVIRONMENT AND DISEASE

1. Common poisoning
2. Radiation Hazards

PRACTICALS TRAINING

Total 10 weeks posting

4 weeks in 6thterm

6 weeks in 8thterm

SCHEME OF EXAMINATIONS

Internal Assessment

Theory: 30 Marks

Minimum of two examinations shall be conducted. 20% IA marks shall include MCQs Average of the two is taken into consideration. The total marks will be reduced to 30 marks and sent to the University.

Practicals: 20 Marks

Minimum two practical examinations shall be conducted. Average of the two is taken into consideration. The total marks will be reduced to 20 marks and sent to the University.

UNIVERSITY EXAMINATION

A. Theory: 100 Marks

PATTERN OF QUESTION PAPER

Total: 100 marks 3 hours

Long essay question	-	2x10= 20 marks
Short essay question	-	10x5= 50 marks
Short answer question	-	10x3= 30 marks

Weightage of marks for theory paper		
1	Vital Statistics & National Childhood & Adolescent Programmes	5
2	Growth And Development	8
3	Nutrition	10
4	Immunisation	5
5	Infectious Diseases	10
6	Central Nervous System	8
7	Gastrointestinal System	8
8	Genitourinary System	3
9	Cardiovascular System	8
10	Respiratory System	10
11	Endocrine System	3
12	Haematological System	3
13	Neonatology	8
14	Genetic Disorders	3
15	Emergency Paediatrics	8

B. PRACTICAL**: 80 Marks One hour**

2 Long cases - (40 marks each)

C. VIVA VOCE**: 20 Marks** (Nutrition, Drugs, Xrays, Instruments)

Recommended Books-Recent Editions.

1. IAP Textbook of Pediatrics, Editor-in-chief Parthasarathy A.
2. The Short Textbook of Pediatrics, Editor Suraj Gupte
3. Ghai essential Pediatrics, Editors O.P. Ghai, Piyush Gupta, V.K.Paul

Reference Books-Recent Editions

1. Nelson Textbook of Pediatrics, Editors Robert M. Kliegman, Richard E. Behrman, Hal B. Jenson, Bonita V. Stanton.
2. Oski's Pediatrics Principles and Practice, Editor-in-chief Julia A. Millan, Editors Ralph A. Feigin, Catherine D. DeAngelis.
3. Rudolph's Fundamentals of Pediatrics, Editors Abraham M. Rudolph, Robert K. Kamer.
4. Avery's Diseases of the Newborn 8th edition Editors William Taeusch, Robert A. Ballard, Christine A. Gleason.
5. Pediatric Clinical Methods, Editor Meherban Singh

SURGERY & ALLIED SPECIALTIES
GENERAL SURGERY

GOAL

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

OBJECTIVES

(a) KNOWLEDGE

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

1. Describe aetiology, pathophysiology, principles of diagnosis and management of common surgical problems including emergencies, in adults and children.
2. Define indications and methods for fluid and electrolyte replacement therapy including blood transfusion.
3. Define asepsis, disinfection and sterilization and recommend judicious use of antibiotics.
4. Describe common malignancies in the country and their management including prevention.
5. Enumerate different types of anaesthetic agents, their indications, mode of administration, contra indications and side effects.

(b) SKILLS

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

1. Diagnose common surgical conditions both acute and chronic, in adult and children.
2. Plan various laboratory tests for surgical conditions and interpret the results.
3. Identify and manage patients of haemorrhagic, septicaemic and other types of shock.
4. Be able to maintain patent air-way and resuscitate.
   a) a critically injured patients.
   b) patient with cardio-respiratory failure.
   c) a drowning case.
5. Monitor patients of head, chest, spinal and abdominal injuries, both in adults and children.
6. Provide primary care for a patient of burns.
7. In the situations identified in Sl.No. 3, 4, 5 and 6 calling for urgent or early surgical intervention, refer at the optimum time to appropriate centres.

8. Acquire principles of operative surgery, including pre-operative, operative and post operative care and monitoring.
9. Treat open wound including preventive measures against tetanus and gas gangrene.
10. Diagnose neonatal and paediatric surgical emergencies and provide sound primary care before referring the patient to secondary/ tertiary centres.
11. Identify congenital anomalies and refer them for appropriate management.

    In addition to the skills referred above in items (1) to (10), he shall have observed/ assisted/ performed the following:

    a) Incision and drainage of abscess
    b) Debridement and suturing open wound
    c) Venesection
    d) Excision
    e) Biopsy of surface malignancy
    f) Catheterisation and nasogastric intubation
    g) Circumcision
    h) Meatotomy
    i) Vasectomy
    j) Peritoneal and pleural aspirations
    k) Diagnostic proctoscopy
    l) Hydrocele operation
    m) Endotrachel intubation
    n) Tracheostomy and cricothyroidotomy
    o) Chest tube insertion
12. Counsel and guide patients and relatives regarding need, implications and problems of surgery in the individual patient.
13. Develop adequate and right attitude in dealing with surgical problems of patients.
14. Organise and conduct relief measures in situations of mass casualties.
15. Effectively participate in the National Health Programmes especially the Family Welfare Programme.
16. Discharge effectively medico-legal and ethical responsibilities.

(c) INTEGRATION

The undergraduate teaching in surgery shall be integrated at various stages with different pre and para and other clinical departments.

COURSE CONTENTS

II Phase (4th Term)

One class per week (24 Hours per term)

1. Introduction to Surgery, Historical background and progress made.

2. Haemorrhage and shock;

a) Aetiology
b) Pathology
c) Symptomatology
d) Management

3. Fluid, Electrolyte and Acid base balance, Nutrition

a) Introduction to Physiology of fluids and Electrolytes
b) Dehydration and over hydration
c) Specific electrolyte losses and symptomatology and management
    i) Hypokalaemia
    ii) Hyponatraemia
    iii) Hypocalcaemia
    iv) Acidosis
    v) Alkalosis
    vi) Acid Base balance
d) Electrolyte changes in specific diseases
    i) Pyloric obstruction
    ii) Intestinal obstruction
    iii) Anuria

* Various replacement fluids in surgery, mode of administration & complications.
* Blood grouping, blood transmission and its hazards
* Nutrition: Pre-operative intravenous alimentation

4. Skin tumours, Burns, Skin Grafting

5. Arterial diseases:

a) Investigations
b) Assessment of a case of peripheral vascular disease
c) Thrombosis and Embolism
d) Thromboangitis obliterans
e) Arterio sclerosis
f) Atheroscerosis and Aneurysms
g) Gangrene
h) Conservative management of on Ischaemic limb
i) Surgical management of an ischaemic limb - direct arterial surgery.

6. Venous diseases:

a) Varicose veins
b) Superficial and deep vein thrombosis
c) Chronic venous ulcers.

7. Lymphatics and Lymphnodes:

a) Lymphangitis and Lymphatic obstruction (filariasis)
b) Diseases of lymphnodes
    i) Acute inflammation
    ii) Chronic inflamamation
    iii) The reticulosis

II Phase (5th Term)

One class per week (24 Hours per term)

1. Wounds, wound healing and wound management
2. Acute non-specific and specific infections
3. Chronic, specific infections
4. Tumours, Cysts, Ulcers and Sinuses and Fistulae
5. Infections of the hand and foot
6. Diseases of muscles, tendons, bursae and fascia
7. Hernia
    a) Inguinal hernia
    b) Femoral hernia
    c) Umbilical hernia
    d) Epigastric hernia
    e) Incisional Hernia-complications and Management
8. Umbilical Granuloma
9. Umbilical Fistula
10. Umbilical adenoma or raspberry tumour
11. Abdominal wall - anatomy, Incisions, Burst abdomen, Desmoid tumor

III Phase (6th Term)

One class per week (24 Hours per term)

1. FACE
    a) Development and congenital anomalies
    b) Cleft lip and cleft palate
    c) Carcinoma lip
    d) Rodent Ulcer
    e) Facio-Maxillary injuries
2. TEETH
    a) Dental caries, Alveolar abscess

3.GUMS

a) Gingivitis and pyorrhoea, tumours of the alveolus (epulis), odontomes, tumors of the jaw.

4. MOUTH

a) Ranula
b) Cancrum Oris
c) Lingual and Sublingual dermoids
d) Carcinoma cheek

5. TONGUE

a) Hyperkeratosis and leukoplakia
b) Carcinoma tongue

6. SALIVARY GLANDS

a) Inflammation
b) Salivary calculi
c) Neoplasm

7. NECK

a) Branchial cyst and fistula
b) Cystic Hygroma and solitary lymphatic cyst
c) Thoracic outlet syndrome
d) Cervical lymphadenitis
e) Differential diagnosis of swellings of the neck
f) Sternomastoid tumor

III Phase (7th Term)

Two classes per week (48 Hours per term)

1. THYROID GLAND, THYROGLOSSAL TRACT AND ENDOCRINES

a) Development, Anatomy, Physiology and Investigations
b) Different Non-toxic goiter, Toxic goiter
c) Solitary nodule in the thyroid gland
d) Hashimoto's disease
e) Riedel's thyroiditis
f) Carcinoma of the thyroid
g) Thyroglossal cyst and fistula
h) Parathyroids and adrenals and thymus

2. BREAST

a) Anatomy and lymphatic drainage
b) Inflammation of the breast
c) Benign breast diseases, nipple discharge
d) Malignant tumors of the breast

3. SYMPATHETIC SYSTEM
    a) Anatomy
    b) Indications for sympathectomy
    c) Cervical sympathectomy
    d) Lumbar sympathectomy

4. CRANIO-CEREBRAL INJURIES
    a) Mechanism, Pathology and Investigations and Management
    b) Cerebral concussion, contusion and laceration
    c) Acute extradural haematoma
    d) Acute intracerebral and chronic subdural haematoma
    e) Acute intracerebral haematoma
    f) Fractures of the skull

5. DISEASES OF THE BRAIN
    a) Injuries of nerves and nerve regeneration
    b) Facial nerve
    c) Radial, Ulnar and Median nerve, Lateral Popliteal nerve

III Phase (8th Term)
Three classes per week (72 Hours per term)

1. GENITO URINARY SYSTEM
    a) Symptomatology and investigations of a genitor-urinary case

2. KIDNEYS AND URETER
    a) Congenital anatomy-Polycystic kidney
    b) Trauma
    c) Anuria and dialysis
    d) Hydronephrosis
    e) Renal and Ureteric calculi
    f) Tuberculosis of kidney
    g) Neoplasms

3. URINARY BLADDER
    a) Congenital anomaly-Ectopia vesicae
    b) Trauma-Rupture bladder
    c) Retention of urine and cystitis
    d) Vesical calculi

4. PROSTATE
    a) Surgical anatomy
    b) Benign enlargement
    c) Carcinoma of prostate

5. URETHRA
    a) Rupture
    b) Stricture and its complications
6. PENIS, TESTIS AND SCROTUM
    a) Penis:
        i) Phimosis
        ii) Paraphimosis
        iii) Pre-cancerous conditions of the penis
        iv) Carcinoma penis.
    b) Testis
        i) Undescended testis and testicular torsion
        ii) Varicocele
        iii) Hydrocele and Haematocele
        iv) Tubercular epididymitis and acute epididymo-orchitis
        v) Neoplasms
    c) Scrotum
        i) Fournier's gangrene
        ii) Carcinoma-scrotum
7. VASECTOMY AND RECANALISATION
    a) Indications
    b) Techniques
    c) Complications with special reference to family planning.

