



PONDICHERRY UNIVERSITY

(A CENTRAL UNIVERSITY)

M.B.B.S.

Syllabus & Regulations

2017-18 Onwards

**PONDICHERRY UNIVERSITY
M.B.B.S
REGULATIONS AND SYLLABUS
(1st AUGUST 2017)**

**IN ACCORDANCE WITH
MEDICAL COUNCIL OF INDIA
REGULATIONS ON
GRADUATE MEDICAL EDUCATION, 1997
(AMENDED UPTO 10th March 2017)**

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CHAPTER 1

GENERAL CONSIDERATIONS AND TEACHING APPROACH

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

11. Lectures alone are generally not adequate as a method of training and are a poor means of transferring/acquiring information and even less effective at skill development and in generating the appropriate attitudes. Every effort should be made to encourage the use of active methods related to demonstration and on first hand experience. Students will be encouraged to learn in small groups, through peer interactions so as to gain maximal experience through contacts with patients and the communities in which they live. While the curriculum objectives often refer to areas of knowledge or science, they are best taught in a setting of clinical relevance and hands on experience for students who assimilate and make this knowledge a part of their own working skills.

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

13. Clinics should be 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 of the patients.

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

15. Maximal efforts have to be made to encourage integrated teaching between traditional subject areas using a problem based learning approach starting with clinical or community cases and exploring the relevance of various preclinical disciplines in both understanding and resolution of the problem. Every attempt be made to de-emphasize compartmentalisation of disciplines so as to achieve both horizontal and vertical integration in different phases.

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

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

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

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

20. History of Medicine - 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 coordinated by the Medical Education Unit of the College.

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

22. Integration of ICT in learning process will be implemented.

OBJECTIVE OF MEDICAL GRADUATE TRAINING PROGRAMME

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:

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

- (a) be competent in diagnosis and management of common health problems of the individual and the community, commensurate with his/her position as a member of the health team at the primary, secondary or tertiary levels, using his/her clinical skills based on history, physical examination and relevant investigations.
- (b) be competent to practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems.
- (c) appreciate rationale for different therapeutic modalities, be familiar with the administration of the "essential drugs" and their common side effects.
- (d) be able to appreciate the socio-psychological, cultural, economic and environmental factors affecting health and develop humane attitude towards the patients in discharging one's professional responsibilities.
- (e) possess the attitude for continued self learning and to seek further expertise or to pursue research in any chosen area of medicine, action research and documentation skills.
- (f) be familiar with the basic factors which are essential for the implementation of the National Health Programmes including practical aspects of the following:
 - (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 level of service delivery, medical waste disposal.
- (vii) Organizational institutional arrangements.

(g) acquire basic management skills in the area of human resources, materials and resource management related to health care delivery, General and hospital management, principal inventory skills and counselling.

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

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

(j) be competent to work in a variety of health care settings.

(k) have personal characteristics and attitudes required for professional life such as personal integrity, sense of responsibility and dependability and ability to relate to or show concern for other individuals.

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

CHAPTER II

ADMISSION, SELECTION, COUNSELING, MIGRATION & TRAINING

4. **Admission to the Medical Course** - Eligibility Criteria: No Candidate shall be allowed to be admitted to the Medical Curriculum proper of first Bachelor of Medicine and Bachelor of Surgery (MBBS) Course until:

1. He/she shall complete the age of 17 years on or before 31st December of the year of admission to the MBBS Course.

2. In order to be eligible to take National Eligibility-cum-Entrance Test, he/she should have passed at first attempt the qualifying examination as under:

(a) 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/Bio-technology 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

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

Or

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

Or

(d) The first year of the three years degree course of a recognized university, with Physics, chemistry and Biology / Bio-technology 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

(e) 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, Biolog (Botany, Zoology)/Bio-technology and further that he/she has passed the earlier qualifying examination with the following subjects - Physics, Chemistry, Biology and English.

Or

(f) 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/Bio-technology including practical test in each of these subjects and English.

Note: The pre-medical course may be conducted either at Medical College, or a science College. After the 10+2 course is introduced, the integrated courses should be abolished.

3. Three percent (3%) seats of the annual sanctioned intake capacity shall be filled up by candidates with locomotory disability of lower limbs between 50% and 70%. Provided that in case any seat in this 3% quota remains unfilled on account of unavailability of candidates with locomotory disability of lower limbs between 50% to 70% then any such unfilled seat in this 3% quota shall be filled up by persons with locomotory disability of lower limbs between 40% and 50% - before they are included in the annual sanctioned seats for General Category candidates. Provided further that this entire exercise shall be completed by each medical college / institution as per the statutory time schedule for admissions and in no case any admission will be made in the MBBS course after 30th of September.

4. The percentage of NRI students to be admitted shall not exceed 15% of the total intake. The guidelines to be followed for eligibility for NRI admission are as follows:

Candidates should fulfil the minimum eligibility criteria to seek admission under Non Resident Indians (NRI) Category. The seats under NRI quota should be utilized by the children or wards of Bonafide NRI's only. It may be noted that the admission procedure, application form and fees are different from the domestic students.

1. As per the GO(MS)No.243/2014/H&FWD dated 6-8-2014 "An Applicant who depends upon his/her Father/Mother / Brothers/Sisters (inclusive of first cousins) / Husband/Wife / Brothers and Sisters (inclusive of first cousins) of Father or Mother / Half Brother/Half Sister / Adopted Father or Adopted Mother or guardian (declared as the guardian of the candidate by the court as per provisions in 'The Guardian and Wards Act, 1890,") who is working abroad, will only be eligible to apply in the NRI category seats. Further, the Candidate should be of Indian origin settled in Foreign (OR) Candidate born in a foreign country and whose parents are of Indian Origin (OR) Child of Indian Citizen staying abroad on employment or business (OR) Child of Indian citizen deputed abroad by Public Sector Undertaking (OR) Child of the Official of the Central / State Government on deputation abroad shall fall under the NRI category. This is subject to further orders, if any, from Government, regarding the matter.

2. The candidate himself/herself should produce the proof for NRI/ Overseas Citizenship India (OCI) or Person of Indian Origin (PIO) or child of NRI/OCI/PIO with current year NRI certificate issued from the Indian embassy of concerned country along with valid passport and visa copies.

3. The candidate should have completed 17 years of age on or before 31st December of the year of admission.

4. Candidate seeking admission to MBBS course under NRI Quota should have, at first attempt, passed H.Sc, Examination (10+2 pattern / equivalent) and must have taken courses in Biology, Physics and Chemistry. English should be one of the subjects in the qualifying examination. And obtained minimum of marks at 50th percentile in 'National Eligibility-cum-Entrance Test to MBBS course' held for the said academic year.

5. The candidate should have obtained a minimum of 50% marks in Biology or Botany and Zoology taken together and a minimum of 50% marks each in Physics and Chemistry Admissions are done on the basis of marks obtained in the qualifying examination Wherever grades like A, B-, C+, etc. are used by the issuing school, appropriate equivalence in terms of percentage like 90%, 75% and 60% should be made available. Rounding off of the percentage of marks to the nearest whole number is not permitted.

6. Candidates with foreign qualifications will have to obtain the 'Equivalence Certificate' from Association of Indian Universities, New Delhi who will equate their qualifications as equivalent to the 10+2 of India. This certificate will have to be submitted at the time of counselling.

Address of AIU, New Delhi:

Evaluation Officer,
Association of Indian Universities,
AIU House, 16 Comrade Indrajit Gupta Marg (Kotla Marg),
New Delhi – 110 002, India
Phone: +91 11 23230059, 23232429, 23232305, Fax: +91 11 23232131
Email: evaluation@aiuweb.org/info@aiuweb.org; Website: aiuweb.org/evaluation

7. For candidates applying under NRI Quota, the Sponsorship should be given by the parents (father or mother) or a blood relative (brother or sister), Candidate who have no living parents or blood relatives and has been taken as a ward by a guardian i.e., by some other NRI relative living abroad with suitable proof of relationship and domicile with copies of Valid passport and visa copies.

8. The selected NRI candidate must join on the specified date. Failure to join on the mentioned date shall result in cancellation of the seat.

Required Documents for Admission under NRI Category

Note: All certificates should be produced in English or Translated version and notarised by a notary along with the original version.

Certified copy (English translated) of educational marks sheets. NEET eligibility certificate Class 10+2/12th Equivalence Certificate obtained from the Association of Indian Universities, New Delhi. Copy of Passport and Visa wherever applicable. Proof of NRI status of the candidate/ sponsors (parents/blood relatives/legal guardian). Birth certificate of the candidate. Registration certificate/Residential permit from local police. Student Visa, PIO Card or OCI Card whichever is/are applicable. Any other documents required by the Government of India from time to time.

5. Selection of Students:

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

I. There shall be a single eligibility cum entrance examination namely 'National Eligibility-cum-Entrance Test for admission to MBBS course' in each academic year. The overall superintendence, direction and control of National Eligibility-cum-Entrance Test shall vest with Medical Council of India. However, Medical Council of India with the previous approval of the Central Government shall select organizations to conduct 'National Eligibility-cum-Entrance Test for admission to MBBS course.

II. In order to be eligible for admission to MBBS Course for a particular academic year, it shall be necessary for a candidate to obtain minimum of marks at 50th percentile in 'National Eligibility-cum-Entrance Test to MBBS course' held for the said academic year. However, in respect of candidates belonging to Scheduled Castes, Scheduled Tribes, Other Backward Classes, the minimum marks shall be at 40th percentile. In respect of candidates with locomotory

disability of lower limbs terms of Clause 4(3) above, the minimum marks shall be at 45th percentile. The percentile shall be determined on the basis of highest marks secured in the All-India common merit list in 'National Eligibility-cum-Entrance Test for admission to MBBS course'. Provided when sufficient number of candidates in the respective categories fail to secure minimum marks as prescribed in National Eligibility-cum-Entrance Test held for any academic year for admission to MBBS Course, the Central Government in consultation with Medical Council of India may at its discretion lower the minimum marks required for admission to MBBS Course for candidates belonging to respective categories and marks so lowered by the Central Government shall be applicable for the said academic year only."

III. The reservation of seats in medical colleges for respective categories shall be as per applicable laws prevailing in States/ Union Territories. An all India merit list as well as State-wise merit list of the eligible candidates shall be prepared on the basis of the marks obtained in National Eligibility-cum- Entrance Test and candidates shall be admitted to MBBS course from the said lists only.

IV. No Candidate who has failed to obtain the minimum eligibility marks as prescribed in Sub Clause (ii) above shall be admitted to MBBS Course in the said academic year.

V. All admissions to MBBS course within the respective categories shall be based solely on marks obtained in the National Eligibility-cum-Entrance Test."

VI. To be eligible for admission to MBBS course, a candidate must have passed at first attempt in the subjects of Physics, Chemistry, Biology / Bio-technology and English individually and must have obtained a minimum of 50% marks taken together in Physics, Chemistry and Biology / Bio-technology at the qualifying examination as mentioned in clause (2) of Regulation 4 and in addition must have come in the merit list of "National Eligibility-cum-Entrance Test" for admission to MBBS course. In respect of candidates belonging to Scheduled Castes, Scheduled Tribes or other Backward Classes the minimum marks obtained in Physics, Chemistry and Biology/Bio-technology taken together in qualifying examination shall be 40% instead of 50%. In respect of candidates with locomotory disability of lower limbs in terms of Clause 4(3) above, the minimum marks in qualifying examination in Physics, Chemistry and Biology/Bio-technology taken together in qualifying examination shall be 45% instead of 50%. Provided that a candidate who has appeared in the qualifying examination the result of which has not been declared, he/she may be provisionally permitted to take up the National Eligibility-cum-Entrance Test and in case of selection for admission to the MBBS course, he/she shall not be admitted to that course until he fulfils the eligibility criteria under Regulation 4.

VII. The Central Board of Secondary Education shall be the organization to conduct National Eligibility-cum-Entrance Test for admission to MBBS course.

5A Common Counseling:

1. There shall be a common counselling for admission to MBBS course in all Medical Educational Institutions on the basis of merit list of the National Eligibility Entrance Test.
2. The Designated Authority for counselling for the 15% All India Quota seats of the contributing States shall be the Directorate General of Health Services.
3. The counselling for all admission to MBBS course in all Medical Educational Institutions in a State/ Union Territory, including Medical Educational Institutions established by the Central Govt, State Govt, University, Deemed University, Trust, Society/ Minority Institutions/ Corporations or a Company shall be conducted by the State/ Union Territory Govt. Such common counselling shall be under the overall superintendence, direction, and control of the State/ Union Territory Govt.

(The above clause 5 “Selection of students” is subject to amendments, if any, by the Supreme Court of India in the admission year 2017 and thereafter)

6. Migration:

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

Note-1: The State Governments/Universities/Institutions may frame appropriate guidelines for grant of No Objection Certificate or migration, as the case may be, to the students subject to provisions of these regulations.

Note-2: Any request for migration not covered under the provisions of these Regulations shall be referred to the Medical Council of India for consideration on individual merits by the Director (Medical Education) of the State or the Head of Central Government Institution concerned. The

decision taken by the Council on such requests shall be final.

Note-3: The College/Institutions shall send intimation to the Medical Council of India about the number of students admitted by them on migration within one month of their joining. It shall be open to the Council to undertake verification of the compliance of the provisions of the regulations governing migration by the Colleges at any point of time.

7. Training Period and Time Distribution:

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

2. The period of 4 ½ years is divided into three phases as follows:-

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

b) Phase-II (3 semesters) - consisting of para-clinical / clinical subjects. During this phase teaching of para-clinical and clinical subjects shall be done concurrently. The para-clinical subjects shall consist of Pathology, Pharmacology, Microbiology, Forensic Medicine including Toxicology and part of Community Medicine. The clinical subjects shall consist of all those detailed below in Phase III. Out of the time for Para-clinical teaching approximately equal time be allotted to Pathology, Pharmacology, Microbiology and Forensic Medicine and Community Medicine combined (1/3 Forensic Medicine & 2/3 Community Medicine). See Appendix C.

c) Phase-III (Continuation of study of clinical subjects for seven semesters after passing Phase-I). The clinical subjects to be taught during Phase II & III are Medicine and its allied specialties, Surgery and its allied specialties, Obstetrics and Gynaecology and Community Medicine. Besides clinical posting as per schedule mentioned herewith, rest of the teaching hours be divided for didactic lectures, demonstrations, seminars, group discussions etc. in various subjects. The time distribution shall be as per Appendix C. The Medicine and its allied specialties training will include General Medicine, Paediatrics, Tuberculosis and Chest, Skin and Sexually Transmitted Diseases, Psychiatry, Radio-diagnosis, Infectious diseases etc. The Surgery and its allied specialties training will include General Surgery, Orthopaedic Surgery including Physio-therapy and Rehabilitation, Ophthalmology, Otorhinolaryngology, Anaesthesia, Dentistry, Radio-therapy etc. The Obstetrics & Gynaecology training will include family medicine, family welfare planning etc.

3. The first 2 semester (approximately 240 teaching days) shall be occupied in the Phase I (Pre-clinical) subjects and introduction to a broader understanding of the perspectives of medical education leading to delivery of health care. No student shall be permitted to join the Phase II (Para-clinical/clinical) group of subjects until he has passed in all the Phase I (Pre-clinical subjects) for which he will be permitted not more than four attempts (I MBBS University examination), provided four chances are completed in three years from the date of enrolment.

4. After passing pre-clinical subjects, 1½ year (3 semesters) shall be devoted to para-clinical subjects. Phase II will be devoted to para-clinical & clinical subjects, along with clinical postings. During clinical phase (Phase III) pre-clinical and para-clinical teaching will be integrated into the teaching of clinical subjects where relevant.

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

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

6A. There shall be no admission of students in respect of any academic session beyond 30th September under any circumstance. The Universities shall not register any student admitted beyond the said date.

6B. The University 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.

The institution which grants admission to any student after the last date specified from the same shall also be liable to face such action as may be prescribed by MCI including surrender of seats equivalent to the extent of such admission made from its sanctioned intake capacity for the succeeding academic year.

7. The supplementary examination for 1st Professional MBBS examination may be conducted within 6 months* so that the students who pass can join the main batch and the failed students will have to appear in the subsequent year 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 the full course of study of three semesters (i.e. 18 months) for the second professional MBBS examination irrespective of the examination of the main batch.

Conduct of supplementary examination and declaration of its results, ideally before 1st August each year so as to enable students passing the supplementary examination to join the regular batch of II MBBS at the earliest. Students can be permitted to appear for the II MBBS University examination with the main batch (November session), provided that a minimum of 75% of attendance is feasible and obtained in each subject.

8. Maximal duration permitted to complete the MBBS course (examinations) is 8 years.

9. In case of a candidate discontinuing in the middle and wishing to rejoin, the period of absence will be condoned only if prior permission has been sought from the University before discontinuing, failing which the admission will be considered as cancelled.

Subjects covered during different Phases of MBBS

(Details of course and evaluation content of each subject is provided in Chapter III)

Phase I (Pre-Clinical subjects)

1. Human Anatomy
2. Human Physiology
3. Biochemistry

4. Introduction to Humanities and Community Medicine

Phase II (Para-Clinical subjects)

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

Phase II & III (Clinical subjects)

1. Medicine and its allied specialities
 - a) Medicine
 - b) Paediatrics
 - c) Psychiatry
 - d) Dermatology & STD
 - e) Tuberculosis and Respiratory Medicine
2. Surgery and its allied specialities
 - a) Surgery
 - b) Orthopaedics
 - c) Radiodiagnosis and Radiotherapy
 - d) Oto-rhino-laryngology
 - e) Ophthalmology
3. Obstetrics & Gynaecology
4. Family Planning (Training in Family Planning should be emphasized in all the three phases and during internship)
5. Community Medicine
6. Emergency Medicine

8. Phase Distribution and Timing of Examinations:

6 MONTHS

6 MONTHS

6 MONTHS



1st professional Examination (during 2nd semester)



2nd professional Examination (during 5th semester)



3rd professional Part I (during 7th semester)



3rd professional Part II (Final Professional)

Note:

a) Passing in 1st Professional is compulsory before proceeding to Phase II training.

b) A student who fails in the 2nd professional examination, should not be allowed to appear 3rd Professional Part I examination unless he passes all subjects of 2nd Professional examination.

c) Passing in 3rd Professional (Part I) examination is not compulsory before entering for 8th & 9th semester training, however passing of 3rd Professional (Part I) is compulsory for being eligible for 3rd Professional (Part II) examination.

d) The student is required to complete the course within 8 years of admission after which he will not be allowed to appear for any examination, unless he has an arrear of one subject alone.

During 3rd to 9th semesters, clinical postings of 3 hours duration daily as specified in the Table below is suggested for various departments, after Introductory course in Clinical Methods in Medicine & Surgery of 2 weeks each for the whole class.

TABLE

Total	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	-	4	-	4	6	6	26
Paediatrics	-	2	-	2	2	4	-	10
Tuberculosis and Chest Diseases	-	2	-	-	-	-	-	02
Skin & STD	-	2	-	2	-	2	-	06
Psychiatry	-	-	2	-	-	-	-	02
Radiology*	-	-	-	-	2	-	-	02
General Surgery****	6	-	4	-	4	6	6	26
Orthopaedics**	-	-	4	4	-	-	2	10
Ophthalmology	-	4	-	4	-	-	-	08
Ear Nose and Throat	-	4	-	4	-	-	-	08
OBG including Family Welfare Planning*****	2	4	4	-	4	4	6	24
Community Medicine	4	4	-	4	-	-	-	12
Casualty	-	-	-	2	-	-	-	02
Dentistry	-	-	-	-	2	-	-	02
Total (in Weeks)	18	22	18	22	18	22	20	140

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 Radiodiagnosis and Radiotherapy where existent.

** This posting includes exposure to Rehabilitation and Physiotherapy.

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

**** This posting includes exposure to dressing and Anaesthesia.

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

CHAPTER - III

12. Examination Regulations:

Essentialities for qualifying to appear in professional examinations.

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

(1) Attendance:

75% attendance in a subject for appearing in the examination is compulsory inclusive of attendance in non-lecture teaching i.e. seminars, group discussions, tutorials, demonstrations, practicals, hospital (Tertiary, Secondary, Primary) posting and bed side clinics etc.”

For appearing at the University Examination, student should have minimum 75% attendance in each subject, even if shortage is in one subject, he/ she will be detained for the entire examination.

Students cannot appear in part or separately in individual subjects during the first appearance at the Professional examination.

(2) Internal Assessment:

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

(ii) Regular periodical examinations shall be conducted throughout the course. Two notified tests per semester and a model examination are minimum compulsory before each University examination. The computation of internal assessment is based on $\frac{1}{n}$ where n is the number of notified tests.

Improvement examinations for students who have failed the University examination at first attempt: a minimum of two theory examinations are to be conducted as improvement examinations. Students who wish to appear for these improvement examinations need to obtain prior permission of the University. Internal Assessment marks cannot be improved after two attempts at the University examination.

(iii) Day to day records should be given importance during internal Assessment. The marks for the record book submitted are to be included in the practical internal assessment.

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

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

Note:

Internal assessment shall relate to different ways in which students participation in learning participation in learning process during semesters in evaluated.

Some examples are as follows:

- (i) Preparation of subject for students seminar.
- (ii) Preparation of a clinical case for discussion.
- (iii) Clinical case study/problem solving exercise.
- (iv) Participation in Project for health care in the community (planning stage to evaluation).
- (v) Proficiency in carrying out a practical or a skill in small research project.
- (vi) Multiple choice questions (MCQ) test after completion of a system/ teaching.

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

Students cannot appear in part or separately in individual subjects during the first appearance at the Professional examination.

(3) University Examinations:

Theory papers will be prepared by the examiners as prescribed. Nature of questions will be short answer type/ objective type and marks for each part indicated separately. Question papers should preferably be of short structure/ objective type.

Practicals/ clinicals will be conducted in the laboratories or hospital wards. The objective will be to assess proficiency in skills, conduct of experiment, interpretation of data and logical conclusion. Clinical cases should preferably include common diseases and not esoteric syndromes or rare disorders. Emphasis should be on candidate's capability in eliciting physical signs and their interpretation.

Clinical cases/ practicals shall take into account common diseases which the student is likely to come in contact in practice. Rare cases/ obscure syndromes, shall not be included for final examination.

Viva/ oral includes evaluation of management approach and handling of emergencies. Candidate's skill in interpretation of common investigative data, X-rays, identification of specimens, ECG, etc. also is to be evaluated.

The examinations are to be designed with a view to ascertain whether the candidate has acquired the necessary for knowledge, minimum skills alongwith clear concepts of the fundamentals which are necessary for him to carry out his professional day to day work competently. Evaluation will be carried out on an objective basis. Question papers should preferably be of short structure/ objective type. During evaluation (both Internal and External) it shall be ascertained if the candidate has acquired the skills as detailed in **Appendix-A**.

Scrutiny of theory question papers received from paper setters:

In order to ensure uniformity and minimum standards acceptable for evaluation for evaluation a Vetting Committee and a Chairman of the Board of paper setters be constituted by the Vice Chancellor for each subject of the four Professional examinations.

First Professional:

In the second Semester of Phase 1 training, in the subjects of Anatomy, Physiology and Biochemistry (Regular in June session followed by Supplementary examination).

Second Professional:

In the Fifth Semester of Phase II training, in the subjects of Pathology, Microbiology, Pharmacy and Forensic Medicine. (Regular in Nov session, followed by supplementary in June session).

Third Professional:

Part 1 – in the Seventh Semester of Phase III, in the subjects of Ophthalmology, Otorhinolaryngology and Community Medicine. (Regular in Nov session, followed by supplementary in June session).

Third Professional:

Part II- (Final Professional) - At the end of Phase III training in the subjects of Medicine, Surgery, Obstetrics & Gynaecology and Pediatrics. (Regular in Nov session, followed by supplementary in June session).

Note:

- a) Passing in 1st Professional is compulsory before proceeding to Phase II training.
- b) A student who fails in the 2nd professional examination, should not be allowed to appear 3rd Professional Part I examination unless he passes all subjects of 2nd Professional examination.
- c) Passing in 3rd Professional (Part-1) is compulsory for being eligible for 3rd Professional (Part II) examination.
- d) The student is required to complete the course within 8 years of admission after which he will not be allowed to appear for any examination, unless he has an arrear of one subject alone.

(4) Distribution of marks in various disciplines:

Long Answer Question (LAQ) of 10 marks each and Short Answer Question (SAQ) of 5 marks each to be included in each paper of 40 or 50 or 60 marks theory paper.

The subjects of Anatomy, Physiology and Biochemistry will have 2 papers of 50 marks each, without separate sections in each paper and 2 hours for each paper. Each paper will include 2 LAQs of 10 marks each, 4 SAQs of 5 marks each and 5 SAQs of 2 marks each.

The subjects of Community Medicine, Medicine & Surgery will have 2 papers of 60 marks each with Section A & B and 3 hours for each paper. Each Section will include 1 LAQ of 10 marks and 4 SAQs of 5 marks each.

The subjects of Forensic Medicine, Otorhinolaryngology, Ophthalmology and Paediatrics will have 1 paper of 40 marks without separate sections and 2 hours to answer. The single paper will include 1 LAQ of 10 marks and 6 SAQs of 5 marks each.

The subjects of Pathology, Microbiology, Pharmacology and OBG will have 2 papers of 40 marks each without separate sections and 2 hours for each paper. Each paper will include 1 LAQ of 10 marks and 6 SAQs of 5 marks each.

The details of the distribution of marks in each paper/ section, for each subject course content is provided in chapter IV.

Pass: In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in practicals / clinicals.

(A) First Professional examination (Pre-clinical Subjects):

(a) Anatomy

Theory-Two papers of 50 marks each
(One applied question of 10 marks in each paper) 100 marks.

Oral (Viva)	20 marks
Practical	40 marks
Internal Assessment (Theory-20; Practical-20)	40 marks
Total	200 marks

(b) Physiology including Biophysics:

Theory-Two papers of 50 marks each (One applied question of 10 marks in each paper)	100 marks
Oral (Viva)	20 marks
Practical	40 marks
Internal Assessment (Theory-20; Practical-20)	40 marks
Total	200 marks

(c) Biochemistry

Theory-Two papers of 50 marks each (One applied question of 10 marks in each paper)	100 marks
Oral (Viva)	20 marks
Practical	40 marks
Internal Assessment (Theory-20; Practical-20)	40 marks
Total	200 marks

Pass: In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in practicals/ clinicals.

(B) Second Professional Examination (Para-clinical subjects):

(a) Pathology

Theory-Two papers of 40 marks each (One applied question of 10 marks in each paper)	80 marks
Oral (Viva)	15 marks
Practical	25 marks
Internal assessment (Theory-15; Practical-15)	30 marks
Total	150 marks

(b) Microbiology

Theory-Two papers of 40 marks each (One applied question of 10 marks in each paper)	80 marks
Oral (Viva)	15 marks
Practical	25 marks
Internal assessment (Theory-15; Practical-15)	30 marks
Total	150 marks

(c) Pharmacology

Theory-Two papers of 40 marks each Containing one question on clinical therapeutics	80 marks
Oral (Viva)	15 marks
Practical	25 marks
Internal assessment (Theory-15; Practical-15)	30 marks
Total	150 marks

(d) Forensic Medicine

Theory-one papers	40 marks
Oral (Viva)	10 marks
Practical/Clinicals	30 marks
Internal assessment (Theory-10; Practical-10)	20 marks
Total	100 marks

Pass: In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in practicals/clinicals.

(D) Third Professional:

(i) PART 1 (Clinical subjects)

Part 1: To be conducted during end period of seventh semester.

(a) Ophthalmology:

Theory: One paper (should contain one question on pre-clinical and para-clinical aspects, of 10 marks)	40 marks
Oral (Viva)	10 marks
Clinical	30 marks
Internal assessment (Theory-10; Practical-10)	20 marks
Total	100 marks

(b) Otorhinolaryngology:

Theory: One paper (should contain one question on pre-clinical and para-clinical aspects, of 10 marks)	40 marks
Oral (Viva)	10 marks
Clinical	30 marks
Internal assessment (Theory -10 Practical-10)	20 marks
Total	100 marks

(c) Community Medicine including Humanities:

Theory: Two papers of 60 marks each (includes problem solving, applied aspects of management at primary level including essential drugs, occupational (agro based) diseases, rehabilitation and social aspects of community).	120 marks
Oral (Viva)	10 marks
Practical/Project evaluation	30 marks
Internal assessment (Theory -20; Practical-20)	40 marks
Total	200 marks

Pass: In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in practicals/ clinicals.

PART-II

Each paper shall have two sections. Questions requiring essaytype answers may be avoided.

(a) Medicine:

Theory- Two papers of 60 marks each Paper 1- General Medicine Paper II- General Medicine (including Psychiatry, Dermatology and S.T.D.) (Shall contain one question on basic sciences and allied subjects)	120 marks
Oral (Viva) Interpretation of X-ray ECG, etc.	20 marks
Clinical (Bed side)	100 marks
Internal assessment (Theory-30; Practical-30)	60 marks
Total	300 marks

(b) Surgery:

Theory-Two papers of 60 marks each Paper-1-General Surgery (Section 1) Orthopaedics (Section 2) PAPER II-General Surgery including Anaesthesiology, Dental diseases and Radiology. (shall contain one question on basic sciences and allied subjects)	120 marks
Oral (Viva) Interpretation of Investigative data	20 marks
Clinical (Bed Side)	100 marks
Internal assessment (Theory-30; Practical-30)	60 marks
Total	300 marks

Paper 1 of Surgery shall have one section in Orthopaedics. The questions on Orthopaedic Surgery be set and assessed by examiners who are teachers in the Orthopaedic surgery.

(c) Obstetrics and Gynaecology:

Theory Two papers of 40 marks each Paper I- Obstetrics including social obstetrics. Paper II - Gynaecology, Family Welfare and Demography (Shall contain one question on basic sciences and allied subjects)	80 marks
Oral (Viva) including record of delivery cases (20+10)	30 marks
Clinical	50 marks
Internal assessment (Theory-20; Practical-20)	40 marks
Total	200 marks

(d) Pediatrics (Including Neonatology):

Theory: One paper (Shall contain one question on basic sciences and allied subjects)	40 marks
Oral (Viva)	10 marks
Clinical	30 marks
Internal assessment (Theory-10; Practical-10)	20 marks
Total	100 marks

Pass: In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in practicals/ clinicals.

13 Appointment of Examiners:

(1) No person shall be appointed as an examiner in any of the subjects of the Professional examination leading to and including the final Professional examinations for the award of the MBBS degree unless he has taken atleast five years previously, a doctorate degree of a recognized university or an equivalent qualification in the particular subject as per recommendation of the Council on teachers' eligibility qualifications and has had at least five years of total teaching experience in the subject concerned in a college affiliated to a recognized university at a faculty position.

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

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

(4) External examiners shall not be from the same university and preferably be from outside the state.

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

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

(7) External examiners shall rotate at an interval of 2 years.

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

(9) Except Head of the department of subject concerned in a college/ institution, all other with the rank of reader or equivalent and above with requisite qualifications and experience shall be appointed internal examiners by rotation in their

subjects; provided that where there are no posts of readers, then an Assistant Professor of 5 years standing as Assistant Professor may be considered for appointment as examiner.

(10) Grace marks are applicable only when the candidate appears for the University Examination in all subjects of that phase/ professional examination. Grace marks for practical examinations are not permitted.

A passing board is constituted for finalizing the results of each phase. The members of the board can allot grace marks of maximum 5% only in one subject if the candidate has passed in other subjects. The grace mark of not more than 5% will be added for one subject only after the marks obtained in theory, at the University examination are scaled down to 100% in the particular subject. That is 6 grace marks, 5 grace marks, 4 grace marks and 2 grace marks can be allotted for a total theory marks of 120, 100, 80, 40 respectively.

I MBBS: Grace marks of 5 are permissible out of 100 in Anatomy or Physiology or Biochemistry, provided that the candidate has appeared for all three subjects at that examination and passed the other two subjects.

II MBBS: Grace marks of 4 are permissible out of 80 in Pathology or Microbiology or Pharmacology, or 2 out of 40 in Forensic Medicine, provided that the candidate has appeared for all four subjects at that examination and passed the other three subjects.

III MBBS (Part 1): Grace marks of 6 are permissible on 120 in Community Medicine, or 2 out of 40 in Otorhinolaryngology or Ophthalmology, provided that the candidate has appeared for all three subjects at that examination and passed the other two subjects.

IV MBBS (Part 2): Grace marks of 6 are permissible out of 120 in Medicine or Surgery, or 4 out of 80 in Obstetrics & Gynaecology, or 2 out of 40 in Paediatrics, provided that the candidate has appeared for all four subjects at that examination and passed the other three subjects.

(11) Re-evaluation of theory papers is not permitted.

CHAPTER IV

CURRICULUM

9. Pre-clinical Subjects of Phase I:

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

(1) Human Anatomy

This entails course content (goal, objectives, course content, skills as well as distribution of marks for theory and Practical University examinations as per MCI and a model question paper in each subject)

(2) Human Physiology Including Biophysics

(3) Biochemistry

(4) Community Medicine

9. Para-Clinical Subjects of Phase II:

(1) Pathology

(2) Microbiology

(3) Pharmacology

(4) Forensic Medicine Including Toxicology & Medical jurisprudence

(5) Community Medicine (Refer to Phase I)

10. Clinical Subjects of Phase II & III:

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

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

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

The course shall comprise of:

(1) Otorhinolaryngology

(2) Ophthalmology

(3) Community Medicine (Refer to Phase I)

(4) Medicine & Allied Specialities

- A) Medicine
- B) Respiratory medicine
- C) Psychiatry
- D) Dermatology and sexually transmitted diseases
- E) Paediatrics including neonatology

(5) Surgery & its allied specialities

- A) Surgery including paediatric surgery
- B) Orthopaedics
- C) Radiodiagnosis & radiotherapy
- D) Dentistry

(6) Obstetrics and gynaecology

(7) Family Planning Training in Family Planning should be emphasised in all three phases during internship as per guideline provided in **Appendix B**.