III Phase (7th Term)
Two classes per week (48 Hours per term)

1. CARDIOTHORACIC SYSTEM
    a) Injuries to the thorax
    b) Infections:
        i) Empyema thoracis
        ii) Suppurative conditions of the lungs and pleura
    c) Malignancy:
        i) Carcinoma of the lungs
        ii) Miscellaneous
2. OESOPHAGUS
    a) i) Investigations of G I tract-general ii) Dysphagia, differential diagnosis, investigations, management Achalasia cardia
    b) Achalasia cardia
    c) Reflux oesophagitis and hiatus hernia
    d) Carcinoma oesophagus

3. STOMACH AND DUODENUM
    a) Congenital pyloric stenosis
    b) Acute dilatation of the stomach
    c) Peptic ulcer
    d) Complications of Peptic ulcer
    e) Malignancy

4. SPLEEN

5. LIVER
    a) Trauma
    b) Liver abscess
    c) Portal hypertension
    d) Neoplasms of the liver
    e) Cysts of the liver

6. GALL BLADDER AND BILE DUCTS
    a) Anatomy and Physiology
    b) Investigations
    c) Cholelithiasis
    d) Cholecystitis
    e) Obstructive Jaundice

7. PANCREAS
    a) Acute pancreatitis
    b) Chronic pancreatitis
    c) Pancreatic cysts
    d) Carcinoma pancreas

8. PERITONEUM
    a) Acute and chronic peritonitis
    b) Subphrenic abscess
    c) Mesenteric cyst
    d) Abdominal Tuberculosis

9. INTESTINES
    a) Congenital deformities
    b) Surgical aspects of intestinal amoebiasis
    c) Crohn's disease
    d) Ulcerative colitis
    e) Large intestinal tumors

10. INTESTINAL OBSTRUCTION
    a) Pathology
    b) Signs and symptoms
    c) Management

11. SPECIFIC OBSTRUCTIONS
    a) Intussusception
    b) Volvulus of sigmoid and small bowel
    c) Paralytic ileus

12. APPENDIX
    a) Appendicitis
    b) Complications and Management

13. RECTUM AND ANAL CANAL
    a) Anatomy
    b) Imperforate anus
    c) Ano-rectal abscess
    d) Haemorrhoids, Fissures, Fistulae
    e) Ano-Rectal carcinoma
    f) Rectal polyp
    g) Prolapse rectum

14. BIO-MEDICAL WASTE

Types, potential risks and their safe management.

    a) Surgical Ethics - brief introduction and basic principles
    b) Laparoscopic surgery - introduction and
        i) Diagnostic Laparoscopy basic principles
        ii) Laparoscopic Appendectomy
        iii) Laparoscopic Cholecystectomy
    c) Day care surgery - a brief note

Teaching Hours of Surgery

1) Clinical Teaching - Students are posted to hospitals for clinical work every day for 3 hours.

   6 weeks in 3rd term,7weeks in 5th term,6weeks in 8th term,4weeks in 9th term

2) Lecture classes - Total number of lecture classes 300 hours.

Phase	Term	No. of classes per week	Total Hours
Phase II	4th Term	1	24
Phase II	5th Term	1	24
Phase III	6th Term	1	24
Phase III	7th Term	2	48
Phase III	8th Term	3	72
Phase III	9th Term	3	72
		Sub total	**264**

3) Demonstration of:

a) X-rays and slides
b) Pathological specimens
c) Operative Surgery
d) Instruments 10 hrs

4) Integrated teaching

a) Jaundice, Thyroid, Diabetes, etc.
b) Critically ill patients
c) Multiple organ injury
d) Cardiothoracic resuscitation with departments of anesthesia & medicine
e) Common Surgical Emergencies 26 hrs

Grand total 300 hrs

Recommended Text Books-Recent Editions.

1. Bailey & Love's Short Practice of Surgery
2. A concise Text Book of Surgery - By Das S
3. A Manual of Clinical Surgery - By S. Das
4. Hamilton Bailey's 'Physical Signs' - Demonstration of Physical signs in Clinical Surgery

Reference Books-Recent Editions

1. Current Surgical Diagnosis and Treatment (Lange Publications)
2. Browse's Introduction to the Symptoms and signs of Surgical Disease

ORTHOPAEDICS

OBJECTIVES

(a) KNOWLEDGE

The student shall be able to:

1. Explain the principles of recognition of bone injuries, dislocations & complications associated with such injuries.
2. Apply suitable methods to detect and manage common infections of bones and joints.
3. Identify congenital, skeletal anomalies and their referral for appropriate correction or rehabilitation.
4. Recognise metabolic bone diseases as seen in this country.
5. Explain etiology, pathogenesis, manifestations, diagnosis of neoplasm affecting bones.
6. Apply suitable knowledge to recognize and their refferal for perifferal nerve injuries associated with musculoskeletal abnormalities.

(b) SKILLS

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

1. Detect sprains and deliver first aid measures for common fractures and sprains and manage uncomplicated fractures of clavicle, Colle's fracture, phalanges fractures.
2. Use techniques of splinting, plaster, immobilization.
3. Manage common bone infections.
4. Describe indications for sequestrectomy, amputations and corrective measures for bone deformities.
5. Advise aspects of rehabilitation for polio, cerebral palsy and amputation.

Application

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

(c) Integration

Integration with anatomy, surgery, pathology, radiology and forensic medicine be done.

COURSE CONTENTS

1. TRAUMATOLOGY:

Injuries of Bone and joint:

Fracture - general types - healing of fractures - principles and management - diagnosis - methods of reductions - immobiliszation - complications of fractures - management of open fractures - pathological fractures.

Injuries of shoulder - arm - forearm. Fracture clavicle, injuries of Acromio clavicular joints.

Fracture scapula, upper end of humerus. Dislocation of shoulder - acute and recurrent. Fracture shaft humerus. Fractures around the elbow, radius, ulna, Monteggia fracture, dislocation - Injuries around the wrist. Fracture scaphoid bone. Dislocation of lunate.

Injuries of the hand: Incidence -closed injury-fracture-metacarpal - Bennett fracture & dislocation, open injuries - tidy injuries - tendon injuries. POP slab application.

Injuries - Lower Extremity:

Dislocation of hip, Fracture neck of femur, trochantric fracture, fracture shaft femur.

Injuries of knee - fracture tibia-fracture dislocation ankle-fracture calcaneum.

Traction splintage - below knee slab and above knee slab.

Injuries of the spine:

Incidence-mechanism, types, clinical features-cord injury - traumatic Paraplegia, Nerve injury: Anatomy of a peripheral nerve-pathology-classification- diagnosis-management-Radial, Ulnar, Median, Sciatic, Lateral Popliteal.

Vascular Injuries:

Types, sub fascial compression, Brachial artery injury, Popliteal artery injury, Tibial artery injury.

Amputations: General indications-levels, technique above knee amputation, below knee amputation, Symes amputation - upper limb amputation, prosthesis.

2. COLD ORTHOPAEDICS:

Deformities: General-congenital-acquired-principles of management, splints, Club foot, DDH (Developmental Displacia of Hip), Congenital skeletal limb deficiencies

3. REGIONAL CONDITIONS:

Neck-Torticollis-Inter vertebral disc prolapse. Cervical rib
Shoulder, peri arthritis-painful arc syndrome, Tennis elbow, Cubitus Varus-valgus.
Wrist and Hand: wrist drop-claw hand, ganglion, Dupuytrens contracture, dequervain's disease, trigger thumb - Carpal tunnel syndrome
Spine: Backache-examination - Spondylolisthesis
Hip: Clinical Examination - Perthe's disease
Knee: Genu valgum, varum, recurvatum - recurrent dislocation of Patella
Semi membranous - Bursa
Foot: Plantar Fasciitis - Flat foot - Foot drop

4. NEURO MUSCULAR DISORDERS:

Cerebral Palsy: Clinical features, management
Anterior Poliomyelitis: Pathology, clinical features management, surgery
Leprosy: Pathology- Orthopedic problems - Claw hand, Foot drop-Wrist drop-Rehabilitation

Infections: Pyogenic osteomyelitis - acute, chronic, subacute- Brodie's abscess - Mycotic infection - Syphilitic lesions.
Metabolic disorders: Rickets-Osteomalacia- Osteoporosis, Scurvy - Gout
Miscellaneous: Paget disease-Bone cyst- Medullary deformities
Diseases of joints: Clinical examination - synovial fluid: normal, septic arthritis-Rheumatic and Rheumatoid diseases, Haemophilic arthritis.

5. BONE AND JOINT TUBERCULOSIS:
Aetio pathogenesis - clinical features - management. Tuberculosis of spine, Pott's paraplegia, Tuberculosis of hip, knee and other joints.
Tumours: benign and malignant bone tumours
Benign: Osteo chondroma, Enchondroma
Malignant: Osteosarcoma, Osteoclastoma, Ewing's tumour, Multiple myeloma, secondaries.

6. PHYSICAL MEDICINE AND REHABILITATION:
Teaching Hours
Theory classes: 100 Hours (including 20 hours of integrated teaching)
Clinical Posting: 4 weeks in 6th term, 6 weeks in 8th term

Recommended Books - Recent Editions.