(8) Emergency Medicine/ Anaesthesiology

HUMAN ANATOMY

HUMAN ANATOMY

GOAL

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

OBJECTIVES:

Knowledge:

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

1. Comprehend the normal disposition, clinically relevant interrelationships, functional and cross sectional anatomy of the various structures in the body.
2. Identify the microscopic structure and correlate elementary ultra-structure of various organs and tissues and correlate the structure with the functions as a prerequisite for understanding the altered state in various disease processes.
3. Comprehend the basic structure and connections of the central nervous system to analyse the integrative and regulative functions of the organs and systems. He/She should be able to locate the site of gross lesions according to the deficits encountered.
4. Demonstrate knowledge of the basic principles and sequential development of the organs and systems, recognise the critical stages of development and the effects of common teratogens, genetic mutations and environmental hazards.
5. He/She should be able to explain the developmental basis of the major variations and abnormalities.

Skills:

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

1. Identify and locate all the structures of the body and mark the topography of the living anatomy.
2. Identify the organs and tissues under the microscope.
3. Understand the principles of karyotyping and identify the gross congenital anomalies.
4. Understand principles of newer imaging techniques and interpretation of Computerised Tomography (CT) Scan, Sonogram etc.
5. Understand clinical basis of some common clinical procedures i.e., intramuscular & intravenous injection, lumbar puncture and kidney biopsy etc.

Integration:

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

COURSE CONTENTS

MUST KNOW CATEGORY

General Anatomy:

Anatomical positions, terms of movement, colours used in anatomical drawings. Constituents of skeleton, types of bones, classification of bones with examples, names of bones, general features of different bones. Parts of typical young long bone. Types of cartilages with suitable examples. Classification of joints, general features of different types

of joints with suitable examples. Types of blood vessels, collateral circulation, components of lymphatic system. Classification and features of individual types of muscles. Parts of Nervous system, basic structure and types of neurons & neuroglial cells. Subdivisions, introduction to structure and functions of Autonomic nervous system. Skin & Fascia.

General Embryology:

Cell division, spermatogenesis, structure of sperm, oogenesis, structure of ovum, growth & rupture of the ovarian follicles. Fertilization, formation of zygote, cleavage. Implantation & abnormal sites of implantation. Blastocyst, blastulation, bilaminar & trilaminar germ disc & gastrulation. Formation of primitive streak, primary yolk sac cavity, appearance of prochordal plate. Changes in trophoblast, formation of cytotrophoblast, syncytiotrophoblast, amniotic membrane. Formation of placenta & chorionic villi, deciduas basalis, features & functions of placenta, placental circulation & abnormalities, placental barrier, types of placenta. Formation of umbilical cord, features of umbilical cord.

Systemic Embryology:

Development of diaphragm, heart and associated anomalies, development & derivatives of Aortic arterial arches. Fetal Circulation. Development of trachea and lungs and associated anomalies. Formation of foregut, midgut, and hindgut and their derivatives & associated anomalies. Development of cloaca and its derivatives. Development of urinary system, gonads & associated anomalies. Development of face, pharyngeal arches, clefts, pouches, palate, tongue & associated anomalies. Formation of neural tube, closure of anterior & posterior neuropores, brain vesicles its derivatives. Derivatives of Neural crest cells. Development of Pituitary gland.

General Histology:

Structure of cell, Types of epithelium with suitable examples, Types & features of individual cartilages. Structure of compact and cancellous bone. Microstructure of skeletal, smooth and cardiac muscle. Microstructure of arteries and veins, spleen, thymus, lymph node, tonsil, thick & thin skin.

Systemic Histology:

Microstructure of trachea, lung, tongue & Gastro intestinal system & associated glands. Histology of urinary system, male & female reproductive systems, endocrine system. Histology of cornea, retina, cerebrum, cerebellum & spinal cord.

Upper limb:

Parts of upper limb, general features of clavicle, scapula, humerus, radius & ulna. Pectoralis major, & minor muscles, mammary gland. Axilla - Boundaries, Axillary lymph nodes, Brachial plexus. Serratus anterior muscle & anastomoses around scapula. Deltoid, quadrangular & triangular spaces. Shoulder joint & its applied significance. Names of the muscles of front & back of arm & forearm & their nerve supply. Distribution of brachial artery, Axillary nerve and radial nerve. Cubital fossa, Distribution of median nerve, ulnar artery & radial artery in forearm. Flexor & extensor retinacula. Pronation & supination. Names of muscles of hand & their nerve supply. Distribution of ulnar nerve & median nerve in palm, palmar arterial arches, palmar spaces & sensory innervation of hand.

Lower limb:

Parts of lower limb, general features of hip bone, femur, tibia & fibula. Thigh muscles - nerve supply & action. Femoral triangle. Femoral sheath, adductor canal, femoral artery, inguinal

lymph nodes & femoral nerve. Gluteal muscles - nerve supply & action. Sciatic nerve. Hip joint. Leg muscles - action & nerve supply. Popliteal fossa, Knee joint. Distribution of tibial & common peroneal nerve. Retinacula around ankle, inversion and eversion foot, arches of foot, dorsalis pedis artery, sensory innervation of foot. Venous drainage of lower limb.

Thorax:

General features of thoracic cage, features of thoracic vertebra, sternum & ribs. Internal thoracic artery, typical intercostal nerve, typical intercostal space & diaphragm. Pleural recesses, lung - parts, lobes, relations of medial surface, hilum & bronchopulmonary segments. Mediastinum - subdivisions & contents. Azygos venous system, Pericardium, its subdivisions & sinuses. Heart - general features, surfaces and blood supply, interior of right atrium, right ventricle & Arch of aorta.

Abdomen, pelvis & perineum:

Inguinal canal, rectus sheath, lesser sac, greater sac, Sub phrenic spaces, pouch of Douglas. Position, parts, relations, blood supply, nerve supply & lymphatic drainage of stomach, pancreas, duodenum, caecum & appendix. Extra hepatic biliary apparatus. Coeliac trunk, Superior & inferior mesenteric vessels, Portal vein & Portocaval Anastomoses. Position, parts, relations, blood supply & nerve supply kidney, urinary bladder, prostate, uterus, rectum, anal canal & testis. Pelvic Diaphragm. Differentiation of Male & Female pelvis. Urogenital diaphragm. Ischioanal fossa, Perineal body, Perineal membrane, Pudendal canal, urethra.

Head & Neck:

Normas of skull, mandible, maxilla, cervical vertebra, layers of scalp and its blood and nerve supply. Orbicularis oculi, Orbicularis oris, Buccinator muscles & sensory innervation of face. Parotid gland, Triangles - Boundaries & contents, Sternocleidomastoid & Digastric muscles. Ansa cervicalis, carotid sheath, thyroid gland, parathyroid, pituitary glands & submandibular salivary gland. Internal & external jugular veins, external carotid artery. Dural folds, dural venous sinuses & cavernous sinus in detail, emissary veins. Extraocular muscles, superior orbital fissure. Muscles of mastication, mandibular nerve, temporomandibular joint, pterygopalatine ganglion. Tongue, pharynx, palatine tonsil, Waldeyer's ring, soft palate, hyoglossus muscles, lymphatic drainage of tongue. Features, Blood supply, nerve supply of lateral wall of nasal cavity and nasal septum. Maxillary air sinus. Cartilages, internal features of Larynx, vocal cords, piriform recess. Tympanic membrane, middle ear cavity, name & parts of inner ear. Anatomy of 3rd, 7th, 9th & 12th cranial nerves.

Neuro Anatomy:

Coverings, level of origin & termination and blood supply of spinal cord. External features & cross section of midbrain, pons and medulla oblongata. Intracerebellar nuclei, cerebellar cortex - functions, and blood supply. Cerebral cortex - gyri & sulci, functional areas & blood supply of superolateral & medial surface of cerebral cortex, internal capsule, corpus callosum, pyramidal tract. Basal Ganglia, Lateral & fourth ventricles, CSF flow, coverings of brain.

Medical Genetics; Genetic Syndromes – Down's, Klinefelter's & Turner's, Barr body

DESIRABLE TO KNOW CATEGORY

General Anatomy:

Types of ossification of bones, general pattern of blood supply of bone. Epiphyseal Cartilage (Growth cartilage). Parts of skeletal muscles, nerve supply, neuromuscular spindles. Myelination of nerve fibres, degeneration and regeneration of neurons.

General Embryology:

Menstrual cycle. Formation of decidua – its subdivisions. Estimation of age, maturation of tissues & organs & rapid growth of body. Extra-embryonic mesoderm & extra-embryonic coelom & connecting stalk, formation of chorion, amniotic cavity, expansions of amniotic cavity & formation of fetal membranes & its abnormalities

Systemic Embryology:

Development of vertebral column, limbs, Adrenal gland .Development of skull & associated anomalies, Development of body cavities, Formation of IVC, SVC, portal vein, Development of larynx, spleen, male and female urethra & external genitals & associated anomalies., nasal cavity, brain, eye & ear & associated anomalies.

General Histology:

Classification of glands with suitable examples, Structure of woven & ossifying bone, mucosa associated lymphatic tissue & structure of peripheral nerve fibre.

Systemic Histology:

Histology oftaste buds, gallbladder, large intestine, bowman's cup. PCT, DCT, juxta glomerular apparatus, urethra, seminal vesicle, prostate, mammary gland, placenta, umbilical cord

Upper limb:

Names & order of arrangement of carpal bones. ossification & growing ends of bones. Clavipectoral Fascia, axillary vein, axillary artery, scapular muscles, scapulohumeral rhythm, profunda brachii artery, anastomoses around elbow. Elbow joint, carpometacarpal joint of thumb. Palmar aponeurosis. Venous & lymphatic drainage of upper limb. Radial & Ulnar bursa.

Lower limb:

Tarsal bones, patella, fascia lata & its modifications, profunda femoris artery, obturator & accessory obturator nerve & vessels. Trendlenderg's sign, cruciate & trochanteric anastomoses. Anastomoses around knee joint, ankle joint, tibial artery, plantar arch, layers of sole, plantar aponeurosis & lymphatic drainage of lower limb.

Thorax:

Azygos lobe, Sibson's fascia, anterior mediastinum & thymus, thoracic duct, oesophagus, left atrium, left ventricle, superficial & deep cardiac plexuses, pulmonary trunk & superior vena cava.

Abdomen, pelvis and perineum:

Planes & regions of abdomen, general features of bony pelvis & lumbar vertebrae, anterior abdominal wall muscles & fascia, peritoneal disposition, greater omentum, ligaments of Liver, rest of small & large intestine & spleen, inferior vena cava, aorta, ureter, renal vascular segments. Psoas & Iliacus muscles & Lymphatic drainage of kidney, urinary bladder, prostate, uterus, rectum, anal canal & testis. Suprarenal gland. Epididymis & scrotum, ovary, internal iliac vessels, hemorrhoids, seminal vesicle, anal sphincters, contents of superficial and deep perineal pouches, pudendal nerve & internal pudendal vessels, female external genitalia.

Head & Neck:

Lymphatic drainage of face, lacrimal apparatus, deep cervical fascia, sublingual salivary gland, cervical lymph nodes, scalene & mylohyoid muscles. Subclavian artery & vein, vertebral artery, carotid body, carotid sinus, common carotid artery, middle meningeal artery, ophthalmic artery, nasociliary nerve, ciliary ganglion, ophthalmic veins, pterygoid venous plexus, maxillary nerve, maxillary artery, pharyngeal plexus, auditory tube, greater & lesser palatine vessels. Constrictors of pharynx, lingual artery, frontal, ethmoidal & sphenoidal air sinus. Movements of vocal cords. Ciliary, accommodation, light reflex, refractive media of eye, Ear ossicles, stapedius, external auditory meatus, pinna, membranous labyrinth, organ of corti.

Neuro Anatomy:

Tracts of spinal cord. Vascular lesions of Brain stem structures. Cerebellar peduncles & Cerebellar lesions. Subdivisions of nucleus & connections & important functions of thalamus, hypothalamus. Other commissural, association & projection fibres. Visual & auditory pathway. Subarachnoid cisterns, third ventricle, choroid plexus, blood brain barrier, blood CSF barrier.

Medical Genetics:

Karyotyping

PRACTICAL SKILLS

Gross Anatomy:

Same as theory

Osteology:

Same as theory

Embryology:

Same as theory

Histology:

Same as theory

Radiological Anatomy:

Identification of normal anatomical features in skiagrams.

Identification of the normal anatomical features in special investigations.

Sectional Anatomy:

Anatomical features at the following vertebral levels

Transverse section Cervical 5 & 7,

Thoracic 4, 8, 10, 12

Lumbar 1,3 & 5.

Median sagittal of head section of head and neck;
Median sagittal section of brain;
Horizontal section of brain at the level of 4th ventricle foramen.
Coronal section of cerebrum at the level of the central sulcus and splenium.

Surface Anatomy:

Location of arterial pulses of the superficial temporal artery, common carotid artery, axillary artery, brachial artery, radial artery, femoral artery, popliteal artery, posterior tibial artery and dorsalis pedis artery. Palpation/location of great auricular nerve, ulnar nerve and common peroneal nerve. Palpation and identification of the bony prominences around shoulder, elbow, wrist, hip, knee and ankle. Identification/location of internal jugular vein, median cubital vein, dorsal venous arch of hand, great saphenous vein, small saphenous vein and dorsal venous arch of foot. Location and surface anatomy of scrotal part of vas deferens, lungs, heart, liver, spleen and kidneys.

Genetics:

Identification of normal and abnormal Karyotyping.

HUMAN ANATOMY - DISTRIBUTION OF MARKS

Theory-Two papers of 50 marks each (One applied question of 10 marks in each paper)	100 marks.
Oral (Viva)	20 marks
Practical	40 marks
Internal Assessment (Theory-20; Practical-20)	40 marks
Total	200 marks

Pass: In each of the subjects, a candidate must obtain 50 % in aggregate with a minimum of 50% in Theory including oral and minimum of 50% in Practicals.

ANATOMY THEORY PAPER

Paper I – 50 marks: Upper limb, Lower limb, General Histology, General Embryology, Abdomen & Pelvis, Systemic Embryology (GIT, Genitourinary system), Systemic Histology related to abdomen

Time: 2 hours

Q1. Long Answer Questions: 2 LAQs X 10 marks each (must be structured)

Q2. Short Answer Questions: 4 SAQs X 5 marks each

Q3. Very Short Answer Question: 5 SAQs X 2 marks each

Paper II – 50 marks: Thorax, Systemic Embryology & Histology related to Thorax, Medical Genetics, General Anatomy, Head & Neck, Neuroanatomy, Systemic Embryology & Histology related to Head & Neck & Brain

Time: 2 hours

Q1. Long Answer Questions: 2 LAQs X 10 marks each (must be structured)

Q2. Short Answer Questions: 4 SAQs X 5 marks each,

Q3. Very Short Answer Question: 5 SAQs X 2 marks each

Note: LAQ should be from must know area. If LAQ is from a particular section, it should be avoided in short notes. Total marks is 100. 80 marks should be asked from must know area and 20 marks should be asked from desirable to know area.

MODEL QUESTION PAPERS:

ANATOMY PAPER - I

(Upper limb, Lower limb, General Histology, General Embryology, Abdomen & Pelvis, Systemic Embryology (GIT, Genitourinary system), Systemic Histology related to abdomen)

ANSWER ALL QUESTIONS

Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 50

1. Describe in detail the formation, branches & applied significance of Brachial plexus. (4+3+3=10)
2. Describe the extent, boundaries, contents & applied significance of Inguinal canal. (1+3+2+4=10)
3. Write short notes on: (4X5 = 20)
 - a. Fertilization & in vitro fertilization techniques
 - b. Locking & unlocking of knee.
 - c. Microscopic anatomy of Liver
 - d. Rotation of midgut loop
4. Answer briefly on: (5X2 = 10)
 - a. Any two sites of porto caval anastomoses & their clinical importance
 - b. Histology of hyaline cartilage.
 - c. Anterior relations of right kidney
 - d. Epiploic foramen
 - e. Histology of Medium sized artery

ANATOMY PAPER - II

(Thorax, Systemic Embryology & Histology related to Thorax, Medical Genetics, General Anatomy, Head & Neck, Neuroanatomy, Systemic Embryology & Histology related to Head & Neck & Brain)

ANSWER ALL QUESTIONS

Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 50

1. Describe the origin, course & branches of coronary arteries. (2+4+4=10)
2. Describe the location, parts, relations & secretomotor nerve supply of submandibular gland. (1+1+4+4=10)
3. Write short notes on: (4X5=20)
 - a. Rhomboid fossa.
 - b. Microscopic anatomy of Pituitary gland.

- c. Fibres present & blood supply of internal capsule.
- d. Development of thyroid gland & its anomalies.

4. Answer briefly on: (5X2 = 10)
- a. Law of ossification.
 - b. Barr body.
 - c. Carotid sheath.
 - d. Little's area.
 - e. Structures within parotid gland.