1. Natarajan M, Textbook of Orthopaedics
2. J. Maheswari, Text book of Orthopaedics.
3. Crawford Adams, Outline of Orthopaedics - Fractures & dislocation.
4. Crawford Adam, Outline of Orthopedics.
5. Baily & Love, A Short Practice of Surgery.
6. Graham Apley, System of Orthopaedics Fractures
7. A Manual of Clinical Surgery, S. Das.

RADIO-DIAGNOSIS AND IMAGING

GOAL

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

OBJECTIVES

(a) KNOWLEDGE

The student shall be able to:

1. Understand basic of x-rays productions, its uses and hazards
2. Appreciate and diagnose changes in bones - like fractures, infections, tumours and metabolic bone diseases;
3. Identify and diagnose various radiological changes in disease conditions of chest and mediastinum, skeletal system, Gastro intestinal Tract, Hepatobiliary system and Genito Uninary (GU) system;
4. Learn about various imaging techniques, including isotopes Computerized Tomography (CT), Ultrasound, Magnetic Resonance Imaging (MRI) and DSA.

(b) SKILLS

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

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

Departmental objectives

At the end of the course in Radiodiagnosis, the student should;

1. Be familiar with various imaging techniques, their advantages and disadvantages.
2. Be aware of indications for common x-ray investigations and view to be taken for various organs. Know the indications for C.T. Scan and Ultrasound.
3. Be aware of radiation hazards and protection with reference to self, patient and the public.

COURSE CONTENTS

1. INTRODUCTION:

Methods of imaging-

1) RADIOGRAPHY
2) C T SCAN
3) ULTRA SOUND
4) MRI
5) RADIO ACTIVE ISOTOPES

2. RESPIRATORY SYSTEM:

a. Normal chest radiograph and anatomy, CT anatomy including mediastinum.

b. Indications for CT,HRCT and MRI of the chest.
c. Diagnosis of common conditions- consolidation, tuberculosis, pleural effusion, pneumothorax, lung abscess, atelectasis, ca lung, mediastinal masses.

3. CARDIOVASCULAR SYSTEM:
   a. Normal radiological cardiac anatomy.
   b. Principles of echocardiography and recognizing of common diseases
   c. Common cardiac conditions like rheumatic heart disease, assessing cardiac function.
4. GASTROINTESTINAL SYSTEM:
   a. Principles of barium studies, ultrasound, CT and MRI in diagnoses of gastrointestinal diseases.
   b. Diagnoses of common acute abdominal conditions like perforation, intestinal obstruction, cholecystitis, pancreatitis. acute appendicitis, renal & uretric calculi
5. SKELETAL SYSTEM:
   a. Diagnosis of common traumatic conditions of skelewton-fracture,dislocation.
   b. Common Infectious diseases of bones like osteomyelitis and tuberculosis.
   c. Common metabolic diseases like rickets.
   d. Common bone tumors and diseases of joints.
6. CENTRAL NERVOUS SYSTEM:
   a. Indications for CT and MRI
   b. Recognizing common conditions related to head injury,stroke and demyelinating diseases.
7. OBSTETRICS AND GYNAECOLOGY:
   a. Radiation hazards to pregnant women and their prevention.
   b. Antenatal ultrasound examination-indications, recognizing fetal death, placental localization, ectopic gestation.
   c. Recognizing common gynecological conditions
   d. PC PNDT Act.
8. EXCRETORY SYSTEM:
   a. Indications for IVU,CT
   b. Recognizing calculi and common diseases.
9. RADIATION SAFETY and AERB Act:
10. SKILL: Recognizing and diagnosis of common diseases.

Recommended Books - Recent Editions.

a. Radiology for Medical students by David Sutton
b. Diagnostic Imaging by Peter Armstrong etall
c. WHO ultrasound Textbook by Palmer

Reference Books - Recent Editions.

a. Text Book by Grainger and Allison
b. Textbook on Radiodiagnosis by IRIA
c. Aids to Radiodiagnosis and Imaging by LC Gupta

RADIOTHERAPY

GOAL

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

OBJECTIVES

(a) KNOWLEDGE

The student shall be able to:

1. Identify symptoms and signs of various cancers and their steps of investigations and management.
2. Explain the effect of radiation therapy in human beings and the basic principles involved in it;
3. Know about radioactive isotopes and their physical properties;
4. Be aware of the advances made in radiotherapy in cancer management and knowledge of various radio therapeutic equipment, while treating a patient.

(b) SKILLS

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

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

Departmental objectives

At the end of training in Radiotherapy, the student should be able to:

1. Exhibit awareness of the principles of radiotherapy, the radio-responsiveness of various tumours and management of common cancers like cervical, breast and oral cancers.
2. Refer for further consultation at appropriate time without delay.
3. State general complications of irradiation and their management.
4. List common chemo-therapeutic drugs and toxicity of the same.
5. Implement health education programmes regarding prevention and early diagnosis of tobacco related cancers, cervical cancers and breast cancers.
6. Know the general outlines of use of radio-isotopes in diagnosis and therapy.

COURSE CONTENTS

1. Physical principles of radiotherapy
2. Principles of chemotherapy
3. Prevention of cancer
4. Early diagnosis of cancer
5. Principles of nuclear medicine.
6. Radio responsiveness of various tumours and management
7. Common radiation reactions and management
8. Radiotherapy in some of the commonly seen cancers.
9. Chemotherapy in certain cancers like childhood tumours, leukemia and lymphomas.
10. Radio-isotopes in diagnosis and therapy.

Teaching hours

Radiodiagnosis and Radiotherapy
Theory : 20 hours
Clinical posting : 2 weeks

Recommended Books - Recent Editions.

Radiodiagnosis, Nuclear Medicine, Radiotherapy and Radiation Oncology by Bipin Valchandji Daga

Reference Books - Recent Editions.

Basic Clinical Radiobiology by Michael C. Joiner
Radiation Oncology: A Question-based Review
by (author) Boris Hristov.

ANAESTHESIOLOGY

OBJECTIVES

At the end of the training, the students should be able to:
Enumerate different types of anaesthetic agents, their indications, mode of admission, contradictions and side effects;
Perform cardio-pulmonary resuscitation with the available resources and transfer the patient to a bigger hospital for advanced life support.
Set up intravenous infusion.
Clear and maintain airway in an unconscious patient.
Perform endotracheal intubation
Administer oxygen correctly
Perform simple nerve block

COURSE CONTENTS

1 History and scope of Anesthesia
2 Anatomy of upper airway
3 Physiology of Respiration, O2/ CO2 Transport, Various methods of oxygen therapy and its indications.
4 Pre-operative evaluation/ Pre-medication
5 Inhalation Anaesthetic agents, Stages of Anaesthesia
6 The principles and mechanism of administration of general anaesthetics, Balanced Anaesthesia
7 IPPV, Endotracheal intubation
8 Muscle relaxants
9 Spinal / Epidural Anaesthesia
10 Local Anaesthesia: The pharmacology of local anaesthetics, their use and how to perform simple nerve blocks like
   - Infiltration anaesthesia
   - Digital block
   - Ankle block
   - Pudendal and paracervical blocks
   Management of complication of regional anaesthesia
11 Cardio pulmonary resuscitation (CPR) basic, including use of simple ventilators
12 Monitoring
13 ICU, Role of anaesthesiologists in ICU

14 Shock
15 Blood Transfusion and Fluid Electrolytes Balance (Basic)
16 Sites of respiratory obstruction and management of airway in an unconscious patient
17 Poisoning
18 Role of anaesthesiologists in acute and chronic pain relief.

Teaching Hours
Theory: Twenty hours on topics mentioned above (during 7th term)
Practical : Clinical posting- 2 weeks in 4th term.

Recommended Books - Recent Editions.

1. Dripps R.D. et. al, Introduction to Anaesthesia, W.B. Saunders, Philadelphia.
2. Lee J.A. Synopsis of Anaesthesia Loyd-Lukee, London
3. Wylie W.D., A Practice of Anaesthesia, Yearbook Medical Publisers, Chicago.

SURGERY & ALLIED SPECIALITIES

SCHEME OF EXAMINATION

Internal Assessment

Theory: 60 Marks

Minimum of three examinations for Gen Surgery for 45 marks,(20% IA marks shall include MCQs) and two for orthopedics for 15 marks(20% IA marks shall include MCQs) shall be conducted. Average marks of best two notified internal examinations shall be reduced to 60 and sent to the University.

Clinical: 40 Marks

Minimum of three examinations for Gen Surgery for 30 marks and two for orthopedics for 10 marks shall be conducted. Average of two best marks obtained in the clinical examination shall be reduced to 40 marks and sent to the University.

UNIVERSITY EXAMINATION

Total marks: 400 (Theory 200, Viva-voce 40 and Clinical 160)

Theory (Written)

There shall be two papers each carrying 100 marks. Each paper shall be of three hours duration. The pattern of questions would be of three types.

2 x Long essay questions	-	2 x 10	= 20 Marks
10 x Short essay question	-	10 x 5	= 50 Marks
10 x Short answer question	-	10 x 3	= 30 Marks

Distribution of subjects in Paper I and Paper II, & Weightage for topics for the University examination shall be as follows:

Paper I, Maximum marks- 100

Section A- General Surgery-50marks

Sl No.	Topics	Weightage of marks
1.	Hemorrhage & Shock Fluid, Electrolyte & Acid base balance, Nutrition Skin Tumors, Burns, Skin grafting Arterial diseases Venous diseases, Lymphatics & lymphnodes	**5**
2	Wounds, Wound healing & wound management Acute non specific & specific infections Chronic specific infections Tumors, Cysts, ulcers, sinuses & fistulae Infections of hand & foot Diseases of muscles, Tendons,bursae & facia Hernia Umbilical granuloma Umbilical fistula Umbilical adenoma or raspberry tumor Abdomonal wall-anatomy, incisions, burst abdomen, Desmoid tumor	**10**
3	Face,Teeth,Gums, Mouth, Tingue, Salivary glands, Neck	**5**
4	Thyroid gland, Thyroglossal tract & endocrines, Breast, Sympathetic system, Cranio cerebral injuries, Disease of the Brain	**10**
5	Genito urinary system	**5**
6	Cardiothoracic system, Esophagus, stomach and duodenum, spleen, liver, gall bladder & Bile ducts, Pancreas, Peritoneum, Intestines, Intestinal obstruction, Specific obstructions, Appendix, Rectum & anal canal, Biomedical waste	**15**

Section B- Orthopaedics

Sl No.	Topics	Weightage of marks
1	Traumatology	20
2	Cold orthopaedics	10
3	Regional conditions	5
4	Neuromuscular disorders	5
5	Bone & Joint tuberculosis	5
6	Physical medicine & rehabilitation	5

Paper I
Max. Marks: 100 Time 3 hours

Section A (General Surgery)

1. Long essay	2 x 10 marks each	-	20
2. Short essay	3 x 5 marks each	-	15
3. Short answers	5 x 3 marks each	-	15
	Total	-	**50 Marks**

Section B (Orthopedics)

1. Long essay	2 x 10 marks each	-	20
2. Short essay	3 x 5 marks each	-	15
3. Short answers	5 x 3 marks each	-	15
	Total	-	**50 Marks**

Paper II
Max Marks: 100 Time: 3 hours
Weightage of marks:-
Gen. Surgery - 75 marks
Anesthesiology - 10 marks
Dental diseases - 05 marks
Radiology - 05 marks
Electrotherapeutics and their application in surgery- 05 marks

1. Long essay	2 x 10 marks each	-	20
2. Short essay	10 x 5 marks each	-	50
3. Short answers	10 x 3 marks each	-	30
	Total	-	**100 Marks**

Clinical examination: 160 marks
Surgery - 120 marks (one long case of 60 marks and two short cases of 30 marks each)
Orthopedics - 40 marks (Two short cases, 20 marks each)

Viva-Voce Examination: 30 marks
Surgery - 30 marks
Orthopedics - 10 marks
Oral questions on all aspects of syllabus and instruments, specimens, x-rays etc.

OBSTETRICS & GYNAECOLOGY

GOALS:

The broad goal of teaching undergraduate students in Obstetrics and Gynaecology is that he/ she shall acquire understanding of Anatomy, Physiology and Pathophysiology of the reproductive system and gain the ability to optimally manage common conditions affecting it.

OBJECTIVES:

(a) KNOWLEDGE

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

1. Outline the Anatomy, Physiology and Pathophysiology of the reproductive system and the common conditions affecting it.
2. Detect normal pregnancy, labour, puerperium and manage problems he/ she is likely to encounter therein.
3. List the leading causes of maternal and perinatal morbidity and mortality
4. Understand the principles of contraception and various techniques, employed, methods of medical termination of pregnancy, sterilization and their complications.
5. Identify the use, abuse and side effects of drugs in pregnancy, pre menopausal and post menopausal periods
6. Describe the national programme for maternal and child health and family welfare and their implementation at various levels.
7. Identify common gynecological diseases and describe principles of their management
8. State the indications techniques and complications of surgeries like Caesarean Section, Laparotomy, Abdominal and vaginal hysterectomy, Fothergill's operation and vacuum aspiration for MTP.

(b) SKILLS

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

1. Examine a pregnant woman, recognize high risk pregnancies and make appropriate referrals.
2. Conduct a normal delivery, recognize complications and provide postnatal care.
3. Resuscitate new born and recognize congenital anomalies
4. Advise a couple on the use of various available contraceptive devices and assist in insertion and removal of IUCD.
5. Perform pelvic examination, dispose and manage common gynecological problems including early detection of genital malignancy.

6. Make a vaginal cytological smear, perform a post coital test and wet mount vaginal smear examination for TV, Monilias and Gram stain for gonorrhea.
7. Interpret results of investigation like biochemical, histopathological radiological, ultrasound etc.

(c) INTEGRATION

The student should be able to integrate clinical skills with other disciplines and bring about co-ordination of family welfare programme for the national goal of population control.

Departmental Objectives:

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

a) Appreciate the socio-cultural, economic and demographic factors that influence the practice of OBG.
b) Appreciate the principles of reproductive Anatomy and Physiology

General guidelines for training:

a) Students shall attend maternity hospital or maternity wards of a general hospital including (i) antenatal care (ii) the management of puerperium and (iii) a minimum period of 6 months in the inpatient and outpatient sections including family welfare planning.
b) In this period of clinical instruction, not less than one month shall be spent as a resident pupil in the labour room of maternity wards of a general hospital. During this period, the student shall conduct atleast 10 cases under adequate supervision and assist in 10 other cases.
c) A certificate showing the number of cases attended by the students in the maternity hospital shall be signed by a responsible medical officer on the staff of the hospital and shall state:
   (i.) That the student has been present during the course and personally conducted each case, making the necessary abdominal and other examinations under the supervision of the certifying officer who shall describe his official position.
   (ii.)That satisfactory written histories of the cases concluded including wherever possible antenatal and postnatal observation, were presented by the student and initiated by the supervising officer.
d) Understand the preconception, antenatal, intranatal and postnatal factors including drugs that affect the mother and fetus.
e) Recognise the changes and adaptation that occur in the mother during pregnancy, labor and puerperium.
f) Impart antenatal care, detect deviations from normal pregnancy and refer risk cases appropriately.
g) Institute primary treatment in obstetrics and gynaecological emergencies

h) Resuscitate and take adequate care of the new born
i) Assist couples with infertility and those requiring contraception
j) Know the action-pathology and management of menstrual abnormalties.
k) Know about the benign and malignant tumors of the genital tract and appreciate the need for screening and prevention
l) Recognise the importance of infection and other diseases of the genital tract, know about the displacements of the genital tract and injuries.
m) Understand the implication of medico legal and ethical issues concerning the speciality.
n) Acquire communication, decision making and managing skills

SYLLABUS **Total teaching hours- 100**

Theory:

4th Term

1. Anatomy & Physiology

* Basic Anatomy - The Pelvis, female genital organs
* Physiology of ovulation and menstruation
* Gametogenesis - maturation and fertilization of the ovum and development of embryo
* Development of the fetus and placenta.

2. Physiology of pregnancy

* Diagnosis of pregnancy
* Maternal changes due to pregnancy
* Genital tract, CVS, Haematology, Respiratory and gastrointestinal system.

3. Prenatal Care :

* Preconception counseling
* Diagnosis of Pregnancy
* Prenatal diagnosis and fetal therapy

4. Physiology of Labour and Puerperium

Causation and stages of labour, mechanism of labour, conduct of normal labour, intrapartum surveillance, normal puerperium

5. Antenatal Care

Objectives of ANC, Assessment of period of gestation, detection of abnormality with the help of gravidogram, clinical monitoring of maternal and fetal well being, detection of normal fetal pelvic relation (obstetric palpation). Advice regarding nutrition, prescribing in pregnancy, immunization against tetanus, basic investigations, fetal well being, biophysical monitoring, pelvic assessment, Basic obstetric ultrasound.

6th Term

1 Basic Gynaecology

* Embryology & development of female genital tract
* Disorders of the development of Mullerian system
* Ovulation and menstruation.
* Paeditric and adolescent gynaecology
* Abnormal and excessive menstrual bleeding
* Physiological vaginal discharge
* Amenorrhoea - Primary and Secondary
* Dysfunctional uterine bleeding
* Fibroid uterus
* PCOS
* Hirsutism
* Intersex

2. The new born and neonatal problems

* Resuscitation and examination of the new born
* Feeding of the newborn and immunization
* RDS & neonatal sepsis
* Neonatal jaundice
* Neonatal problem and management

3. Benign lesions of the Genital tract: Vulva, Vegina, Cervix

4. Disease complicating pregnancy

* Disease of CVC
* Liver disorders in pregnancy, jaundice in pregnancy
* Tuberculosis and pregnancy
* HIV in pregnancy
* Maternal infections during pregnancy
* Disease of the urinary system
* Tumor of the uterus and adnexa, complicating pregnancy fibrous ovarian tumor, RV, prolapse and cases
* Surgical emergencies in pregnancies

7th Term

1. Broader perspective

Vital statistics, birth rate, maternal mortality, perinatal and neonatal mortality, live birth, still birth, abortion, period of viability including definition of all above.

2. Abnormal Obstetrics : Complications of early pregnancy

a) Abortion - definition, types, causes, management of incomplete, inevitable abortion.

   Recurrent abortion, Induced abortion, aetiopathology, impact on maternal and fetal health, principles of management

b) MTP, MTP law, 1st and 2nd trimester abortion.

c) Ectopic pregnancy - causes, clinical feature, D/D of acute abdomen and conservative management of ectopic pregnancy and principles of surgical management

d) Hyperemesis gravidarum - definition, aetiology, clinical feature and management.

3. Family planning and contraception and sterilization

Various methods and devices, selection of patients, counselling of couples, side effects failures and complications, laparoscopic sterilization, vasectomy, tubectomy

4. Causes and prevention of Maternal Mortality & Morbidity

a) Morbidity and maternal mortality in hospital and community setting.

b) Reproductive and child Health programme (RCH) - NRHM

c) Current topics in obstetric women's health and gender issues.

5. Genital injuries and fistulae.

Stress Urinary Incontinence (SUI)

6. Genital infection including STD, AIDS and pelvic tuberculosis, infections affecting individual organs.

a) Aetiology, pathology, clinical feature, D/D, principles of basic investigation and medical therapy.

b) STD in the female.

c) Tuberculosis of female genital tract long term implications and surgical management.

d) Safe motherhood, obstetric care and the society.