PRACTICAL EXAMINATION (40 marks)

I) SPOTTERS

- a) GROSS ANATOMY (10X2=20 marks)**
- 1. Upper limb – 1
 - 2. Lower limb – 1
 - 3. Abdomen & pelvis – 3
 - 4. Thorax – 1
 - 5. Head & Neck – 3
 - 6. Brain – 1

- b) HISTOLOGY SPOTTERS (10x 1=10 marks)**
- 1. General Histology – 4
 - 2. Systemic Histology – 6

- II) GROSS DISCUSSION (2 x 5=10 marks)**
- Discussion – I - Paper – I 5 marks
 - Discussion – II - Paper – II 5 marks

VIVA (20 marks)

- Embryology – 5
- Osteology - 5
- Radiology – 5
- Surface Anatomy - 5

**HUMAN
PHYSIOLOGY
INCLUDING
BIO-PHYSICS**

HUMAN PHYSIOLOGY INCLUDING BIO-PHYSICS

(A) PHYSIOLOGY:

GOAL

The broad goal of the teaching of undergraduate students in Physiology aims at providing the student comprehensive knowledge of the normal functions of the organ systems of the body to facilitate an understanding of the physiological basis of health and disease.

OBJECTIVES

Knowledge

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

1. Explain the normal functioning of all the organ systems and their interactions for well-coordinated total body function.
2. Assess the relative contribution of each organ system to the maintenance of the milieu interior.
3. Elucidate the physiological aspects of normal growth and development.
4. Describe the physiological response and adaptations to environmental stresses.
5. List the physiological principles underlying pathogenesis and treatment of disease.

Skills

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

1. Conduct experiments designed for study of physiological phenomena.
2. Interpret experimental/investigative data.
3. Distinguish between normal and abnormal data derived as a result of test which he/she has performed and observed in the laboratory.

Integration

At the end of the integrated teaching the student should acquire an integrated knowledge of organ structure and function and its regulatory mechanisms.

COURSE CONTENTS

MUST KNOW CATEGORY

General physiology:

Concept of homeostasis, milieu interieur, physiological norms, their range and control. Structure and functions of the cell and cell organelles including cytoskeleton, molecular motors, intercellular connections. Mechanism and modes of transport across cell membrane and the capillary wall. Primary active transport with examples. Secondary active transport with examples. Intercellular communication, Membrane receptors, second messengers and signal transduction. Body fluid compartments.

Blood:

Composition and functions of blood. Functions of plasma proteins, red cells, white cells and thrombocytes. Haemopoiesis and factors regulating it. Erythropoiesis and its regulation.

Haemoglobin – types and functions. RBC lifespan, hemolysis. Classification of anaemias and polycythemias, principles of management of anaemia due to deficiency of iron Vitamin B12, and folic acid. Classification and functions of leukocytes. Types and mechanism of immunity and transplant physiology, AIDS. Tissue Macrophage system. Structure and functions of platelets and their role in coagulation. Role of vascular endothelium in blood coagulation. Hemostasis and its disorders. Anticlotting mechanisms, Fibrinolytic system. Anticoagulants and their mechanism of action. Blood groups: ABO, Rh system, Clinical importance, Rh incompatibility. Blood transfusion and blood banking, Mismatched transfusion. Formation, composition and functions of lymph.

Nerve muscle physiology:

Neuron - structure, types, functions, myelination and axoplasmic transport. Genesis and ionic basis of nerve potential (graded and action potential), propagation of action potential. Properties and classification of nerve fibers, degeneration and regeneration of nerve fibers (Wallerian). Structure and transmission across the neuromuscular junction. Drugs affecting neuro-muscular transmission. Disorders of the neuromuscular junction -Myasthenia Gravis. Muscle proteins, structure of sarcomere, sarcotubular system. Events in skeletal muscle contraction and relaxation. Rigor mortis. Skeletal muscle- properties, fiber types, Motor units. Gradation of skeletal muscle force (summation and recruitments). Smooth muscle - structure, types, electrical activity, mechanism of contraction and relaxation, properties of smooth muscles. Cardiac muscle – structure, electrical potentials of cardiac muscle, length – tension relationship of cardiac muscle.

Excretory system:

Structure and functions of the of nephron and Juxtaglomerular apparatus, renin Angiotensin System. Renal blood flow and its measurement and regulation. Concept of Plasma Clearance. Glomerular filtration, measurement, and factors affecting GFR. Reabsorption of essential nutrients: Glucose, sodium, potassium, calcium, phosphate, bicarbonate and water. Secretion of substances like hydrogen and potassium. Acidification of urine. Concentration of urine. Mechanism of action of diuretics. Role of kidney in fluid and electrolyte balance. Innervation of bladder, Micturition, Cystometrogram, disorders of micturition, effect of denervation. Principles of dialysis.

Digestive system:

Functional anatomy of the gastrointestinal tract and innervation of G.I.T, Enteric Nervous system. Gastrointestinal hormones – gastrin, cholecystokinin – pancreaticozym, secretin, motilin, VIP, GIP. Gastrointestinal movements-Mastication, deglutition, Gastric motility, gastric emptying and vomiting. Motility of small intestine, large intestine, defecation. Gastrointestinal secretions – salivary, gastric, pancreatic, biliary and intestinal secretions-formation and composition, their function in digestion, regulation of secretion. Pathophysiology of diseases of the lower esophageal sphincter, peptic ulcer, jaundice, diarrhoea.

Endocrine system:

Synthesis, transport and metabolism of thyroid and adrenocortical hormones. Chemical nature, mechanism of action, physiological actions and consequences of altered secretion of the hormones of the hypothalamus, anterior pituitary, posterior pituitary, thyroid, parathyroid, adrenal cortex, adrenal medulla, endocrine pancreas. General principles of regulation of all endocrine gland secretions.

Male and female reproduction:

Control of onset of puberty. Pubertal changes in male and female. Menopause. Actions of pituitary gonadotropins and prolactin in males and females. Functional anatomy of male internal and external genitalia. Blood- testes barrier. Spermatogenesis. Composition of semen. Actions and regulation of testosterone, and Control of testicular function. Functional anatomy of female internal and external genitalia. Cyclical changes in ovary, uterus, cervix, vagina and breast during menstrual cycle and hormonal regulation of the menstrual cycle. Chemical nature, actions and regulation of secretion of estrogen, progesterone. Indicators of ovulation. Common menstrual abnormalities. Principles and methods of contraception in male and female. Physiological changes in pregnancy and hormonal control of pregnancy. Foetoplacental unit. Physiology of parturition & lactation.

Cardiovascular system:

Organization of cardiovascular system. Functional anatomy of heart and blood vessels. Properties of cardiac muscle. Action potentials recorded from different tissues of heart. Origin and spread of cardiac impulse. Normal ECG: methods of recording, Physiologic basis of ECG, ECG abnormalities in myocardial infarction and in electrolyte disturbances (potassium and calcium). Cardiac cycle: Mechanical events, Heart sounds. Jugular venous pulse, arterial pulse. Cardiac output: definition, physiological variations, principles of measurement and regulation. Heart rate: Regulation, normal value and physiological variations. Principles of hemodynamics: laminar and turbulent flow, forward and lateral pressures, statement of Hagen-Poiseuille's law, definition of Reynold's number. Blood pressure: definition, types, variations, methods of measurement, regulation, hypertension. Regional circulation: cerebral, coronary, cutaneous, visceral, muscle and fetal circulation. Pathophysiology of heart failure, shock and the physiologic basis of their management

Respiratory system:

Functional anatomy of respiratory system. Non-respiratory functions of the lung. Mechanics of respiration. Surfactant, Compliance. Lung volumes and capacities, timed vital capacity, FEV1/FVC ratio. Pulmonary circulation and its peculiarities. Pulmonary edema. Content and partial pressure of oxygen and carbon dioxide in inspired air, expired air, alveolar air, arterial blood and venous blood. Diffusion of gases in lungs and factors affecting it. Ventilation – perfusion ratio. Anatomical and physiological dead space and their significance. Oxygen and carbon dioxide transport, oxygen hemoglobin dissociation curve, and factors affecting it. Neural, reflex and chemical regulation of respiration. Types of hypoxia and physiological basis of their classification. Oxygen therapy and hyperbaric oxygen.

Environmental and integrative physiology:

Growth and development. Body temperature regulation. Physiological adjustments to ambient temperature. Physiological responses to high altitude. Physiology of exercise.

Central nervous system:

Organization and functional anatomy of central nervous system. Synaptic transmission. Reflexes, muscle spindle, regulation of muscle tone. Sensory receptors and initiation of impulses in sense organs and ascending sensory pathways for different sensory modalities. Physiology of pain. Nuclei and functions of thalamus. Brain stem reticular system. Sleep, wakefulness, and EEG. Organization of motor system. Descending tracts - corticospinal tract, and effects of lesions at different levels.

Special senses Vision:

Functional anatomy of the eyeball. Structure and functions of retina. Visual pathways and effect of lesion at various levels. Areas of cortex responsible for vision. Principles of optics. Role of various refractory media in image formation. Errors of refraction. Mechanism of accommodation and the near response. Light reflex. Rod and cone pigments and sequence of events in phototransduction. Dark adaptation. Visual acuity. Field of vision. Colour vision. Colour blindness and its inheritance. Eye movements. Functional anatomy, physiology, and functions of basal ganglia, cerebellum and vestibular apparatus. Nuclei of hypothalamus and their functions. Limbic system, connections, and physiological functions. Functional areas of cerebral cortex. Higher functions-Conditioned reflexes, learning, memory and speech and its disorders. Formation, circulation and functions of CSF. Concept of blood- brain-barrier. Organization and functions autonomic nervous system.

Hearing:

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

Smell:

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

Taste:

Receptors and pathways for taste. Basic taste modalities and receptor stimulation. Substances evoking primary taste sensations.

PRACTICAL SKILLS

Haematology:

Principles of microscopy and use of microscope. Total red cell count. Estimation of hemoglobin and calculation of blood indices. Total leucocyte count. E.S.R & P.C.V. Preparation and staining of a blood smear. Performing differential leucocyte count and Arneeth count. Absolute eosinophil count. Bleeding time and clotting time. Blood grouping – ABO & Rh. Demonstrations: Methods of collection of blood, Reticulocyte count, Platelet count. Osmotic fragility of red cells.

Nerve and Muscle

Mosso's ergography:

Calculation of work done and effect of rate of work done on muscle fatigue. Calculation of mechanical efficiency by i) bicycle ergometry and ii) treadmill. Demonstrations: Study of appliances used in amphibian practicals. Recording of muscle twitch and calculation of velocity of nerve impulse in the frog gastrocnemius – sciatic preparation. Demonstration of phenomenon and site of fatigue in gastrocnemius – sciatic preparation of frog. Electromyography and nerve conduction in humans. Strength – Duration curve. Effect of ions and drugs on small intestine of rabbit.

Reproduction

Demonstrations:

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

CVS:

Measurement of blood pressure. Effect of posture and exercise on Blood pressure and heart rate. ECG recording. Clinical examination of CVS. Autonomic function tests: Valsalva maneuver, response to isometric exercise, deep breathing difference. Cardiac function tests. Demonstrations: Effect of drugs and vagal stimulation on frog heart. Properties of Cardiac muscle. Capillary circulation in the frog web. Perfusion of mammalian heart and effect of ions on it.

Respiration:

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

Nervous system:

Examination of sensory functions. Examination of motor functions including reflexes. Examination of cranial nerves.

Special senses:

Acuity of vision. Colour vision. Perimetry. Tests for hearing. Tests for smell and taste

DESIRABLE TO KNOW CATEGORY**General physiology:**

Cell adhesion molecules. Measurement of body fluid compartments. Ageing. Apoptosis.

Blood:

Sickle cell disease

Nerve muscle physiology:

Energy sources for muscle contraction

Excretory system:

Non-excretory functions of the kidney.

Digestive system:

Malabsorption syndrome, Adynamic ileus, megacolon, constipation, Pancreatitis, Gall stones.

Endocrine system:

Physiological actions of local hormones

Male and female reproduction:

Sex differentiation and development of genitalia in the embryo. Fertilization and implantation

Cardiovascular system:

ECG changes in heart blocks. Fetal circulation.

Respiratory system:

Respiratory adjustments during breath holding, hyperventilation, increased barometric pressure, drowning. Cyanosis, Asphyxia. Pathophysiology of common respiratory disorders - Periodic breathing, hypercapnea, hypocapnea. Artificial respiration.

Environmental and integrative physiology:

Physiology of Yoga. Physiology of Nutrition.

Central nervous system:

Disorders of CSF formation and circulation

Special senses:

Electrical responses in rods and cones. Hearing – Audiometry. Smell & Taste - Abnormalities of olfaction. Abnormalities of taste.

PRACTICAL SKILLS**Respiration:**

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

Nervous system:

EEG. Evoked potentials. Decerebrate and spinal frog.

Special senses:

Ophthalmoscopy. Audiometry.

(B) BIOPHYSICS**GOAL & OBJECTIVES**

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

Course Content

Physical principles of transport across cell membranes and across capillary wall Biopotentials. Physical principles governing flow of blood in heart and blood vessels. Also physical principles governing flow of air in air passages.

PRACTICAL SKILLS

Demonstration of: Biopotential on oscilloscope, Electro Encephalogram (EEG), Electro Myelogram (EMG), Electro Cardiogram (ECG).

PHYSIOLOGY - DISTRIBUTION OF MARKS

Theory-Two papers of 50 marks each (One applied question of 10 marks in each paper)	100 marks
Oral (Viva)	20 marks
Practical	40 marks
Internal Assessment (Theory-20; Practical-20)	40 marks
Total	200 marks

Pass: In each of the subjects, a candidate must obtain 50 % in aggregate with a minimum of 50% in Theory including oral and minimum of 50% in Practicals.

Physiology Theory Paper

Paper I – 50 marks (General Physiology, Blood, Nerve and Muscle, ANS, GI system, Endocrine Physiology, Physiology of Reproduction and Renal system)

Time: 2 hours

Q1. Long Answer Questions: 2 LAQs X 10 marks each (must be structured)

Q2. Short Answer Questions: 4 SAQs X 5 marks each,

Q3. Very Short Answer Question: 5 SAQs X 2 marks each

Paper II – 50 marks (Cardiovascular System, Respiratory system and Environmental physiology, Neurophysiology-CNS, Special senses and Integrative physiology)

Time: 2 hours

Q1. Long Answer Questions: 2 LAQs X 10 marks each (must be structured)

Q2. Short Answer Questions: 4 SAQs X 5 marks each,

Q3. Very Short Answer Question: 5 SAQs X 2 marks each

Note: LAQ should be from must know area. If LAQ is from a particular section, it should be avoided in short notes. Total marks is 100. 80 marks should be asked from must know area and 20 marks should be asked from desirable to know area.

MODEL QUESTION PAPERS:

PHYSIOLOGY PAPER – I

(General Physiology, Blood, Nerve and Muscle, ANS, GI system, Endocrine Physiology, Physiology of Reproduction and Renal system)

ANSWER ALL QUESTIONS

Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 50

1. Describe the Neuromuscular Junction and explain in detail the transmission across the Neuromuscular Junction with a neat diagram. Add a note on myasthenia gravis. (2+8=10)

2. Describe the synthesis and regulation of thyroid hormones. Add a note on myxedema. (8+2=10)

3. Write short notes on: (4x5=20)

- Explain in detail the factors influencing Erythropoiesis.
- Explain the synthesis of HCl in the stomach. Add a note on Peptic ulcer disease.
- Describe the functions of testosterone.
- Counter current multiplier system.

4. Very short answers: (5x2=10)

- What is secondary active transport? Give an example.

- b. What contraceptive methods should be advised to a married couple who comes to a physician to postpone the second pregnancy?
- c. A tall person comes to you with huge hands and feet and complains of deficit in the temporal field of vision both sides. What is the diagnosis and explain the reason for such defective field of vision.
- d. Explain the pathophysiology of Hemophilia
- e. Renal tubular transport of glucose.

PHYSIOLOGY PAPER – II

(Cardiovascular System, Respiratory system and Environmental physiology, Neurophysiology-CNS, Special senses and Integrative physiology)

ANSWER ALL QUESTIONS

Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 50

1. Define blood pressure. Explain the short-term regulation of blood pressure. (2+8=10)
2. Name the descending tracts? With the help of a neat diagram explain the corticospinal tract. (2+8=10)
3. Write short notes on: (4x5=20)
 - a. Oxygen hemoglobin dissociation curve.
 - b. With the neat diagram explain the ECG in lead II. Explain the ECG changes in myocardial infarction.
 - c. Visual pathway and the effect of lesions at different levels.
 - d. Explain the functions of Hypothalamus.
4. Very short answers: (5x2=10)
 - a. Reflex arc
 - b. Aphasia
 - c. Hypoxic Hypoxia
 - d. Referred pain
 - e. Dysbarism

PRACTICAL EXAM:

(TOTAL MARKS=40)

Hematology 10 marks

OSPE – skilled	2 marks
OSPE – non-skilled	2marks
Experiment	6 marks

Clinical 30 marks

OSCE – skilled	5 marks
OSCE – non-skilled	5 marks
Major	10 marks
Minor (5 X2)	10 marks

BIOCHEMISTRY

BIOCHEMISTRY

GOAL

The broad goal of the teaching of undergraduate students in biochemistry is to make them understand the scientific basis of the life processes at the molecular level and to orient them towards the application of the knowledge acquired in solving clinical problems.

OBJECTIVES

Knowledge

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

1. Describe the molecular and functional organization of a cell and list its sub cellular components;
2. Delineate structure, function and inter-relationships of bio molecules and consequences of deviation from normal;
3. Summarize the fundamental aspects of enzymology and clinical application wherein regulation of enzymatic activity is altered;
4. Describe digestion and assimilation of nutrients and consequences of malnutrition;
5. Integrate the various aspects of metabolism and their regulatory pathways;
6. Explain the biochemical basis of inherited disorders with their associated sequelae;
7. Describe mechanisms involved in maintenance of body fluid and pH homeostasis;
8. Outline the molecular mechanisms of gene expression and regulation, the principles of genetic engineering and their application in medicine;
9. Summarize the molecular concepts of body defence and their application in medicine;
10. Outline the biochemical basis of environmental health hazards, biochemical basis of cancer and carcinogenesis;
11. Familiarize with the principles of various conventional and specialized laboratory investigations and instrumentation analysis and interpretation of a given data;
12. The ability to suggest experiments to support theoretical concepts and clinical diagnosis.

Skills

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

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

Integration

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.

COURSE CONTENTS

MUST KNOW CATEGORY

Eukaryotic cell structure:

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

Carbohydrate chemistry:

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

Lipid chemistry:

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

Protein chemistry:

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

Structure – function relationship of proteins:

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

Nucleic acids:

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

Enzymes:

General characteristics of enzymes, enzyme nomenclature, enzyme kinetics, enzyme inhibition, organisation of multienzyme systems, regulation of enzyme activity in vivo, factors influencing enzyme activity, clinical enzymology. Co-enzymes: Definition, concepts of cosubstrate, second substrate, role of co-enzymes in group transfer reactions, classification and biological significance.

Vitamins:

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

Digestion and absorption:

Mechanism of digestion and absorption in gastrointestinal tract of carbohydrates, lipids, proteins, aminoacids, vitamins, factors influencing digestion and absorption.

Introduction to intermediary metabolism:

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

Stages of catabolism of molecules:

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

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

a) **Carbohydrates (without stress on structures):** An overview and regulatory steps of glycolysis, glycogenesis, glycogenolysis, gluconeogenesis, HMP shunt, uronic acid pathway, interconversion of hexoses, metabolism of fructose and galactose, blood glucose homeostasis, overview of common disorders of carbohydrate metabolism and their clinical significance, diabetes mellitus and relevant biochemical investigations & oral glucose tolerance test.

b) **Lipids:** Overview of fatty acid synthesis, oxidation, ketosis, metabolism of triacyl glycerol, Phospholipids Prostaglandins, lipoproteins and cholesterol, biochemical basis of atherosclerosis, hyperlipoproteinemias, fatty liver obesity, role of adipose tissue, lipotropic factors and hypolipidemic drugs fatty liver.

c) **Proteins and amino acids:** Basic concepts of disposal of nitrogen, transamination, deamination, urea cycle, overview of disposal of carbon skeleton of amino acids – glycine, tryptophan, tyrosine, phenylalanine, histidine, sulphur containing amino acids. Common inborn errors of amino acid metabolism. Synthesis of biologically important compounds from amino acids.

d) Integration of **metabolism of carbohydrates**, lipids and amino acids, common metabolic pathway (TCA cycle).

e) **Nucleotides, purines and pyrimidines:** Origin of constituents in the formation of purines, pyrimidines and nucleotides, regulatory influences, breakdown of purine and pyrimidines, biochemical basis and laboratory diagnosis of gout. Purine salvage pathways, secondary hyperuricemia.

f) Chemistry, **Breakdown of hemoglobin**, biochemical basis of jaundice, classification and their importance, bile pigments and their importance; overview of biochemical basis of porphyrias, hepato biliary function tests.

g) **Minerals:** Sources, daily requirements, absorption, biochemical functions and deficiency manifestations of calcium, phosphorus, iron fluorides, magnesium, copper, zinc, iodine, sodium, potassium and chloride, selenium, chromium, and cobalt.

h) **Nutrition:** Calorie requirements, qualitative and quantitative requirements, specific dynamic action, BMR, factors influencing BMR, respiratory quotient, biological value of proteins, formulation and computation of energy requirements for a medical student, balanced and adequate diets, formulation of diets in health and diseases, protein and protein energy malnutrition, obesity, starvation, role of dietary fibre, prescription of diet for diabetes mellitus, renal failure, protein energy malnutrition and liver failure.

i) Outline of **detoxification mechanisms** in human body.

Methods of investigations of intermediary metabolism; detailed aspects of metabolism of carbohydrates, rare disorders related to metabolism including glycogen storage disease; rare disorders related to lipid metabolism. Detailed step in the breakdown of amino acids and rare inherited disorder related to amino acid metabolism. Foodtoxins and additives; adulteration of foods, nutrification and fortification of foods; Basic concepts of total parenteral nutrition. knowledge of porphyrias.

Organ function test:

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

Molecular Biology & Immunology:

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

DESIRABLE TO KNOW CATEGORY

Eukaryotic cell structure:

Structure and functions of biological membrane, liposomes.

Carbohydrate chemistry:

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

Protein chemistry:

Structure of amino acids, Sequencing of amino acids

Structure – function relationship of proteins:

Collagen structure and function.

Enzymes:

Isolation of enzymes, Structure of coenzymes and mechanism of enzyme catalysis.

Vitamins:

Free radicals and antioxidants

Digestion and absorption:

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

Introduction to intermediary metabolism:

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

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

Organ function test:

Role of radio isotopes in Medicine;

Fetoplacental unit; biochemical tests of fetal maturity and abnormalities.

Molecular Biology & Immunology:

Immunodiagnostic methods, Regulation of genetic expression in eukaryotes

Inhibitors of protein synthesis, post translational modifications, gene therapy.

PRACTICAL SKILLS

1. General properties of carbohydrates and reactions of glucose, fructose, lactose, maltose, starch and dextrans.
2. Colour reactions of proteins, precipitation reactions of proteins.
3. Normal constituents of urine.
4. Abnormal constituents of urine.
5. Analysis of a food mixture.
6. Principles and application of the principle in chromatography, electrophoresis, RIA and ELISA.
7. Demonstration of estimation of glucose, urea, creatinine and total proteins in blood. Bilirubin estimation, prothrombin time determination.
8. Working of autoanalyser, blood gas analyser.

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

- a) Color reactions of carbohydrates amino acids and the responsible functional groups.
- b) Suggest suitable / relevant biochemical investigations for diagnosis/confirmation of a patient with jaundice, acute renal failure, nephrotic syndrome, myocardial infarction, metabolic acidosis, metabolic alkalosis, respiratory acidosis, respiratory alkalosis, glycosuria, hypothyroidism, hyperthyroidism. Dyslipidemia
- c) Significance of
 - (i) Albumin: globulin ratio with the values of total protein and albumin provided.
 - (ii) Urea and creatinine clearance with the parameters provided, Urine creatinine: Albumin ratio,AST:ALT ratio,etc
 - (iii) The RF value for any carbohydrate or amino acid from a given chromatogram.

d) Interpret

(i) Normal electrophoretic pattern and pattern related / associated with cirrhosis of liver, nephrotic syndrome, multiple myeloma, mono and polyclonal gammopathies.

(ii) Values obtained after an oral glucose tolerance test in normal and diabetic states.

(iii) Laboratory data in pancreatitis, myocardial infarction, various types of jaundice, acute renal failure, nephrotic syndrome, proteinurias, acidosis, alkalosis, hypo and hyperthyroidism.

e) Mention/list the uses of some of the common instruments like colorimeters, pH meters, urinometer, electrophoretic apparatus etc. used in biochemistry laboratory.

BIOCHEMISTRY - DISTRIBUTION OF MARKS

Theory-Two papers of 50 marks each (One applied question of 10 marks in each paper)	100 marks
Oral (Viva)	20 marks
Practical	40 marks
Internal Assessment (Theory-20; Practical-20)	40 marks
Total	200 marks

Pass: In each of the subjects, a candidate must obtain 50 % in aggregate with a minimum of 50% in Theory including oral and minimum of 50% in Practicals.

BIOCHEMISTRY THEORY PAPER

Paper I – 50 marks (Biomolecules – structure function correlations, Cell organization; Enzymes, Bioenergetics and Biological oxidation; Body fluids, Fluid Electrolyte and Acid Base balance and associated disorders, Hepatobiliary, Gastric, Pancreatic function tests; Interpretation of Lab. Data; Digestion and absorption of nutrients, metabolism of carbohydrates and lipids, influence of hormones and associated inborn errors. Integration of intermediary metabolism. Biochemistry and diabetes mellitus)

Time: 2 hours

Q1. Long Answer Questions: 2 LAQs X 10 marks each (must be structured)

Q2. Short Answer Questions: 4 SAQs X 5 marks each,

Q3. Very Short Answer Question: 5 SAQs X 2 marks each

Paper II – 50 marks (Vitamins, Minerals and Nutrition; Instrumentation and techniques used in Biochemistry; Thyroid, Adrenocortical and renal function tests; Interpretation of laboratory data; Xenobiotics, environmental hazards and cancer biology, Metabolism of proteins, amino acids, haemoglobin, Nucleotides, purines and pyrimidines, their regulation and associated inborn errors; Porphyrrias; Human genetics, Molecular biology and Immunology)

Time: 2 hours

Q1. Long Answer Questions: 2 LAQs X 10 marks each (must be structured)

Q2. Short Answer Questions: 4 SAQs X 5 marks each,

Q3. Very Short Answer Question: 5 SAQs X 2 marks each

Note: LAQ should be from must know area. If LAQ is from a particular section, it should be avoided in short notes. Total marks is 100. 80 marks should be asked from must know area and 20 marks should be asked from desirable to know area.

MODEL QUESTION PAPERS:

BIOCHEMISTRY - PAPER I

(Biomolecules – structure function correlations, Cell organization; Enzymes, Bioenergetics and Biological oxidation; Body fluids, Fluid Electrolyte and Acid Base balance and associated disorders, Hepatobiliary, Gastric, Pancreatic function tests; Interpretation of Lab. Data; Digestion and absorption of nutrients, metabolism of carbohydrates and lipids, influence of hormones and associated inborn errors. Integration of intermediary metabolism. Biochemistry and diabetes mellitus)

ANSWER ALL QUESTIONS

Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 50

1. Describe the various types of inhibition of enzyme activity using Lineweaver Burk plot and state how are they distinguished? Name an enzyme inhibitor used as a drug. (6+3+1=10)

2. Define Gluconeogenesis. Mention the substrates for gluconeogenesis. Describe in detail the various steps of gluconeogenesis. Add a note on its regulation. (1+2+4+3=10)

3. Short Answer Questions (4X5=20)

- Describe the fluid mosaic model of cell membrane.
- Discuss the role of kidney in the maintenance of blood pH.
- Discuss the various biochemical investigations in a case of obstructive jaundice.
- Digestion and absorption of lipids.

4. Very Short Answer Questions (5X2=10)

- Uncouples of oxidative phosphorylation
- Renal Glycosuria
- Mention two causes of ketogenesis and name one hormone that inhibits ketogenesis.
- Von-Gierke's disease.
- Mention the enzymatic and non enzymatic parameters to diagnose acute myocardial infarction.

BIOCHEMISTRY PAPER II

(Vitamins, Minerals and Nutrition; Instrumentation and techniques used in Biochemistry; Thyroid, Adrenocortical and renal function tests; Interpretation of laboratory data; Xenobiotics, environmental hazards and cancer biology, Metabolism of proteins, amino acids, haemoglobin, Nucleotides, purines and pyrimidines, their regulation and associated inborn errors; Porphyrrias; Human genetics, Molecular biology and Immunology)

ANSWER ALL QUESTIONS

Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 50

1. Describe the steps of DNA replication and add a note on telomerase. (8+2=10)
2. Discuss the dietary sources, daily requirement, biochemical functions and deficiency manifestations of ascorbic acid. (1+1+5+3=10)
3. Short Answer Questions (4X5=20)
 - a. Write in detail about absorption of iron in the gut.
 - b. Phenylketonuria.
 - c. Factors affecting oxygen dissociation curve of haemoglobin.
 - d. PCR and its applications.
4. Very Short Answer Questions (5X2=10)
 - a. Lesch-nyhan syndrome.
 - b. Creatinine clearance.
 - c. Monooxygenases.
 - d. Nitrogen balance.
 - e. Enumerate the special products of tyrosine.

PRACTICAL EXAM

(TOTAL MARKS=40)

1. Objective Structured Practical Examination (OSPE)
2. Four performance and Six response stations : Total Ten stations
3. Each station carries Four marks (4X10=40)
4. Time allotted for each station for performing/answering is 4 minutes
5. In performance station: 3 marks will be allotted for performing the test and 1 mark will be allotted for a station related viva (3+1=4).
6. The performance stations (4 Nos) shall have tests pertaining to
 1. Urinalysis (normal/abnormal) ----- 2 stations
 2. AA/protein reactions ----- 1 station
 3. Carbohydrate reactions ----- 1 station
7. The response stations (6 Nos) shall have
 - Minimum 3 case scenarios – where student has to justify/explain/interpret the test results/disease process/metabolic derangement, etc., (OGTT, Nephrotic/Nephritic case, lipid disorders, thyroid disorders, PFT, LFT & jaundice, MI and bone disorders)
 - Nutrition: One question shall pertain to vitamin/mineral deficiency, balanced diet.
 - One question on urinometer/pH meter/ colorimeter/electrophoresis apparatus/ chromatography/ serum electrophoresis - Display type.
 - One question on calculation and interpretation of biochemical parameters like glucose, urea, Lipid profile A:G ratio, Protein: Creatinine ratio, AST/ALT ratio.

**COMMUNITY
MEDICINE
INCLUDING
HUMANITIES**

COMMUNITY MEDICINE INCLUDING HUMANITIES

GOAL

The broad goal of the teaching of undergraduate students in Community Medicine is to prepare them to function as community and first level physicians in accordance with the institutional goals.

OBJECTIVES

Knowledge

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

1. Describe the health care delivery system including rehabilitation of the disabled in the country;
2. Describe the National Health Programmes with particular emphasis on Maternal and child health programmes, family welfare planning and population control.
3. List epidemiological methods and describe their application to communicable and non-communicable diseases in the community or hospital situation or during emergencies.
4. Apply bio-statistical methods and techniques;
5. Outline the demographic pattern of the country and appreciate the roles of the individual, family, community and socio-cultural milieu in health and disease.
6. Describe the health information systems.
7. Enunciate the principles and components of primary health care and the national health policies to achieve the sustainable developmental goals.
8. Identify the environmental and occupational hazards and their control.
9. Describe the importance of water and sanitation in human health.
10. To understand the principles of health economics, health administration, health education in relation to community.

Skills

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

1. Use epidemiology as a scientific tool to make rational decisions relevant to the community and individual patient intervention.
2. Collect, analyse, interpret and present simple community and hospital based data.
3. Diagnose and manage common health problems and emergencies at the individual, family and community levels keeping in mind the existing health care resources and in the context of the prevailing socio-cultural beliefs.
4. Diagnose and manage maternal and child health problems and advise a couple and the community on the family planning methods available in the context of the national priorities.

5. Diagnose and manage common nutritional problems at the individual and community level.
6. Plan, implement and evaluate a health education programme with the skill to use simple audio-visual aids.
7. Interact with other members of the health care team and participate in the organisation of health care services and implementations of national health programmes.
8. Appreciate his/her limitations, recognize situations calling for referral to higher centers and be willing to refer patients for further consultations at the appropriate moment to appropriate centers.

COURSE CONTENT

MUST KNOW CATEGORY

History of medicine and evolution of public health:

Various milestones in the history of medicine. Evolution of public health over centuries.

Concepts in Health:

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

Epidemiology:

Use of basic epidemiological tools to make a community diagnosis of the health situation in order to formulate appropriate intervention measures. Epidemiology: definition, concepts and its role in health and disease. Definition of the terms used in describing disease, transmission and control. Natural history of a disease and its application in planning intervention. Modes of transmission and measures for prevention and control of communicable and non-communicable diseases. Principal sources of epidemiological data.

Various types of epidemiological study designs. Definition, calculation and interpretation of the measures of frequency of diseases and mortality. Need and uses of screening tests. Accuracy and clinical value of diagnostic and screening tests (sensitivity, specificity, predictive values). Planning, collecting, analyzing and interpreting data to reach a community diagnosis. Planning and investigation of an epidemic of a communicable disease in a community setting and institution of control measures. Know about the measures of association and criteria of causality.

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

The specific objectives of selected communicable diseases of public health importance for which National Disease Control/Eradication Programmes have been formulated are described here. The idea of formulating objectives for a few diseases is to highlight their importance and to emphasize certain learning outcomes.

For the rest of the diseases, the individual teacher would formulate the objectives while drawing the lesson plans.