8th Term- Obstetrics

1. Abnormal labor

* Abnormal fetal positions and presentation
* Occipito posterior
* Breech
* Face & Brow
* Transverse lie (shoulder presentation)
* Compound presentation, cord presentation

2. Dystocia

Contracted Pelvis, CPD
Uterine dysfunction - classification, recognition of uterine dysfunction, Principles of induction and augmentation of labour

3. Complications of 3rd stage of labour
Predisposing factors, prevention, management of atonic PPH and Injuries to the parturient canal
Injury to bony parts, vulva, Perineal tears, Laceration of vagina and cervix, rupture uterus

4. Abnormal Puerperium

5. Antepartum Haemorrhage: Classification and etiopathology
Placenta Previa, abruptio placentae - Clinical feature, D/D, USG, Complication and Management

6. Pharmacotherapeutics in Obstetrics: Oxytocin, Antihypertensives, tocolytics, anticonvulsants

7. Fetal monitoring, antenatal, intrapartum

8. Medicolegal aspects in OBG.

9. Complications in pregnancy

* Premature rupture of mambranes
* Preterm labor
* Post term pregnancy
* Multifetal gestation
* Rh isoimmunization
* Intrauterine fetal demise (IUFD)

10. Fetal Disorders

* IUGR
* Macrosomia
* Infection during pregnancy - TORCH
* Fetal anomalies - Down syndrome, congenital nervous system disorders, congenital heart disease,gastroschiasis, diaphragmatic hernia, sacrococcygeal teratoma

8th Term

Gynaecology

1. Infertility

* Cause in male and female
* Physical examination of both female and male partners
* Essential investigation
* Management options principles of ART

2. Dysfunctional uterine Bleeding

* Endometriosis and Adenomyosis
* Pelvic Inflammatory Diseases
* Fibroid uterus
* Endoscopy in Gynaecology
* Diseases of the breast
* Hormone in Gyneacology
* Imaging technique in Gynaecology
* Operative Gynaecology -
  - Dilatation and curettage
  - Tubal Patency tests
  - Operations on the cervix - cauterization, biopsy, amputation, trachelorrhaphy

9th Term- Obstetrics -

1. Complication of Pregnancy

* Anaemia in pregnancy
* Hypertensive Disorder in Pregnancy
* Antepartum haemorrhage - Placenta Previa Abruptio Placenta
* Preterm Labour
* IUGR
* Prolonged pregnancy
* Rh iso immunization
* Multiple pregnancy
* Diabetes in Pregnancy

2. Operative Obstetrics

Indication, technique and complication of

* Episiotomy, Vacuum extraction, Obstetric forceps
* Instrumental evacuation, menstrual regulation
* Caesarean section
* Assisted Breech delivery, ECV, IPV
* Cervical encercelage
* Destructive operation

3. Special cases

* Post caesarean pregnancy - risks, identification of scar dehiscence
* Repeated pregnancy loss (RPL)
* High risk pregnancy
* Shock in obstetric
* Immunology in obstetric
* Blood coagulation disorder in pregnancy DIC, HELLP

4. Gestational Trophoblastic diseases (GTD)

* Molar pregnancy
* Chorio Carcinoma

9th Term

1. Gynaecology

* Displacement of the uterus, Prolapse, Retroversion
* Gyneocological - Malignancy of cervix, vagina, vulva
* Endometrium
* Ovary
* Benign Ovarian Tumor
* Menopause
* Screening Procedure in gynaecology
* Radiotherapy in gyneacology
* Chemotherapy in gyneacology

2. Operative gynaecology

* Hysterectomy - abdominal, vaginal, laparoscopic
* Staging laparotomy for ovarian malignancy
* Mayowards operation
* Forthegill's operation and Sling surgeries for prolapse
* Tubal sterlisation and tuboplasty
* Myomectomy

Practicals : Clinical postings as per the MCI guidelines.

Clinical postings - 2 months in 3rd term
1½ months in 5th term
1 ½ months in 8th term
1 month in 9th term

SCHEME OF EXAMINATION

Internal Assessment

Theory: 60 Marks

Minimum of three examinations shall be conducted. ,20% IA marks shall include MCQs. 1st theory internals at the end of 6th term, 2nd theory interanl examination at the end of 8th term and 3rd and the final theory internal examination during 9th term. Average of the best of two is taken. The marks will be reduced to 60 marks and sent to the University.

Practicals: 40 Marks

Minimum three practical examinations shall be conducted. 1st clinical internals at the end of 1st clinical posting (3rd term) 2nd at the end of 2nd clinical posting (5th term and the final clinical internal assessment at the end of 3rd clinical posting (8th term). Average of the best two is taken. The marks will be reduced to 40 marks and sent to the University.

UNIVERSITY EXAMINATION

Theory: 2 Papers

Paper I: Basic Sciences and Obstetrics - 100 marks

Paper II: Basic Sciences with gynecology and family planning - 100 marks

Weightage of Marks for University Examinations

Paper-I Basic Sciences and Obstetrics

Sl No.	Topics	Weightage of Marks
1	Anatomy & Physiology, Physiology of pregnancy, Physiology of Labour and Puerperium	10
2	Abnormal Obstetrics	30
3	Abnormal labor, presentation & Dystocia	30
4	Antepartum & postpartal haemorrhage	10
5	Complications of Pregnancy	10
6	Operative Obstetrics	10

Weightage of Marks for University Examinations

Paper-II Basic Sciences with gynecology and family planning

Sl No.	Topics	Weightage of Marks
1	Basic Gynaecology & Infertility	05
2	Genital infections	10
3	Gynaecology(8th term portions-1 to 11)	35
4	Gynaecology(9th term portions-1 to 9)	35
5	Operations in gynecology problems	05
6	Family planning	10

Practicals - 160 marks

Obstetric case - (long case) - 80 marks

Gynaec case - (long case) - 80 marks

Viva-voce - 40 marks

Records - 10 marks

Specimens - 06 marks

Instruments - 06 marks

Dummy and pelvis - 06 marks

Drugs, ultrasound, NST - 06 marks

Family planning - 06 marks

Recommended Books, Recent Editions.

1. Mudaliar & Menon's Clinical Obstetrics, Mudaliar A.L. & Krishna Menon,Orient Longman, Chennai
2 Text book of Obstetrics,V. Padubidri, E. Anand, BI Publications, New Delhi
3 Manual of Obstetrics, Seth Sirish N. Daftary Sudip Chakravathi,Elsevier, New Delhi
4 Holland & Brews,Manual of Obstetrics,Daftary Sirish N., Churchill Livingstone New Delhi
5 Obstetrics Daftary N.S. Jani, Elsevier, New Delhi
6 Text book of Obstetrics, Sudha Salhan, Jaypee Brothers, New Delhi
7 Text book of Obstetrics, Dutta D.C. New Central Book Agency, Calcutta
8 Practice of Fertility control S.K. Chaudhri Elsevier
9 Text book of Obstetrics, Sheila Balakrishnana, Paras Publishing
10 Essentials of Obstetrics, S. Arulkumaran, Prataph Kumar, Alokendu Chatterjee, V. Sivanesarathnemma, Japee
11 Williams ObstetricsCunninghom, Mc Graw Hill
12 Jan Doivald's Practical Obstetric Problems Renu Mishra, BI Publications,, New Delhi
13 Practical Guide to high risk pregnancy and delivery Arius Fernando Harcourt Brace & Co. Singapore
14 Medical Disorders in Obstetrics, Michael De Swiet Bluckwell Scientific Co. London
15 Operative Obstetrics, Munro Keer Saunders

Reference Books, Recent Editions

16 Hawkins & Bourne Shaw's Textbook of Gynaecology, U.G. Padubidri, S.N. Daftary Elsevier, New Delhi
17 Textbook of Gynaecology including contraception, Dutta P.C., New Control Book Agency, Calcutta
18 Clinical Gynaecology. K. Bhaskar Rao
19 Essentials of Gynaecology, S. Arulkumaran, Pratap Kumar, V.S. Ratnam, Chatterjee Jaypee
20 Obstetrics & Gynaecology, S.S. Ratham, K. Bhaskar Rao
21. Arulkumar Oriant Longman, Hyderabad
22. Clinical Gynaecology Endocrinology & Infertility, Leon Speroff & Marc A. Fritz Jaypee Brothers, New Delhi
23. Te Linde's Operative Gynaecology, John A. Rock, H.W. Jones III, Wolts Kluwer/ LWW/ London
24. Jeffcote's Principles of Gynaecology, Bhatla Neeraja Arncld Co., London

Section V

TEACHING OF MEDICAL ETHICS IN MBBS

1. INTRODUCTION

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

There is now a shift from the traditional individual patient, doctor relationship and medical care. With the advances in science and technology and the needs of patient, their families and the community, there is an increased concern with the health of society. There is a shift to greater accountability to the society. Doctors and health professionals are confronted with many ethical problems. It is, therefore necessary to be prepared to deal with these problems.

2. OBJECTIVES

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

a) Identify underlying ethical issues and problems in medical practice.
b) Consider the alternatives under the given circumstances and
c) Make decisions based on acceptable moral concepts and also traditional practices

3. Course Contents (Syllabus)

i) Introduction to Medical Ethics
   What is ethics?
   What are values and norms?
   Relationship between being ethical and human fulfillment
   How to form a value system in one's personal and professional life
   Heteronomous Ethics and Autonomous Ethics
   Freedom and personal Responsibility

ii) Definition of Medical Ethics
   Difference between medical ethics and bio-ethics
   Major Principles of Medical Ethics
   Beneficence = fraternity
   Justice = equality
   Self determination = liberty

iii) Perspective of Medical Ethics
   The Hippocratic oath
   The Declaration of Helsinki
   The WHO Declaration of Geneva
   International code of Medical Ethics (1993)
   Medical Council of India Code of Ethics (2002)

iv) Ethics of the Individual
The patient as a person
The Right to be respected
Truth and confidentiality
The autonomy of decision
The concept of disease, health and healing
The Right to health
Ethics of Behaviour modification
The Physician - Patient relationship
Organ donation

v) The Ethics of Human Life
What is human life?
Criteria for distinguishing the human and non human
Reasons for respecting human life
The beginning of human life
Conception, contraception
Abortion
Prenatal sex-determination
In vitro fertilization (IVF), Artificial Insemination by Husband (AIH)
Artificial Insemination by Donor (AID)
Surrogate motherhood, Semen Intrafallopian Transfer (SIFT)
Gamete Intrafallopian Transfer (GIFT), Zygote Intrafallopian Transfer (ZIFT)
Genetic Engineering

vi) The Family and Society in Medical Ethics
The Ethics of human sexuality
Family Planning perspectives
Prolongation of life
Advanced life directives - The Living Will
Euthanasia
Cancer and Terminal care

vii) Death and Dying
Use of life-support systems
Death awareness
The moment of death
Prolongation of life
Ordinary and extraordinary life support
Advanced life directives
Euthanasia - passive and active

Suicide - the ethical outlook
The right to die with dignity

viii)Professional Ethics
Code of conduct
Contract and confidentiality
Charging of fees, Fee-splitting
Prescription of drugs
Over-investigating the patient
Low-cost drugs, vitamins and tonics
Allocation of resources in health cares
Malpractice and Negligence

ix) Research Ethics
Animal and experimental research/ humanness
Human experimentation
Human volunteer research - Informed consent
Drug trials

x) Ethical workshop of cases
Gathering all scientific factors
Gathering all human factors
Gathering all value factors
Identifying areas of value- conflict, setting of priorities
Working out criteria towards decisions

4. Teaching / Learning Experience

Classroom teaching would focus on professional relationship, patient-doctor relationship, issues at the beginning and end of life, reproductive technologies, resource allocation and health policy. It will also deal with values, ethical concepts and principles.
Clinical ethics must be taught as part of bedside teaching group discussions, case studies, problem analyzing and problem solving exercises may also be employed.