Extent of the problem, epidemiology and natural history of the disease. Relative public health importance of a particular disease in a given area. Influence of social, cultural and ecological factors on the epidemiology of the diseases. Epidemiology of communicable and non-communicable diseases of public health importance and their control. Control and prevention of communicable and non-communicable diseases by: Diagnosing and treating a case and in doing so demonstrate skills in: Clinical methods including anthropometric measurements, Use of essential laboratory techniques. Selection of appropriate treatment regimes. Follow-up of cases. Preventive measures including immunization. Principles of planning, implementing and evaluating control measures for the diseases at the community level bearing in mind the relative importance of the diseases. Institution of programmes for the education of individuals and communities. Epidemiologic basis of national health programmes. Awareness of the National diseases Control Programmes.

Biostatistics:

The scope and uses of biostatistics. Collection, classification and presentation of statistical data. Analysis and interpretation of data. Obtaining information, computing indices (rates and ratio) and making comparisons. Common sampling techniques, simple statistical methods for the analysis, interpretation and presentation of data, frequency distribution, measures of central tendency, measures of variability. Know about the various tests of significance.

Medical Entomology:

Role of vectors in the causation of diseases. Identifying features of and mode of transmission of vector borne diseases. Methods of vector control with advantages and limitations of each. Mode of action, dose and application cycle of commonly used insecticides.

Environmental Studies and Sanitation:

Awareness of the concept of safe and wholesome water. Awareness of the requirements of a sanitary source of water. Understanding the methods of purification of water on large and small scale with stress on chlorination of water. Physical, chemical standards; tests for assessing quality of water. Disposal of solid waste, liquid waste, both in the context of urban and rural conditions in the country. Problems in the disposal of refuse, sullage and sewage. Sources, health hazards and control of environmental pollution. Influence of physical factors – like heat humidity, cold, radiation and noise – on the health of the individual and community. Standards of housing and the effect of poor housing on health. Management of bio-medical wastes. Public health aspects of global warming.

Reproductive & Child Health (RCH):

Need for specialized services for reproductive health. Calculation of maternal and child health indicators. Local customs and practices during pregnancy, child birth and lactation. Concepts of 'high risk' and 'MCH Package', 'Child surgical and Safe Mother-hood', 'Integrated Child Development Scheme' 'Integrated management of neonatal and child health guidelines' and other existing regional programmes. Monitoring of growth and development and use of WHO growth charts. Organisation, implementation and evaluation of programmes for mothers and children as per National Programme guidelines; supervising health personnel; maintaining records; performing nutritional assessment; promoting breast feeding. All national health programmes under the reproductive and child health program including RMNCH+A. Genetics and Community Health.

Demography & Family Planning:

Definition of demography and family welfare programme. Stages of the demographic cycle and their impact on the population. Definition, calculation and interpretation of demographic indices like birth rate, death rate, growth rate, Fertility rates. Reasons for rapid population growth in India. Need for population control measures and the National Population Policy. Geriatric health and palliative care. Identify and describe the different family planning methods and their advantages and shortcomings. Demonstrate skills in motivating a couple for selecting an appropriate family planning method. Recent advances in contraception.

Health Planning and Management & health care delivery system:

Explain the terms: public health, public health administration, regionalization, comprehensive medical care, delivery of health care, planning management, evaluation. Components of health care delivery: Describe the salient features of the National Health Policy concerning: (a) Provision of medical care; (b) primary health care and Health for All; (c) universal health coverage (d) health manpower development; (e) planned development of health care facilities; (f) encouragement of indigenous systems of medicine. Explain the process of health planning in India by demonstrating awareness of: The health systems and health infrastructure at centre, state and district levels. The inter-relationship between community development block and primary health centre. The organization, functions and staffing pattern of community health centers, primary health centers, rural health centre and sub-centre. The job descriptions of health supervisor (male and female); health workers; village health guide; anganwadi workers traditional birth attendants. The activities of the health team at the primary health centre. Familiarity with management techniques: Define and explain principles of management; explain the three broad functions of management (planning, implementation and evaluation) and how they relate to each other. The components of health care delivery: Appreciate the need for International Health Regulations and Disease Surveillance. be aware of the constitutional provisions for health in India. Enumerate the three major divisions of responsibilities and functions (concerning health) of the union and the state governments. Explain the process of health planning in India by demonstrating awareness of recommendations of different health committees such as Bhore, Mudaliar, etc. Sustainable developmental goals. Appreciate the role of national, international voluntary agencies in health care delivery. Know about the essential drugs

Nutrition:

Common sources of various nutrients and special nutritional requirement according to age, sex, activity, physiological condition. Nutritional assessment of individual, families and the community by selecting and using appropriate; methods such as: anthropometry, clinical, dietary, laboratory techniques. Compare recommended allowances of individual and families with actual intake. Plan and recommend a suitable diet for individuals and families bearing in mind local availability of foods, economic status, etc. Common nutritional disorders: PEM, Vit. A Deficiency, anemia, iodine deficiency disease, fluorosis, food toxin diseases and their control and management. National Programmes & Acts in nutrition like the prevention of food adulteration.

Medical Sociology:

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

School Health:

Objectives of the School Health Programme. Activities of the Programmes like: Carrying out periodic medical examination of the school children and the teachers. Immunization of children. Health education. Mid-day meals. Adolescent health packages.

Occupational Health:

Relate the history of symptoms with the specific occupation including agriculture. Various legislations in relation to occupational health including Employees State Insurance Scheme, Factories act.

Health Education (Behavioral Change Communication - BCC):

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

Mental health:

Know about the common mental health disorders prevalent in the community, methods to screen and manage at the primary health care level

Urban Health:

Impact of urbanization on health and disease. Common health problems (medical, social, environmental, economic, psychological) of urban slum dwellers. Organisation of health services for slum dwellers. Organisation of health services to address the common health problems in urban areas.

DESIRABLE TO KNOW CATEGORY

Concepts in Health:

Difficulties in measurement of health.

Epidemiology:

The derivation of normal values and the criteria for intervention in case of abnormal values. Planning an intervention programme with community participation based on the community diagnosis. Applications of computers in epidemiology. Knowledge about various techniques in qualitative research and operational research techniques

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

Training health workers in (i) disease surveillance, (ii) control and treatment, (iii) health education. Managerial skills in the areas of (i) supervision, (ii) collection and compilation of data, (iii) maintenance of records, (iv) transmission of data.

Though the list of diseases is quite long, here are names of some important communicable and non-communicable diseases/conditions which need to be taught. Needless to say, the emphasis on these diseases/conditions will vary from place to place. They are:

Poliomyelitis, Infective hepatitis, ARI, T.B., Vector-borne diseases like malaria, dengue, filariasis, Japanese Encephalitis, scrub typhus, Kala Azar; Rabies, STDs and AIDS, Diarrhoeal diseases, Mental health, Coronary heart disease, Blindness, Diabetes, Accidents, Hypertension, Leprosy.

Biostatistics:

Choosing of appropriate controls. Use of statistical tables.

Medical Entomology:

Steps of management of a case of insecticide toxicity.

Environmental Studies and Sanitation:

Conservation and preservation of forests.

Demography & Family Planning:

Organizational, technical and operational aspects of the National Family Welfare Programme and participate in the implementation of Programme. Give guidance for MTP and infertility services.

Health Planning and Management & health care delivery system:

Explain the terms: cost-effectiveness, cost-benefit. Medical audit, budgeting. Health system research, operational research

Nutrition:

Food adulterants, additives, food standards

Medical Sociology:

Anthropology. Qualitative research

School Health:

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

Occupational Health:

Identification of the physical, chemical and biological hazards to which workers are exposed while working in a specific occupational environment. Diagnostic criteria of relevant occupational diseases. To suggest preventive measures against these diseases including accident prevention.

SKILLS

Part I: GENERAL SKILLS:

The student should be able to:

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

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

Part II: SKILLS IN RELATION TO SPECIFIC TOPICS:

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

2. **Team activity** - Work as a member of the health team; in planning and carrying out field work like school health.

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

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

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

6. **Epidemiology and Statistics** - Selecting a sample for study using an appropriate sampling technique. Calculation of sample size for prevalence studies. Apply appropriate tests of significance to make a correct inference. Simple analysis and presentation of data with use of basic statistics.

7. **Nutrition** - Conducting a diet survey. Community survey and clinical diagnosis of nutritional deficiencies; vitamin A deficiency, iodine deficiency, malnutrition. Making recommendations regarding diet. Occupational health. Recommendations in improving work sites. Medical examination of workers

8. **Health Care of the Community** - Motivating community to participate in health care. Arranging intersectoral coordination where necessary. Working in liaison with other agencies involved in health care in various National Health Programmes.

9. **Health Management:** Be an effective team leader. Guide and train workers. Supervision of workers and programmes.

10. Family Planning: Advice on appropriate methods. Inserting an intra-uterine contraceptive device in a PHC.

11. Managerial: Organise antenatal and under - five clinic.

COMMUNITY MEDICINE INCLUDING HUMANITIES - DISTRIBUTION OF MARKS

Theory : Two papers of 60 marks each (includes problem solving, applied aspects of management at primary level including essential drugs, occupational (agro based) diseases, rehabilitation and social aspects of community).	120 marks
Oral (Viva)	10 marks
Practical evaluation	30 marks
Internal assessment (Theory -20; Practical-20)	40 marks
Total	200 marks

Pass: In each of the subjects a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in practicals/clinicals

COMMUNITY MEDICINE THEORY PAPER

Paper I – 60 marks (Gen. Epidemiology, Biostatistics, Sociology, Nutrition, Demography, Environmental Health)

Time: 3 hours

Section A

Q1. Long Answer Question 10 Marks (must be structured)

Q2. Short Answer Questions: 4 Short Notes of 5 marks each (20 marks)

Section B

Q1. Long Answer Question 10 Marks (must be structured)

Q2. Short Answer Questions: 4 Short Notes of 5 marks each (20 marks)

Paper II – 60 marks (Epidemiology of Communicable and Non-communicable diseases, Occupational Health, Maternal and Child Health, Family Welfare, Public Health Administration, Health Education)

Time: 3 hours

Section A

Q1. Long Answer Question 10 Marks (must be structured)

Q2. Short Answer Questions: 4 Short Notes of 5 marks each (20 marks)

Section B

Q1. Long Answer Question 10 Marks (must be structured)

Q2. Short Answer Questions: 4 Short Notes of 5 marks each (20 marks)

Note: Long Answer Questions (LAQ) should be from must know area. Total number of short notes is 16 of which 4 or 5 should be from desirable to know areas.

MODEL QUESTION PAPERS:

COMMUNITY MEDICINE PAPER I

(Gen. Epidemiology, Biostatistics, Sociology, Nutrition, Demography, Environmental Health)

ANSWER ALL QUESTIONS

**Each Section to be answered in separate Answer Book
Illustrate your answer with suitable diagrams**

Time: 3 hours

Maximum marks: 60

SECTION A

1. Briefly describe the natural history of disease. Discuss the levels of prevention using diabetes as an example. (3+7=10)

2. Write short notes on: (4 x 5 = 20)

- a) Sampling techniques
- b) Audio-visual aids to make lecture more effective
- c) Incubation period and its uses
- d) Community diagnosis

SECTION B

3. What is a 'balanced diet'. Describe the various methods of assessment of nutritional status in children. (2+8 = 10)

4. Write short notes on: (4 x 5 = 20)

- a) Sensitivity of a screening test
- b) Bacteriological quality of drinking water
- c) Role of family in health and disease
- d) Integrated vector control measures against aedes mosquitoes

COMMUNITY MEDICINE PAPER II

(Epidemiology of Communicable and Non-communicable diseases, Occupational Health, Maternal and Child Health, Family Welfare, Public Health Administration, Health Education)

ANSWER ALL QUESTIONS

**Each Section to be answered in separate Answer Book
Illustrate your answer with suitable diagrams**

Time: 3 hours

Maximum marks: 60

SECTION A

1. Describe the problem of acute respiratory infections (ARI). List the agent, host and

environmental factors for the control of ARI among children aged 2 months to 5 years. (10)

2. Write short notes on: (4 x 5 = 20)

- a) Management of diarrhea among children with some dehydration
- b) Prevention of rheumatic fever and rheumatic heart disease
- c) Sickness benefit under E S I
- d) Role of health education in school health

SECTION B

3. What is the importance of perinatal mortality rate (PMR)? In the context of developing countries what are the social & biological causes of PMR? What are the measures to reduce PMR? (2+4+4=10)

4. Write short notes on: (4 x 5 = 20)

- a) Pearls Index
- b) Network analysis
- c) Risk factors for hypertension
- d) Principles of Primary Health Care

PRACTICAL EVALUATION (30 MARKS)

5 spotters	-	5 marks
2 statistical/ epidemiological exercises	-	10 marks
1 clinico-psycho-social case	-	15 marks

PATHOLOGY

PATHOLOGY

GOAL

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

OBJECTIVES

Knowledge

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

1. Describe the structure and ultrastructure of a sick cell, mechanisms of cell degeneration, cell death and repair and be able to correlate structural and functional alterations.
2. Explain the pathophysiological processes which govern the maintenance of homeostasis, mechanisms of their disturbance and the morphological and clinical manifestations associated with it.
3. Describe the mechanisms and patterns to tissue response to injury such that she/he can appreciate the pathophysiology of disease processes and their clinical manifestations.
4. Correlate normal and altered morphology (gross and microscopic) of different organ systems in common diseases to the extent needed for understanding of disease processes and their clinical significance.

Skills

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

1. Describe the rationale and principles of technical procedures of the diagnostic laboratory tests and interpretation of the results;
2. Perform the simple bed-side tests on blood, urine and other biological fluid samples;
3. Draw a rational scheme of investigations aimed at diagnosing and managing the cases of common disorders;
4. Understand biochemical/physiological disturbances that occur as a result of disease in collaboration with pre clinical departments.

Integration

At the end of training he/she should be able to integrate the causes of disease and relationship of different etiological factors (social, economic and environmental) that contribute to the natural history of diseases most prevalent in India.

COURSE CONTENTS

MUST KNOW CATEGORY

GENERAL PATHOLOGY

Cell Injury:

Cause and mechanism of ischemic, Toxic, Free- radical induced injury, Apoptosis, Reversible cell injury: Types, morphology, hyaline and fatty change. Necrosis and gangrene, Dystrophic and metastatic Calcification. Pigment deposition such as melanin, bilirubin, hemosiderin and carbon.

Inflammation and Repair:

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

Hemodynamic disturbances:

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

Growth Disturbance and Neoplasia:

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

Immunopathology:

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

Genetic disorders:

Basic concepts of genetic disorders and some common examples. Down's syndrome, Turner's syndrome and Klinefelter's Syndrome

Infectious Diseases:

Etiopathogenesis, gross and microscopic features, clinicopathological correlation, relevant investigations and complications of commonly prevalent infections like Mycobacterial diseases: Tuberculosis and Leprosy. Fungal diseases, Actinomyces, Rhinosporidiosis, Opportunistic infections. Parasitic diseases: Malaria. HIV infection and AIDS: Aetiology, Mode of transmission, Pathogenesis, Diagnostic procedure.

Miscellaneous Disorders:

Nutritional disorders – Protein Energy Malnutrition, Vitamin deficiency. Occupational and environmental pathology – Radiation Injury, Pneumoconiosis.

Hematopathology:

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

SYSTEMIC PATHOLOGY

Cardiovascular Pathology:

Rheumatic Heart Disease & Infective endocarditis, Hypertension, Atherosclerosis and Ischemic heart Disease

Respiratory Pathology:

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

Pathology of Gastrointestinal tract:

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

Liver and Biliary Tract pathology:

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

Lymphoreticular Pathology:

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

Urinary tract pathology:

Renal function tests, Urinalysis, Acute and Chronic renal failure, polycystic kidney disease, Nephrotic Syndrome. Glomerulonephritis: Post streptococcal, Crescentic, Secondary. Acute tubular necrosis, Urinary tract infection and Pyelonephritis, Nephrolithiasis. Renal tumors: Renal cell carcinoma, Wilms Tumor. Urinary bladder: cystitis, urothelial carcinoma.

Pathology of Reproductive System:

Diseases of cervix: Cervical carcinoma, PAP stain, Screening and diagnosis. Hormonal influences and histology of different phases of endometrium. Endometrial hyperplasia and carcinoma, Smooth muscle tumor, Endometriosis. Hydatidiform mole and Choriocarcinoma, Ovarian tumors. Diseases of breast– fibrocystic disease, Fibroadenoma, Breast Carcinoma, Phylloides tumor, Nodular hyperplasia and carcinoma prostate. Disease of penis-premalignant and carcinoma. Tumors of testis

Pathology of Musculoskeletal system:

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

Endocrine Pathology:

Non neoplastic lesions of thyroid: Thyroid function tests, Iodine deficiency, Goitre, Autoimmune thyroiditis, Myxedema and thyrotoxicosis, Tumors of thyroid, multiple endocrine neoplasia, Adrenals - Hyperfunction and hypofunction, Tumors. Parathyroid hyperplasia and adenoma, Pituitary hyperfunction tumors

Neuropathology:

CSF and its disturbance, inflammatory disorders: Meningitis and Brain abscess. CNS tumors: Astrocytoma and Meningioma: classification

Miscellaneous:

Skin tumors like Melanoma, Basal cell carcinoma, Squamous cell carcinoma.