Demonstrating by example how to identify and resolve a particular problem

Increasing the awareness and knowledge of students of the value dimensions of interactions with the patients, colleagues, relations and public.

Fostering the development of skills of analysis, decision making and judgement.

Making the students aware of the need to respect the rights of the patient as also duties and responsibilities of the doctor.

MEDICAL ETHICS

Recommended distribution of Teaching hours in different phases of MBBS course
Total Teaching Hours : 40

Phase I : Preclinical Period - 6 hours

2 hours each by Anatomy, Physiology, Biochemistry during the I year

Phase II : Paraclinical Period - 6 hours

2 hours each from Pharmacology, Pathology and Microbiology

Phase III : Community Medicine - 4 hours

2 hours each from Ophthalmology and ENT = 4 hours

2 hours each in two terms from Medicine, Surgery and OBG = 12 hours

8 hours from other clinical departments

N.B.: The teaching of Medical Jurisprudence by the department of Forensic Medicine will continue as before.

5. Evaluation

At least one short answer question may be asked on medical ethics appropriate to the subject in all major subjects in the university question paper. A few questions may be asked during viva-voce examination.

6. Recommended Reading, Recent Editions.

a) Francis C.M., Medical Ethics, Jaypee Brothers, New Delhi,

b) Ethical Guidelines for Biomedical Research on Human Subjects, Indian Council of Medical Research, New Delhi

Section VI

INTERNSHIP

A. General

In order to make trained workforce available, it may be considered as a phase of training wherein the graduate is expected to conduct actual practice under the supervision of a trained doctor.The learning methods and modalities have to be done during the MBBS course itself with a larger number of hands on sessions,practice on simulators including Zoes model.

B. Specific Objectives

At the end of the internship training, the student shall be able to:

1. Diagnose clinically common disease conditions encountered in practice and make timely decision for referral to higher level.
2. Use discreetly the essential drugs, infusions, blood or its substitutes and laboratory services.
3. Manage all type of emergencies-medical, surgical, obstetric, neonatal and paediatric, by rendering first level care.
4. Demonstrate skills in monitoring of the national health programme and schemes, oriented to provide preventive and promotive health care services to the community.
5. Develop leadership qualities to function effectively as a leader of the health team organised to deliver the health and family welfare service in existing socio-economic, political and cultural environment;
6. Render services to chronically sick and disabled (both physical and mental) and to communicate effectively with patient and the community.

C. Internship - Time Distribution

Time allocation to each discipline is approximate and shall be guided more specifically by the actual experience obtained. Thus a student serving in a district or taluk hospital emergency room may well accumulate skill in surgery, orthopaedics, medicine, obstetrics and gynaecology and paediatrics during a single night on duty. The intern's experience shall be designed to maximize the opportunities to practice skills in patient care, in rough approximation of the time allocation.

1. Compulsory Postings

a.	Community Medicine	2 months
b.	Medicine	2 months
c.	Surgery including 15 days of Anaesthesia	2 months
d.	Obst & Gynae including Family Welfare Planning	2 months
e.	Paediatrics	1 month
f.	Orthopaedics including PMR	1 month
g.	Ophthalmology	15 days
h.	Otorhinolaryngology	15 days
i.	Casualty	15 days

2. Elective Postings

Elective posting will include one of the following for 15 days:

a. Dermatology, venereology and leprosy.
b. Psychiatry.
c. Tuberculosis and respiratory diseases.
d. Radio-diagnosis.
e. Forensic medicine and toxicology.
f. Blood bank and transfusion medicine.

D. Other Details

1. All parts of the internship shall be done as far as possible in institutions in India. In case of any difficulties, the matter may be referred to the Medical Council of India to be considered on individual merit.
2. Every candidate will be required, after passing the final MBBS examination, to undergo compulsory rotational internship to the satisfaction of the college authorities and university concerned for a period of 12 months, so as to be eligible for the award of the degree of Bachelor of Medicine and Bachelor of Surgery (MBBS) and full registration.
3. The University shall issue a provisional MBBS pass certificate on passing the final examination.
4. The State Medical Council will grant provisional registration to the candidate on production of the provisional MBBS pass certificate. The provisional registration will be for a period of one year. In the event of the shortage or unsatisfactory work, the period of provisional registration and the compulsory rotating internship may be suitably extended by the appropriate authorities.
5. The intern shall be entrusted with clinical responsibilities under direct supervision of senior medical officer. They shall not be working independently.

6. Interns will not issue a medical certificate or a death certificate or a medicolegal document under their signature.
7. In recognition of the importance of hands-on experience, full responsibility for patient care and skill acquisition, internship should be increasingly scheduled to utilize clinical facilities available in district hospital, taluk hospital, community health centre and primary health centre, in addition to teaching hospital. A critical element of internship will be the acquisition of specific experiences and skill as listed in major areas.
8. 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.
9. Provided further that for such trainee a certificate of satisfactory completion of training shall be obtained from the relevant administrative authorities which shall be countersigned by the Principal/Dean of college.
10. Adjustment to enable a candidate to obtain training in elective clinical subjects may be made.
11. 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.
12. 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 programme at the community level. One month of primary care training may be in the form of preceptorship with a practicing family physician or voluntary agency or other primary health care provider.
13. 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.
14. 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.

E. Assessment of internship

1. The intern shall maintain a record of work which is to be verified and certified by the medical officer under whom he works. Apart from scrutiny of the record of work, assessment and evaluation of training shall be undertaken by an objective approach using situation tests in knowledge, skills and attitude during and at the end of the t raining. 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.

2. Satisfactory completion shall be determined on the basis of the following:- (All scored on a scale of 0-5)
   a. Proficiency of knowledge required for each case.
   b. The competency in expected skills to manage each case:
      i. Of having observed.
      ii. Of having assisted in procedures.
   c. Responsibility, punctuality, work up of case, involvement in treatment, follow-up reports.
   d. Capacity to work in a team (behaviour with colleagues, nursing staff and relationship with paramedicals).
   e. Initiative, participation in discussions, research aptitude.

SCORE 0-5

Poor	-	0
Fair	-	1
Below average	-	2
Average	-	3
Above average	-	4
Excellent	-	5

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

F. Internship - discipline related

1. Community Medicine

Interns shall acquire skills to deal effectively with an individual and the community in the context of Primary Health Care. This is to be achieved by hands on experience in the Primary Health care centre, Secondary Health care centre

A) Secondary health care level: Vivekananda memorial hospital Sargur. (15 days)

1. During this period of internship an intern must acquire
   * Competence for diagnosis of common ailments, use of bed side investiga tion and primary care techniques.
   * Gain information on essential drugs and their uses.
   * Recognize medical emergencies resuscitation and institute initial treatment and refer to suitable institution

2. HIV Care
   * Learn about HIV/AIDS case management
   * Learn about social and vocational rehabilitation of HIV/AIDS cases

3. Skills in Implementation of National Programmes
    * Participate in programmes in prevention and control of locally prevalent endemic diseases including nutritional disorders.
    * Learn skills related to use of family planning procedure
    * Learn the implementation of National health programmes
    * Learn about tribal people, health problem and socio-cultural practices affect ing their health.
4. Health education
    - Conduct programme on health education
    - Gain capabilities to use audio-visual aids.
    - Acquire capability of utilization of scientific information for promotion of community health.
5. Be capable of establishing linkage with other agencies as water supply, food distribution and other environmental/social agencies.
6. Acquire managerial skills, delegation of duties to paramedical staff and other health professionals.
7. Learn about involvement of other systems of medicine like Ayurveda in modern medicine in case management

B) Primary Health Center; Hadinaru, Suttur, Tithimathi (15days)

1. Initiate or participate in family composite health care (birth to death), inventory of events.
2. Participation in all of the modules on field practice for community health e.g. safe motherhood, nutrition surveillance and rehabilitation, diarrheal disorders etc
3. Acquire competence in diagnosis and management of common ailment e.g. Malaria, Tuberculosis, Enteric Fever, Congestive Heart Failure, Hepatitis, Meningitis, Acute Renal Failure etc.
4. Acquire proficiency for family welfare programmes (ante natal care, normal delivery, Advice on contraceptives etc)
5. Field visits to a village to understand issues of community health along with exposure to ASHA and sub-centres staff (Junior Health Assistants).
6. To conduct aganwadi and school health check ups and try to learn screening of school children for common ailments and nutritional deficiency disorders.

C) Urban Health Centre (15days)

1. To learn socio-demographic profile and environmental conditions of urban slums.
2. To learn about various national health programme implementation.
3. To participate and learn to organise health awareness programme.
4. To learn about social and health problems of slum dwellers.

D) Bharath Hospital & Institute of Oncology (15 days)

1. To learn about presentation of various types of cancer and to be able to screen the population for common types of cancer.
2. To learn about available cancer treatment modalities and their advantage and disadvantages.
3. To know the referral centres available for different types of cancers.
   * One short research project on topic of their interest has to be completed by the interns to learn basics of research methodology.

2. General Medicine

a. Interns shall acquire following training during their term:
   i. Acquire competence for clinical diagnosis based on history physical examination and relevant laboratory investigation and institute appropriate line of management.
   ii. This would include diseases common in tropics (parasitic, bacterial or viral infections, nutritional disorders, including dehydration and electrolyte disturbances) and system illnesses.

b. The intern shall have assisted as a care team in intensive care of cardiac, respirator, hepatic, neurological and metabolic emergencies.

c. The intern shall be able to conduct the following laboratory investigations:
   i. Blood: routine haematology smear and blood groups.
   ii. Urine: routine chemical and microscopic.
   iii. Stool: for ova/cyst and occult blood.
   iv. Sputum and throat swab for gram stain or acid fast stain.
   v. Cerebro spinal fluid (CSF) for smear.

d. Conduct following diagnostic/ therapeutic procedures:
   i. Urethral catheterization.
   ii. Proctoscopy.
   iii. Ophthalmoscopy/otoscopy.
   iv. Indirect laryngoscopy.
   v. Insertion of Ryles Tube.
   vi. Pleural & ascitic tap.
   vii. Cerebro Spinal Fluid (CSF) tap.
   viii. Installing of air way tube.
   ix. Oxygen administration etc.

e. Biopsy Procedures:
   i. Liver, kidney, skin, nerve, lymph node, and muscle biopsy, bone marrow aspiration, biopsy of malignant lesions on surface, nasal/nerve/skin smear for leprosy.

f. Familiarity with usage of life saving procedures

i. Use of aspirator, respirator and defibrillator.

ii. Competence in interpretation of different monitoring devices such as cardiac monitor, blood gas analysis etc.

g. Participate as a team member in total health care of an individual including appropriate follow-up and social rehabilitation.

h. Other competencies as indicated in general objectives.