DESIRABLE TO KNOW CATEGORY

General Pathology:

Cell Ageing, Cell cycle, stem cells, Growth factors, Tumor and host interaction, Tumor immunology, Primary immunodeficiency. Use of immunopathology in laboratory diagnosis like immunofluorescence, immunohistochemistry, flow cytometry. Karyotyping, molecular diagnosis, Storage Disorders, congenital malformations. Bacterial Diseases: Pyogenic, Typhoid, Meningococcal, Syphilis, Bacillary Dysentery, Filariasis, Kala Azar, Amebiasis, Cysticercosis, Hydatid. Viral diseases: Herpes, Hepatitis, Rabies, Dengue Pathology of alcohol and smoking Cystic fibrosis, Obesity.

Systemic Pathology:

G6PD deficiency, PNH, Microangiopathic hemolytic anemia, myelophthisic anemia, chronic myeloproliferative disorder, Myelodysplastic syndromes. Congenital Heart Diseases like VSD, ASD, Fallot's Tetralogy, PDA. Pericardial Diseases, Cardiomyopathy, Vasculitis and Aneurysm, Cardiac tumors like Myxoma, Hyaline Membrane Disease and ARDS. Interstitial lung disease, Nasopharyngeal and Laryngeal tumors. Mesothelioma, Sjogren Syndrome, Hirschsprung disease, GIST, Malabsorption diseases, Pancreatitis and Pancreatic tumors. Liver function tests, Liver failure, Portal hypertension. Renal vascular disorders, End-stage renal disease, Semen analysis and investigation of infertility, Pelvic inflammatory disease, Vulval and vaginal diseases, Genital tuberculosis. Paget's disease of bone, Muscular dystrophies, gout, soft tissue sarcomas. Arthritis: Rheumatoid, Osteoarthritis, Tuberculous. Jaw- Ameloblastoma, Degenerative diseases like Alzheimer's and PRION disease. Cerebrovascular diseases: Hemorrhage, Aneurysm, Infarction. Peripheral neuropathy and demyelinating diseases.

PRACTICAL SKILLS

Acquisition of Skills:

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

Practicals

1. One third of the allotted practical hours will be devoted to:
 - a) Perform a complete urine examination and detect abnormalities and correlate clinically.
 - b) Perform with accuracy and reliability various hematological procedures such as Hemoglobin estimation, Total and differential leucocyte count, peripheral smear staining and reporting and blood grouping.
 - c) Observing or performing under guidance tests like bleeding time, Clotting time, ESR, PCV, bone marrow examination, semen analysis and interpret abnormal findings.
2. One third of the practical hours allotted should be devoted to Identify and interpret gross and microscopic feature of:
 - a) Acute inflammation like acute appendicitis, pneumonia, meningitis
 - b) Chronic cholecystitis
 - c) Granulomatous inflammation like tuberculosis
 - d) Granulation tissue and Ulcer
 - e) Typhoid, tuberculous and amebic ulcers
 - f) Common infections like Leprosy, Malaria, Rhinosporidiosis, Hydatid disease, Actinomycosis, Mycetoma, Molluscum contagiosum

- g) Fatty liver, Amyloidosis, Venous congestion of lung, liver and spleen
- h) Types of necrosis
- i) Common benign and malignant tumors like Squamous cell carcinoma, Basal cell carcinoma, Adenocarcinoma, Hemangioma, Lipoma, Melanoma, metastatic tumors etc
- j) Common systemic diseases like Cirrhosis, Pyelonephritis, Peptic ulcer, Rheumatic Heart Disease, Bronchiectasis, Osteomyelitis
- k) Specific tumors of various organs like Cervical cancer, Uterine leiomyoma, Seminoma, Osteosarcoma etc

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

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

PATHOLOGY - DISTRIBUTION OF MARKS

Theory-Two papers of 40 marks each	80 marks
(One applied question of 10 marks in each paper)	
Oral (Viva)	15 marks
Practical	25 marks
Internal assessment (Theory-15; Practical-15)	30 marks
Total	150 marks

Pass: In each of the subjects, a candidate must obtain 50 % in aggregate with a minimum of 50% in Theory including oral and minimum of 50% in Practicals.

PATHOLOGY THEORY PAPER

Paper I – 40 marks (General Pathology 20 marks and Haematology 20 marks)

Time: 2 hours

Q1. Long Answer Question 10 Marks (must be structured)

Q2. Short Answer Questions: 6 Short Notes of 5 marks each (30 marks)

Paper II – 40 marks (Systemic Pathology: CVS, RS, GIT, Hepatobiliary system -20 marks and Systemic pathology: Other systems – 20 marks)

Time: 2 hours

Q1. Long Answer Question-10 Marks

Q2. Short Answer Questions: 6 Short Notes of 5 marks each (30 marks)

Note: Long Answer Questions (LAQ) should be from must know area. Total number of SAQs is 12 of which 2 or 3 should be from desirable to know areas.

MODEL QUESTION PAPERS:

PATHOLOGY PAPER I
(General Pathology and Haematology)

ANSWER ALL QUESTIONS
Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 40

1. A 65 old female from "Old age home" brought with severe weakness and spastic paresthesia in lower limbs. On examination she had severe pallor, atrophic glossitis and mild yellowish discoloration of skin. Peripheral smear examination showed presence of macro-ovulocytes.

- a) What is the most probable diagnosis and why?
- b) Describe the Etio-Pathogenesis of disease in detail.
- c) Describe laboratory findings. (2+4+4=10)

2. Write Short Notes on: (6 X 5 = 30)

- a. Granulomatous Inflammation
- b. Myelodysplastic Syndrome
- c. Grading & staging of tumor
- d. Down's Syndrome
- e. Hemophilia
- f. Types of necrosis

PATHOLOGY PAPER II
(Systemic Pathology)

ANSWER ALL QUESTIONS
Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 40

1. A 50 year old male, chronic smoker, presented to casualty with sudden onset of chest pain, sweating, tachycardia and giddiness. ECG showed ST-segment elevation.

- a) What is your probable diagnosis and why?
- b) Write the etiopathogenesis of the disease.
- c) Write briefly about the morphology of the affected organ.
- d) Mention Laboratory investigation findings.
(2+3+3+2=10)

2. Write Short Notes on: (6 X 5 = 30)

- a. Small cell carcinoma Lung
- b. Cholelithiasis
- c. Meningioma
- d. Giant Cell tumor of Bone
- e. Choriocarcinoma
- f. Hashimoto's Thyroiditis

PRACTICAL EXAM PATTERN: 25 MARKS

Hematology exercises (TC, DC, Hb / Blood group)	–	10 marks
Clinical pathology (Urine exam)	–	5 marks

Histopathology
Applied Pathology (Lab investigation based case studies)

– 5 marks
– 5 marks

MICROBIOLOGY

MICROBIOLOGY

GOAL

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

OBJECTIVES

Knowledge

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

1. State the infective microorganisms of the human body and describe the host parasite relationship.
2. List pathogenic microorganisms (bacteria, viruses, parasites, fungi) and describe the pathogenesis of the diseases produced by them.
3. State or indicate the modes of transmission of pathogenic and opportunistic microorganisms and their sources, including insect vectors responsible for transmission of infection.
4. Describe the mechanisms of immunity to infections.
5. Acquire knowledge on suitable antimicrobial agents for treatment of infections and scope of immunotherapy and different vaccines available for prevention of communicable diseases.
6. Apply methods of disinfection and sterilization to control and prevent hospital and community acquired infections.
7. Recommend laboratory investigations regarding bacteriological examination of food and water.
8. Understand the relevance of standard precautions and biomedical waste management, and their practices.

Skills

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

1. Plan and interpret laboratory investigations for the diagnosis of infectious diseases and to correlate the clinical manifestations with the etiological agent.
2. Identify the common infectious agents with the help of laboratory procedures and use antimicrobial sensitivity tests to select suitable antimicrobial agents.
3. Perform commonly employed bedside techniques and microscopy for Gram stain, AFB stain and stool for ova and cyst.
4. Identify malarial and filarial parasites in a blood film.

5. Identify microscopic appearance of common fungi causing infections.
6. Use the appropriate method to collect, preserve and transport clinical materials for microbiological investigations.
7. Appropriate practice of standard precautions (e.g., steps of hand washing, skin preparation etc)

Integration

The student should understand infectious diseases of national importance in relation to the clinical, therapeutic and preventive aspects by horizontal or vertical integration.

COURSE CONTENTS

MUST KNOW CATEGORY

General Microbiology:

Basic concept of microorganisms in relation to infectious diseases. Definitions pertaining to infectious diseases. (e.g: host, parasite, endogenous and exogenous flora, transmission, routes, source, reservoir etc.). Classification of microbes from clinical view point. Normal human microbial flora and its importance in health and disease. Bacterial cell structure, bacterial growth curve, factors influencing bacterial growth, and mechanisms of genetic variation in relation to virulence. Sterilization, disinfections and standard precautions in patient care and disease prevention. Antimicrobials, mode of action, interpretation of AST results and rational use, mechanisms of antimicrobial resistance and its transfer.

Immunology:

Host defence mechanisms (Immunity to infection). Structure and functions of Immune system. Antigen (antigens as vaccines) and antibody. Principles and applications of antigen and antibody reactions, functions of complement. Normal immune response. Hypersensitivity, Immunodeficiency, and Auto-immunity (teaching to be integrated with department of Pathology).

Systematic Bacteriology:

Gram positive / negative - cocci / bacilli - Staphylococcus, Streptococcus, Pneumococcus, Neisseria, Corynebacterium, Clostridium, Coliforms (E.coli, Klebsiella, Proteus), Salmonella, Shigella, Pseudomonas, Bacillus, Yersinia pestis, Haemophilus, Bordetella, Brucella, Vibrio cholerae. Mycobacteria – Mycobacterium tuberculosis, M. leprae. Spirochaetes – T. pallidum, Leptospira. Scrub typhus (with brief introduction to Rickettsiae).

Virology:

General concepts of viral infections (structure, classification, laboratory diagnosis). Virus, host interaction and pathogenesis. Herpes (Herpes simplex virus, Varicella zoster virus), Arboviruses– Dengue virus, Chikungunya virus, Japanese Encephalitis virus, Picornavirus (Polio), Influenza virus, Para influenza viruses (Measles virus, Mumps virus), Rubella virus, Rabies virus, Human immunodeficiency virus, Hepatitis viruses, Human Papilloma Virus. Viral vaccines and commonly used antiviral agents.

Parasitology:

General concepts & definition of key terms and classification of parasites causing important human infections, including parasitic infections prevalent in India. Immunity and laboratory

diagnosis of parasitic diseases. Protozoa: Entamoebahistolytica, Giardia lamblia, Trichomonas vaginalis, Leishmania, Plasmodia, Toxoplasma, Isospora, Cyclospora, Cryptosporidium. Helminths: Cestodes- Taeniasolium, Taeniasaginata, E. granulosus, Nematodes: Ascarislumbricoides, Hookworm and larvamigrans, Strongyloides stercoralis, Trichuris trichuria, Enterobius vermicularis and Wuchereria bancrofti.

Mycology:

General properties and classification of fungal diseases, pathogenesis, approach to laboratory diagnosis (sample collection, identification), and antifungal agents. Superficial mycosis- Dermatophytoses, Tinea versicolor. Subcutaneous- Mycotic mycetoma (and actinomycotic mycetoma). Systemic- Candidiasis, Cryptococcosis. Opportunistic fungal infections- Pneumocystis, Aspergillosis, Zygomycosis.

Applied Microbiology:

CNS Infections: Acute and chronic meningitis (including *Listeria*), encephalitis, slow viral infections and brain abscess. Blood stream infections. Microbiological aspects of PUO. Gastrointestinal infections- Diarrhoeal diseases (including *Campylobacter*, Rota virus) and food poisoning (including *Clostridium botulinum*), antibiotic associated colitis (*Clostridium difficile*), and acid peptic disease (*Helicobacter pylori*). Respiratory Tract Infection (of upper & lower respiratory tract, including *Nocardia* and Corona virus). Urinary tract infections. Skin and soft tissue infections. Sexually transmitted infections & Non Gonococcal Urethritis (including *Chlamydia*, *Mycoplasma*). Infections in immunocompromised individuals. Health Care Associated Infections (HCAI) and its prevention- CAUTI, VAP, BSI, SSI (organisms commonly associated including *Acinetobacter* spp.) Standard precautions and hospital waste management (including biomedical waste). Zoonotic diseases (eg. anthrax, rabies, plague, brucellosis etc). Congenital infections including teratogenic viruses. Organisms associated with oncogenicity. National Programmes for prevention of Communicable Diseases. Investigation of outbreaks and notification (including bacteriology of food and water). Immunoprophylaxis.

DESIRABLE TO KNOW CATEGORY

General Microbiology:

Conventional and recent advances in diagnostic microbiology

Immunology:

Tumor immunology, Transplantation immunology

Systematic Bacteriology:

Nonsporing Anaerobes (*Bacteroides*), Burkholderia cepacia and pseudomallei, Actinomycetes, Bacillus anthracis, Campylobacter, Helicobacter pylori. Atypical Mycobacteria causing human infections.

Virology:

Opportunistic viral infection – Epstein-Barr virus and Cytomegalovirus. Viruses of epidemic importance as applied to India (Kyasanur forest disease (KFD) and Crimean–Congo haemorrhagic fever (CCHF).

Parasitology:

Protozoa- Free living amoebae. Cestodes - *Diphyllobothrium latum*, *Hymenolepis nana*. Trematodes- *Fasciola hepatica*, *Schistosoma haematobium*, *Paragonimus westermani*.

Mycology:

Rhinosporidiosis, Penicilliosis, Histoplasmosis

PRACTICAL SKILLS

Use and care of light microscope. Collection of relevant clinical samples: blood (for culture and serology), body fluids, sputum, throat swab, pus, wound swab, urine and stool for culture. Preservation and transport of the clinical specimens. Preparation of smears from clinical materials and microscopic examination. To perform: Gram stain, Ziehl – Neelsen stain, Stool microscopy for ova and cyst, To Identify: Parasites in peripheral blood smear, Fungi in stained preparation, Adult parasites. Perform appropriate techniques for standard precautions: hand wash, asepsis, antisepsis and Personal Protective Equipment (PPE). Demonstrate appropriate practices of biomedical waste disposal (e.g., Needles & sharps, and infectious materials). Requesting appropriate and rational microbiological investigations and interpretation of reports: Problem solving exercises (PSE). Culture & Sensitivity (rational use of antibiotics). Interpretation of serology reports.

MICROBIOLOGY - DISTRIBUTION OF MARKS

Theory-Two papers of 40 marks each (One applied question of 10 marks in each paper)	80 marks
Oral (Viva)	15 marks
Practical	25 marks
Internal assessment (Theory-15; Practical-15)	30 marks
Total	150 marks

Pass: In each of the subjects, a candidate must obtain 50 % in aggregate with a minimum of 50% in Theory including oral and minimum of 50% in Practicals.

MICROBIOLOGY THEORY PAPER

Paper I – 40 marks (General Microbiology 10 marks, Immunology 10 marks and Systematic Bacteriology 20 marks)

Time: 2 hours

Q1. Long Answer Question 10 Marks

Q2. Short Answer Questions: 6 Short Notes of 5 marks each (30 marks)

Paper II – 40 marks (Applied Microbiology 10 marks, Parasitology 10 marks, Virology 10 marks, Mycology 10 marks)

Time: 2 hours

Q1. Long Answer Question-10 Marks

Q2.Short Answer Questions: 6 Short Notes of 5 marks each (30 marks)

Note: Long Answer Questions (LAQ) should be from must know area. Total number of SAQs is 12 of which 2 or 3 should be from desirable to know areas.

MODEL QUESTION PAPERS:

MICROBIOLOGY PAPER I

(General Microbiology, Immunology and Systematic Bacteriology)

ANSWER ALL QUESTIONS

Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 40

1. Enumerate bacteria that invade the intestinal epithelium. Discuss the pathogenesis and laboratory diagnosis of enteric fever. (2 + 4 + 4=10)
2. Write short notes on: (6 x 5 = 30)
 - a) Role of capsule in bacterial virulence
 - b) Mechanisms of antibiotic resistance in bacteria
 - c) Role of antibodies in host defence mechanism.
 - d) Antigen and host cell interactions.
 - e) Treponemal antibody tests to confirm syphilis.
 - f) Laboratory diagnosis of pulmonary tuberculosis

MICROBIOLOGY PAPER II

(Parasitology, Virology, Mycology and Applied Microbiology)

ANSWER ALL QUESTIONS

Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 40

1. An 8 year old boy presented with acute onset of fever, headache and altered sensorium for the past 2 days. On physical examination, his temperature was 102^oF, he was confused, agitated and had nuchal rigidity. LP was done and CSF was sent for laboratory investigations. CSF was cloudy with polymorphonuclear leucocytosis >100 cells/ μ l, and decreased glucose, 35mg/dL with increased protein. 0.50mg/dL.
 - a) What is your probable diagnosis?
 - b) List the agents that can cause this condition in different age groups.
 - c) Describe some rapid and conventional methods for etiological diagnosis of this condition in the laboratory?
 - d) List the vaccines that can prevent this condition in children. (1+2+4+3=10)
2. Write short notes on: (6 x 5 = 30)
 - a) Strategies and tests for serodiagnosis of HIV.
 - b) Epidemiology of influenza virus infections.
 - c) Pathogenesis and laboratory diagnosis of Cryptococcal meningitis.
 - d) Common dimorphic fungi causing human infections.
 - e) Draw a neat labelled diagram of the life cycle of *Plasmodium falciparum* in man.
 - f) Pathogenesis and laboratory diagnosis of hydatid disease in man.