3. Pediatrics

The details of the skills that an intern shall acquire during his/her tenure in the department of Pediatrics are as follows:

a. Diagnose and manage common childhood disorders including neonatal disorders and acute emergencies (enquiry from parents of sick children), examining sick child making a record of information.

b. Carry out activities related to patient care such as laboratory work, investigative procedures and use of special equipments. The details are given as under:

i. Diagnostic techniques: blood (including from femoral vein and umbilical cord), bscess, cerebrospinal fluid, urine, pleura and peritoneum and common tissue biopsy techniques.

ii. Techniques related to patient care: immunization, perfusion techniques, feeding procedures, tuberculin testing & breast feeding counseling.

iii. Use of equipment: vital monitoring, temperature monitoring, resuscitation at birth and care of children receiving intensive care.

c. Screening of newborn babies and those with objective risk factors for any anomalies and steps for prevention in future.

d. Plan in collaboration with parents and individual, collective surveillance of growth and development of new born babies, infants and children so that he/she is able to:

i. Recognize growth abnormalities.

ii. Recognize anomalies of psychomotor development.

iii. Detect congenital abnormalities.

e. Assess nutritional and dietary status of infants and children and organize prevention, detection and follow up of deficiency disorders both at individual and community level such as:

i. Protein-energy malnutrition.

ii. Deficiencies of vitamins especially A, B, C and D.

iii. Iron deficiency.

f. Institute early management of common childhood disorders with special reference to pediatric dosage and oral rehydration therapy.

g. Participate actively in public health programme oriented towards children in the community.

4. General Surgery

An intern is expected to acquire following skills during his/her posting:

a. Diagnose with reasonable accuracy all surgical illnesses including emergencies.
b. Resuscitate a critically injured patient and a severe burns patient.
c. Control surface bleeding and manage open wound.
d. Monitor patients of head, spine, chest, abdominal and pelvic injury.
e. Institute first-line management of acute abdomen.
f. Perform venesection.
g. Perform tracheostomy and endotracheal intubation.
h. Catheterise patients with acute retention or perform trocar cystostomy.
i. Drain superficial abscesses.
j. Suturing of wound.
k. Perform circumcision.
l. Biopsy of surface tumours.
m. Perform vasectomy.

5. Casualty

The intern after training in casualty must be able to:

a. Identify acute emergencies in various disciplines of medical practice.
b. Manage acute anaphylatic shock.
c. Manage peripheral-vascular failure and shock.
d. Manage acute pulmonary oedema and Left ventricular failure (LVF).
e. Undertake emergency management of drowning poisonings and seizures.
f. Undertake emergency management of bronchial asthma & status asthamaticus.
g. Undertake emergency management of hyperpyrexia.
h. Undertake emergency management of comatose patients regarding airways positioning, prevention of aspiration and injuries.
i. Assess and administer emergency management of burns;
j. Assess and do emergency management of various trauma victims.
k. Identify medicolegal cases and learn filling up forms as well as complete other medicolegal formalities in cases of injury, poisoning, sexual offenses, intoxication and other unnatural conditions.

6. Obstetrics and Gynaecology

Technical skills that interns are expected to learn:

a. Diagnosis of early pregnancy and provision of ante-natal care.

b. Diagnosis of pathology of pregnancy related to:
   i. Abortions.
   ii. Ectopic pregnancy.
   iii. Tumours complicating pregnancy.
   iv. Acute abdomen in early pregnancy.
   v. Hyperemesis gravidarum.

c. Detection of high risk pregnancy cases and suitable advice e.g. PIH, hydramanios, antepartum hemorrhage, multiple pregnancies, abnormal presentations and intra-uterine growth retardation.

d. Antenatal pelvic assessment and detection of cephalo-pelvic disproportion.

e. Induction of labour and amniotomy under supervision.

f. Management of normal labour, detection of abnormalities, post-partum haemorrhage and repair of perineal tears.

g. Assist in forceps delivery.

h. Assist in caesarean section and postoperative care thereof.

i. Detection and management of abnormalities of lactation.

j. Perform non-stress test during pregnancy.

k. Per speculum, per vaginum and per rectal examination for detection of common congenital, inflammatory, neoplastic and traumatic conditions of vulva, vagina, uterus and ovaries.

l. Medicolegal examination in gynecology and obstetrics.

m. To perform the following procedures:-
   i. Dilation and curettage and fractional curettage.
   ii. Endometrial biopsy.
   iii. Endometrial aspiration.
   iv. Pap smear collection.
   v. Intra uterine contraceptive device (IUCD) insertion.
   vi. Minilap ligation.
   vii. Urethral catheterization.
   viii. Suture removal in postoperative cases.
   ix. Cervical punch biopsy.

n. To assist in major abdominal & vaginal surgery cases in obstetrics & gynaecology.

o. To assist in follow-up postoperative cases of obstetrics and gynaecology such as:
   i. Colposcopy
   ii. Second trimester medical termination of pregnancy (MTP) procedures e.g. emcredyl prostaglandin instillations.

p. To evaluate and prescribe oral contraceptive.

7. Oto Rhino Laryngology (ENT)

a. Interns shall acquire ability for a comprehensive diagnosis of common ear, nose and throat (ENT) diseases including the emergencies and malignant neoplasma of the head and neck.

b. He/she shall acquire skills in the use of head mirror, otoscope and indirect laryngoscopy and first line of management of common ear nose and throat (ENT) problems.
c. He/she shall be able to carry out minor surgical procedures such as:
    i. Ear syringing, antrum puncture and packing of the nose for epistaxis.
    ii. Nasal douching and packing of the external canal.
    iii. Remove the foreign bodies from the nose and ear.
    iv. Observe or assist in various endoscopic procedures and trachesotomy.
d. An intern shall have participated as a team member in the community diagnosis e.g. chronic suppurative otitis media (CSOM) and be aware of national programme on prevention of deafness.
e. He/she shall possess knowledge of various ENT rehabilitative programmes.

8. Ophthalmology

An intern shall acquire following skills: -

a. He/she shall be able to diagnose and manage common ophthalmological conditions such as:
    i. Trauma.
    ii. Acute conjunctivitis.
    iii. Allergic conjunctivitis.
    iv. Xerosis.
    v. Entropion.
    vi. Corneal ulcer.
    vii. Iridocyclitis.
    viii. Myopia.
    ix. Hypermetropia.
    x. Catarct.
    xi. Glaucoma.
    xii. Ocular injury.
    xiii. Sudden loss of vision.
b. He shall be able to carry out assessment of refractive errors and advise its correction.
c. He shall be able to diagnose ocular changes in common systemic disorders.
d. He/she shall be able to perform investigative procedures such as:
    i. Tonometry.
    ii. Syringing.
    iii. Direct ophthalmoscopy.
    iv. Subjective refraction.
    v. Fluorescein staining of cornea.
e. He/she shall have carried out or assisted the following procedures:
    i. Subconjunctival injection.
    ii. Ocular bandaging.
    iii. Removal of concretions.

iv. Epilation and electrolysis.
v. Corneal foreign body removal.
vi. Cauterization of corneal ulcers.
vii. Chalazion removal.
viii. Entropion correction.
ix. Suturing conjunctival tears.
x. Lids repair.
xi. Glaucoma surgery (assisted).
xii. Enucleation of eye in cadaver;

f. He/she shall have full knowledge on available methods for rehabilitation of the blind.

9. Orthopaedics

a. Goal:

The aim of teaching the undergraduate student in orthopaedics and rehabilitation is to impart such knowledge and skills that may enable him to diagnose and treat common ailments. He shall have ability to diagnose and suspect presence of fracture, dislocation, acute osteomyelitis, acute poliomyelitis and common congential deformities such as congenital talipes equinovarus (CTEV) and dislocation of hip (CDH).

b. Therapeutics an intern must know:
   i. Splinting (plaster slab) for the purpose of emergency splintage, definitive splintage and post operative splintage and application of Thomas splint.
   ii. Manual reduction of common fractures - phalangeal, metacarpal, metatarsal and Colles's fracture.
   iii. Manual reduction of common dislocations - inter phalangeal, metacarpopha langeal, elbow and shoulder dislocations.
   iv. Plaster cast application for undisplaced fractures of arm, fore arm, leg and ankle.
   v. Emergency care of a multiple injury patient.
   vi. Precautions about transport and bed care of spinal cord injury patients.

c. Skill that an intern should be able to perform under supervision:
   i. Advise about prognosis of poliomyelitis, cerebral palsy, CTEV and CDH.
   ii. Advise about rehabilitation of amputees and mutilating traumatic and leprosy deformities of hand.

d. An intern must have observed or preferably assisted at the following operations:

i. Drainage for acute osteomyelitis.
ii. Sequestrectomy in chronic osteomyelitis.
iii. Application of external fixation.
iv. Internal fixation of fractures of long bones.

10. Dermatology Venereology & Leprosy

An intern must be able to:

a. Conduct proper clinical examination; elicit and interpret physical findings, and diagnose common disorders and emergencies.
b. Perform simple, routine investigative procedures for making bedside diagnosis, specially the examination of scraping for fungus, preparation of slit smears and staining for AFB for leprosy patient and for STD cases.
c. Take a skin biopsy for diagnostic purpose.
d. Manage common diseases recognizing the need for referral for specialized care in case of inappropriateness of therapeutic response.

11. Psychiatry

An Intern must be able to:

a. Diagnose and manage common psychiatric disorders.
b. Identify and manage psychological reaction and psychiatric disorders in medical and surgical patients in clinical practice and community setting.

12. Tuberculosis And Respiratory Diseases

An intern after training must be able to:

a. Conduct proper clinical examination, elicit and interpret clinical findings and diagnose common respiratory disorders and emergencies.
b. Perform simple, routine investigative procedures required for making bed side diagnosis, specially sputum collection, examination for etiological organism like AFB, interpretation of chest X-rays and respiratory function tests.
c. Interpret and manage various blood gases and pH abnormalities in various respiratory diseases.
d. Manage common diseases; recognize need for referral for specialized care in case of in appropriateness of therapeutic response.
e. Perform common procedures like laryngoscopy, pleural aspiration, respiratory physiotherapy, laryngeal intubation and pneumo-thoracic drainage aspiration.

13. Anaesthesia

After the internship in the department of anesthesiology, an intern shall acquire knowledge, skill and attitude to:

a. Perform pre-anaesthetic check up and prescribe pre-anaesthetic medications.
b. Perform venepuncture and set up intravenous drip.
c. Perform laryngoscopy and endotracheal intubation.
d. Perform lumbar puncture, spinal anaesthesia and simple nerve blocks.
e. Conduct simple general asaesthetic procedures under supervision.
f. Monitor patients during anaesthesia and post operative period.
g. Recognise and manage problems associated with emergency anaesthesia.
h. Maintain anaesthetic records.

i. Recognise and treat complication in post operative period.
j. Perform cardio-pulmonary brain resuscitation (CPBR) correctly, including recognition of cardiac arrest.

14. Radio-Diagnosis

An intern after training must be able to identify and diagnose:

a. All aspects of 'emergency room' radiology like :
   i. All acute abdominal conditions.
   ii. All acute traumatic conditions with emphasis on head injuries
   iii. Differentiation between medical, surgical and radiological emergencies.
b. Basic hazards and precautions in radio-diagnostic practices.

15. Physical Medicine and Rehabilitation

An intern is expected to acquire the following skills during his/her internship:

a. Competence for clinical diagnosis based on detailed history and assessment of common disabling conditions like poliomyelitis, cerebral palsy, hemiplegia, paraplegia, amputations etc.
b. Participation as a team member in total rehabilitation including appropriate follow up of common disabling conditions.
c. Principles and procedures of fabrication and repair of artificial limbs and appliances.
d. Various therapeutic modalities.
e. Use of self help devices and splints and mobility aids.
f. Familiarity with accessibility problems and home making for disabled.
g. Ability to demonstrate simple exercise therapy in common conditions like prevention of deformity in polio, stump exercise in an amputee etc.

16. Forensic Medicine And Toxicology

The intern is to be posted in the casualty department of the hospital while attached under forensic medicine department with the following objectives:

a. To identify medicolegal problem in a hospital and general practice.
b. To identify and learn medicolegal responsibilities of a medical man in various hospital situations.
c. To be able to diagnose and learn management of basic poisoning conditions in the community.
d. To learn how to handle cases of sexual assault.
e. To be able to prepare medico-legal reports in various medicolegal situations.
f. To learn various medicolegal post-mortem procedures and formalities during its performance.

ANNEXURE I

Different methods recommended for Internal Assessment by MCI

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

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

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

ANNEXURE II

A comprehensive list of skills recommended as desirable for Bachelor of Medicine and Bachelor of Surgery (MBBS) Graduate: (by Medical Council of India in Regulations on Graduate Medical Education, 1997)

I. Clinical Evaluation

a. To be able to take a proper and detailed history.

b. To perform a complete and thorough physical examination and elicit clinical signs.

c. To be able to properly use the Stethoscope, Blood pressure apparatus, Otoscope, Thermometer, Nasal 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/ ketones/ microscopy;

b. Stool exam for ova and cysts;

c. To do Gram's stain and Ziehl-Neelsen stain for AFB;

d. To do skin smear for lepra bacilli ;

e. To do and examine a wet film vaginal smear for Trichomonas;

f. To do a skin scraping and Potassium hydroxide (KOH) stain for fungal 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, ascetic tap and 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 anesthesia and nerve block

b. Be able to secure airway patency, administer oxygen by Ambu bag.

V. Surgical Procedure

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 out minor surgical procedures, e.g. excision of small cysts and nodules, circumcision, reduction of paraphimosis, debridement of wound, etc.

e. To perform vasectomy

f. To manage anal fissures and give injection for piles.

VI. Obstetric 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 episiotormies;

d. To insert and remove IUD's and to perform tubectomy.

VII. Paediatrics

a. To assess new born and recognize abnormalities and I.U. retardation.

b. To perform immunization

c. To teach infant feeding to mothers

d. To monitor growth by the use of 'road of health chart' and to recognize development retardation

e. To assess dehydration and prepare and administer Oral Rehydration Therapy (ORT)

f. To recognize ARI clinically

VIII. ENT Procedures

a. To be able to remove foreign bodies

b. To perform nasal packing for epistaxis

c. To perform tracheostomy

IX. Ophthalmic Procedures

a. To invert eyelids
b. To give subconjunctivai 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 co-operative efforts for the health care
b. To be able to carry on managerial responsibilities, e.g. management of stores, indenting, 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 hospital solid waste, chlorination of drinking water
f. To identify and institute control measures for epidemics including its proper data collection and reporting.

XII. Forensic medicine including toxicology

a. To be able to carry on proper medico legal examination and documentation of injury and age reports
b. To be able to conduct examination for sexual offences and intoxication
c. To be able to preserve relevant ancillary materials for medico legal examination
d. To be able to identify important post-mortem finding in common unnatural 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 (LVF)
d. Emergency management of drowning, poisoning and seizures
e. Emergency management of bronchial asthma and status asthmaticus
f. Emergency management of hyper pyrexia
g. Emergency management of comatose patients regarding airways, positioning, prevention of aspiration and injuries
h. Assess and administer emergency management of burns

ANNEXURE III

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

I Term

Month	Anatomy	Physiology	Biochem
1	General Anatomy General Embryology General Histology General Human Genetics	General Physiology Cell membrane Transport Homeostasis Body fluids Biophysical principles Haematology Muscle Physiology	Cell structur Sub-cellular Components Biophysical Principles P Biochemistr nucleic acid Classificatio & functions proteins, ca & lipids Plasma prot Protein synt Diagnostic Enzymology
2	Osteology Myology Arthology		
3 & 4	Heart, Blood vessels Lungs, Pleura systemic embryology		
5 & 6	Abdomen, Digestive and Genitourinary organs with systemic embryology Pelvis		Digestive en Vitamins, D and absorpti Liver functi detoxificatio function, ga function

II Term

Month	Anatomy	Physiology	Biochemistry	Integrated Teaching
7 & 8	Neuroanatomy Special senses Neural development	Nervous system Special senses Autonomic Nervous system Endocrine glands	Metabolism of carbohydrates, Amino acids, protein, fats, minerals, water	Endocrine and exocrine pancreas (Diabetes Mellitus) Cardiovascular system Respiratory system Anatomy + Physiology + Biochemistry
9 & 10			Neurotransmitter Radio Isotopes Biological Oxidation Electron transfer cycle	CSF Anatomy + Physiology + Biochemistry Digestive system, secretion and motility Renal & reproductive Physiology

Co-ordinated Programme for Dissection/ Practical / Demonstration

I Term

II Term

Month	Anatomy	Physiology
5 & 6	Thorax Abdomen Pelvis Embryology, Histology tissues Muscles, Bone marrow	Osmosis Blood pressure, RBC, ESR (Demonstration) Principles of cardiography (Demonstration) Stress test Heart sounds
7 & 8	Head and Neck Prosected part Histology- bone connection Tissue Embryology	Chemical examination of Cranial nerves Sensory function Motor function
3	Thorax Abdomen Embryology model	Spirometry Stethograph Artificial respiration F
9 & 10	Brain	Examination of higher functions, reflexes

Urine : Physical and Chemical Estimation of Glucose in blood and urine G.T.T.

ANNEXURE IV

Topics for Integrated Teaching Programme during MBBS Phase-I course

I Term

II Term

		Sl. No	**Topic**	**Department to organise**	**Department to organise**
		1	Acid base balance	Biochemistry	Physiology, Bioc
		2	Thyroid gland	Anatomy	Anatomy, Ph
		3	Pancreas	Anatomy	Anatomy, Ph
		4	Stomach	Anatomy	Anatomy, Ph
		5	Limbic system, Emotion, learning	Physiology	Anatomy & P
		6	Growth & Development	Physiology	Anatomy & P
		7	Cerebral ventricles	CSF	Anatomy & P

Topics for Horizontal and Vertical Integrated Teaching Programme

During MBBS Phase - I Course

Duration : 90 minutes

The knowledge acquired in basic subjects shall help the students to understand the structure and function of the human body in health and correlate the knowledge acquired in solving the clinical problems

Sl No	Topic	Anatomy	Physiology	Biochemistry	Clinical subjects
1	Coronary circulation	Coronary arteries & its peculiarities (30 mins)	Circulation, Regulation & measurement (30 mins)	Biochemical markers of infarction (15 mins)	CAD- Medicine Department (15 mins)
2	Diabetes	Islets of Langerhans (20 mins)	Metabolic functions of insulin (30 mins)	Diagnostic tests of diabetes (20 mins)	Symptoms and complication of Diabetes- Medicine Department (20 mins)
3	Kidney	Structure of Glomerulus (20 mins)	Glomerular filtration (30 mins)	Renal function tests (30 mins)	Disorders of glomerulus- Nephrology Department (10 mins)
4	Jaundice	Hepatobiliary system (20 mins)	Bilirubin metabolism (20 mins)	LFT (30 mins)	Common liver disorders causing jaundice- Gastroenterology Department (10 mins)
5	Ovaries	Ovary & ovarian cycle (30 mins)	HPO Axis (30 mins)	Fertility hormonal assay (20 mins)	Common causes of infertility- Obstrectrics & Gynaecology- Department (10 mins)

ANNEXURE V

Segregation of Biomedical waste and colour coding for disposal

Notes:

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

Colour coding	Type of Container	Waste category
Yellow	Plastic bag	Cat 1, Cat 2, Cat 3 & Cat 6
Red	Disinfected container/ plastic bag	Cat 3, Cat 6, Cat 7
Blue/ White Translucent	Plastic bag/ puncture proof container	Cat 4, Cat 7
Black	Plastic bag	Cat 5, Cat 9 & Cat 1 (solid)