PRACTICAL EXAM (Total marks – 25)

1. Gram stain - 5 marks
2. ZN Stain - 5 marks
3. Stool examination - 5 marks

4. Identification of Fungi (Prepared LPCB with the fungal growth on SDA culture bottle) - 2 marks
5. Problem Solving Exercise (Applied Microbiology) - 8 marks (4X2=8 marks)

PHARMACOLOGY

PHARMACOLOGY

GOAL

The broad goal of the teaching of undergraduate learners 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 essential and commonly used drugs.
3. To select and use an appropriate drug in a particular disease with consideration to its efficacy, safety and cost for individual needs and mass therapy under national health programs.
4. Describe the pharmacokinetic basis, clinical presentation, diagnosis and management of common poisoning and their specific antidotes.
5. Integrate the concept of rational drug therapy in clinical pharmacology.
6. Understand the concept of 'Essential Drugs' and their utilization in different health care settings (primary, secondary and tertiary).
7. List the drugs of addiction and recommend the management.
8. To prescribe drugs rationally in special medical situations such as pregnancy, lactation, extremes of age, hepatic and renal failure.
9. Know the ethics and basics of development and introduction of new drugs.

Skills

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

1. Prescribe drugs rationally for common ailments, diseases covered under national health programs and emergency medical conditions.
2. To recognize, report, manage and prevent adverse drug reactions.
3. Observe experiments designed for study of effects of drugs, bioassay and interpret the experimental data on animals (using Computer Assisted Learning).
4. Critically appraise the information on common drug formulations.
5. To implement the concept of essential medicines in various health care settings.

6. To communicate with the patients regarding optimal use of drugs and devices.

Integration

Practical knowledge of use of drugs in clinical practice will be acquired through integrated teaching with clinical, pre and para-clinical departments. (e.g) Diabetes mellitus (DM).

COURSE CONTENT

MUST KNOW CATEGORY

General Pharmacology:

Pharmacology: Definition, scope, various branches. General principles and mechanism of drug action. Concept of therapeutic Index and margin of safety. Drug nomenclature. Clinical Pharmacology – Basic concepts. Scope and relevance of clinical pharmacology. Routes of administration of drugs, drug delivery system. Pharmacokinetics – Absorption, distribution, metabolism, excretion. Bioavailability and bioequivalence. Factors modifying drug action and drug dosage. Drug interactions, pharmacogenomics, pharmacogenetics. Adverse drug reactions and Pharmacovigilance. Therapeutic drug monitoring & adherence. Essential drugs and fixed dose drug combinations, pharmacoeconomics, rational drug use, P-drugs. Phases of clinical trials.

Autonomic Pharmacology:

General principles of autonomic neurotransmission. Systemic actions of neurotransmitters. Various types and sub-types of receptors and their agonists and antagonists, therapeutic indications, contraindications and common side effects of agonists and antagonists. Pharmacotherapy of organophosphorous and atropine poisoning. Pharmacotherapy of glaucoma, Alzheimer's disease and myasthenia gravis. Pharmacology of skeletal muscle relaxants.

Autacoids and related drugs:

Definition. Pharmacological actions of autacoids. Histamine, prostaglandins, leukotriene and 5-HT – receptors, agonists, antagonists, pharmacological actions, indications, adverse effects and contraindications. Pharmacotherapy of migraine.

Central Nervous System:

Antiepileptic drugs – Classification, pharmacological actions, uses, adverse effects, contraindications and selection of appropriate drug for various types of epilepsy. Sedative & Hypnotics – Classification, pharmacological actions, uses, adverse effects and contraindications, Management of Insomnia. General anaesthetics – Cardinal features, merits and demerits of commonly used anaesthetics, drug interactions, balanced anaesthesia, neuroleptanalgesia, dissociative anaesthesia and pre-anaesthetic medication. Local anaesthetic agents – Pharmacological actions, adverse drug reactions, indications and management of complications. Opioid analgesics – Opioid receptors and their subtype, classification, pharmacological actions, indications, contraindications, adverse effects and drug interactions of commonly used agents, Management of opioid poisoning and deaddiction. Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) – Classification, pharmacological actions, indications, contraindications, adverse effects and drug interactions of commonly used drugs, Management of overdose and toxicity. Pharmacology of drugs used in the treatment of rheumatoid arthritis and gout. Drugs used in the treatment of

Parkinson's disease – Classification, indications, contra-indications, adverse effects, drug interactions and management of drug induced parkinsonism. Pharmacology of ethanol and management of methanol poisoning. Pharmacology of drugs used for psychosis, anxiety, depression, and manic depressive illness. Drugs of addiction, abuse, dependence and principles of deaddiction of commonly abused agents like alcohol, opioids, cocaine, cannabinoids, etc.

Cardiovascular system:

Antihypertensive drugs – Classification, mechanism of action, uses, adverse effects, drug interactions and basis of combination therapy, Management of hypertensive emergencies. Pharmacology of anti-anginal drugs, management of angina pectoris and myocardial infarction. Drug therapy of heart failure including cardiac glycosides. Plasma expanders and management of shock. Pharmacology of diuretics and antidiuretics.

Drugs affecting blood and blood formation:

Anti-anemic drugs - Haematinics and Hematopoietic growth factors including erythropoietin. Drugs affecting coagulation, bleeding and thrombosis. Pharmacology of Vitamin K and other hemostatics. Pharmacology of anticoagulants and their antidotes. Pharmacology of antiplatelet drugs. Pharmacology of Fibrinolytics and anti-fibrinolytics.

Respiratory system:

Antiasthmatic drugs - Classification, mechanism of action, common side effects, contraindications, drug interactions and management of asthma based on severity. Drug delivery devices used in asthma. Pharmacology of Antitussives, expectorants and mucolytic agents.

Gastro-intestinal system:

Drugs for peptic ulcer - Classification, mechanism of action, uses, adverse drug reactions, contra-indications., Pharmacotherapy of GERD., Anti-H.pylori drugs, Antiemetic and prokinetic drugs - mechanism of action, uses, side effects and adjuvant antiemetics. Pharmacology of drugs used in constipation and diarrhea, principles for using ORS. Drug therapy of inflammatory bowel diseases and Irritable bowel syndrome.

Drugs acting on Endocrine System:

Pharmacology of hypothalamic and pituitary hormones. Pharmacology of Thyroid hormones and antithyroid drugs - Management of thyroid storm and myxoedema coma. Pharmacology of drugs used in diabetes - Management of hypoglycemia and diabetic ketoacidosis. Pharmacology of Sex hormones- analogues and antagonists - Pharmacological approaches to contraception. Pharmacology of drugs acting on uterus - Pharmacology of Adrenocortical hormone analogues and antagonists. Pharmacology of drugs affecting calcium balance - Pharmacotherapy of osteoporosis.

Chemotherapy:

General principles of chemotherapy, classification of chemotherapeutic agents and rational use of antimicrobial agents. Chemotherapeutic agents- Classification, mechanism of action, side effects, indications, mechanism of resistance and drug interactions of penicillins, cephalosporins, other β -lactams, β -lactamase inhibitors, aminoglycosides, broad spectrum antimicrobial agents, quinolones, sulphonamides, macrolides etc. Antitubercular drugs and antileprotics. Antifungal drugs. Antiretroviral drugs and other antiviral drugs. Antimalarial, Antiamoebic and other antiprotozoals. Antihelminthic drugs. Anticancer drugs - mechanism of action, indications, side effects, contraindications, precautions and toxicity amelioration.

Toxicology:

General principles in the management of poisoning including snake bite and insect stings. Chelating agents and management of heavy metal poisoning. Management of over dosage of commonly used therapeutic agents and their antidotes.

Miscellaneous:

Immunomodulators. Drug therapy in special situations (pregnancy, lactation, paediatrics, geriatrics, renal and hepatic diseases). Dermatological pharmacology - Principles of drug application, vehicles and formulations, keratolytic agents, drug therapy of bacterial, viral, fungal infections and allergic skin disorders, Management of psoriasis. Vitamins. Essential Medicine List. Commonly used fixed drug combinations. National health programs (communicable and non-communicable diseases). Drug interactions and their mechanism.

DESIRABLE TO KNOW CATEGORY**General Pharmacology:**

Drugs and drug combinations that are banned in India. Molecular mechanism of drug action. Drug regulation & drug acts, legal aspects, inventory control. Drug dose relationships and basic principles of bioassay and biostandardisation. Pharmacoeconomics.

Autonomic Pharmacology:

Drugs acting on autonomic ganglia

Autacoids and related drugs:

Pharmacology of platelet activating factor and bradykinin. Drugs for vertigo.

Central Nervous System:

Endogenous opioid peptides and their functions. Pharmacotherapy of osteoarthritis. CNS stimulants and cognition enhancers. Drug abuse in sports.

Cardiovascular system:

Pharmacology of anti-arrhythmic drugs. Vasoactive peptides and nitric oxide. Pharmacological management of peripheral vascular diseases.

Drugs affecting blood and blood formation:

Hypolipidaemic drugs - Classification, mechanism of action, indications and adverse drug reactions.

Respiratory system:

Management of COPD.

Gastro-intestinal system:

Emetics. Digestants and gall stone solvent. Anti-obesity drugs. Appetite stimulants.

Drugs acting on Endocrine System:

Drugs in the management of infertility. Management of erectile dysfunction. Pharmacology of Melatonin & analogues. Glucagon.

Chemotherapy:

Newer antimicrobial agents

Miscellaneous:

Vaccines and sera. Antiseptics and disinfectants. Therapeutic gases. FDCs banned in India. Ocular pharmacology. Dietary supplements.

PRACTICAL SKILLS

Introduction to pharmacology & drug sources. Drug information sources. Enteral dosage forms. Parenteral and topical dosage forms. Patient-doctor communication. Parenteral drug administration [im, sc, iv (infusion and bolus), intradermal]. Drug dosage calculation. Pharmacoeconomics. Estimation of half life of drug (pK) and concept of TDM. Prescription writing for common diseases. Prescription Audit (Comment Criticize Rewrite). Problem solving exercises. Essential medicine list. Adverse drug reaction reporting. CAL - Effect of drugs on rabbit eye. CAL - Effect of drug on perfused Frog's heart. CAL - Effect of drugs on ciliary movement of Frog's oesophagus. CAL - Effect of drugs on blood pressure of anesthetized Dog. Emergency pharmacotherapy: a) Clinical case scenario, b) Picture based. Informed consent. Critical appraisal of drug promotional literature. Spotters (system wise).

PHARMACOLOGY - DISTRIBUTION OF MARKS

Theory-Two papers of 40 marks each (Containing one question on clinical therapeutics)	80 marks
Oral (Viva)	15 marks
Practical	25 marks
Internal assessment (Theory-15; Practical-15)	30 marks
Total	150 marks

Pass: In each of the subjects, a candidate must obtain 50 % in aggregate with a minimum of 50% in Theory including oral and minimum of 50% in Practicals.

PHARMACOLOGY THEORY PAPER

Paper I – 40 marks

- 1) General Pharmacology - 10 marks
- 2) Autonomic Nervous System - 10 marks
- 3) Cardiovascular System - 10 marks
- 4) Blood / Autacoids / Respiratory System - 10 marks.

Note for paper setter:

- One LAQ can be from any of 1, 2, 3 or 4.
- If LAQ is from 1, 2, 3 or 4, it should not be included in SAQ section.
- If LAQ is not from 1, 2, 3 or 4, two SAQs can be included from the respective section.

Time: 2 hours

Q1. Long Answer Question 10 Marks

Q2. Short Answer Questions: 6 Short Notes of 5 marks each (30 marks)

Paper II – 40 marks

- 1) Chemotherapy - 15 marks
- 2) Drugs acting on Central Nervous system - 10 marks
- 3) Hormones and related drugs – 10 marks
- 4) Gastrointestinal drugs / Miscellaneous - 5 marks.

Note for paper setter:

- One LAQ can be from 1, 2 or 3
- If LAQ is from 1, then only one SAQ should be asked from 1.
- If LAQ is not from 1, three SAQs can be included from 1.
- If LAQ is from 2 or 3, it should not be included in SAQ section.
- If LAQ is not from 2 or 3, two SAQs can be included from the respective topic.
- One SAQ can be included from 4.

Time: 2 hours

Q1. Long Answer Question-10 Marks

Q2. Short Answer Questions: 6 Short Notes of 5 marks each (30 marks)

Note: Long Answer Questions (LAQ) should be from must know area. Total number of SAQs is 12 of which 2 or 3 should be from desirable to know areas.

MODEL QUESTION PAPERS:

PHARMACOLOGY PAPER I

(General pharmacology, autonomic nervous system, cardiovascular system, blood, autacoids and respiratory system)

ANSWER ALL QUESTIONS

Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 40

1. Classify antihypertensive drugs. Discuss the mechanism of action, uses and adverse effects of "Sartans". Explain the pharmacological basis of any two commonly used drugs in hypertensive emergency. (3+1+2+2+2=10)
2. Short notes: (6 x 5 = 30)
 - a) Define plasma half-life and its clinical significance.
 - b) Theophylline.
 - c) Pharmacological management of organophosphorus poisoning.
 - d) Write briefly on phase II biotransformation reactions with suitable examples.
 - e) 5HT₃ antagonists.
 - f) Pharmacotherapy of benign prostatic hypertrophy.

PHARMACOLOGY PAPER II

(Chemotherapy, drugs acting on central nervous system, hormones and related drugs, gastrointestinal drugs and miscellaneous)

ANSWER ALL QUESTIONS

Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 40

1. Classify anti-tubercular drugs. Discuss in detail the mechanism of action, uses and adverse effects of any one first line anti-tubercular drug. Add a note on DOT's regimen.

(2+2+2+2+2=10)

2. Short notes:

(6 x 5 = 30)

- a) List any two SSRI drugs and brief the advantages of SSRI over Tricyclic antidepressants (TCA).
- b) Sodium valproate
- c) DPP-4 inhibitors
- d) Briefly discuss the adverse effects and contraindications of glucocorticoids.
- e) Pharmacotherapy of constipation.
- f) Enumerate any four commonly used aminoglycosides and list the uses and adverse effects

PRACTICAL - MARKS (25)

Clinical Pharmacology Exercise (Part A)

1. Prescription Writing+ spotters. (3+2)
2. CCR Exercises/ problem solving/ toxicology.(5)
3. Pharmacoeconomic Exercise/ Dosage calculation/ Clinical Pharmacokinetic Exercises/ ADR reporting. (5)

Experimental Pharmacology (Part B)

1. Computer Assisted Learning (Major & Minor). (5)
2. Patient doctor Communication /injection techniques. (5)

FORENSIC MEDICINE INCLUDING TOXICOLOGY

FORENSIC MEDICINE INCLUDING TOXICOLOGY

GOAL

The broad goal of the teaching of undergraduate students in Forensic Medicine is to produce a physician who is well informed about medicolegal responsibilities in practice of medicine. He/ She will also be capable of making observations and inferring conclusions by logical deductions to set enquiries on the right track in civil and criminal matters and connected medicolegal problems. He/ She acquires knowledge of law in relation to medical practice, medical negligence and respect for codes of medical ethics.

OBJECTIVES

Knowledge

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

1. Identify the basic medicolegal aspects of hospital and general practice.
2. Define the medicolegal responsibilities of a general physician while rendering community service either in a rural primary health centre or an urban health centre.
3. Appreciate the physician's responsibilities in civil and criminal matters and respect for the codes of medical ethics.
4. Diagnose, manage and identify also medicolegal aspects of common acute and chronic poisonings.
5. Describe the medicolegal aspects and findings of post-mortem examination in case of death due to suddennatural and common unnatural conditions and poisonings.
6. Detect occupational and environmental poisoning, prevention and epidemiology of common poisoning and their legal aspects particularly pertaining to Workmen's Compensation Act.
7. Describe the general principles of analytical toxicology.
8. Medical jurisprudence in view of the Consumer Protection Act – wherein doctors have been covered under its ambit. They have both rights as well as responsibilities. Under medical insurance acts of negligence covered as well as rights for effective service delivery.

Skills

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

1. Make observations and logical inferences in order to initiate enquiries in civil and criminal matters and medicolegal problems.
2. Examine and issue statutory certificates and medicolegal reports.
3. Diagnose and treat common emergencies in poisoning and manage chronic toxicity.
4. Make observations and interpret findings at postmortem examination.
5. Observe the principles of medical ethics in the practice of his profession.

Integration

Department shall provide an integrated approach towards allied disciplines(Pathology, Obstetrics& Gynaecology, Radiology, Forensic Sciences, Hospital Administration and medicolegal issues of other departments)to impart training regarding medicolegal responsibilities of physicians at alllevels of health care. Integration with relevant disciplines will provide scientific basis of clinical toxicology e.g. medicine, pharmacology etc.

COURSE CONTENTS

MUST KNOW CATEGORY

Definition of Forensic Medicine and Medical Jurisprudence. Courts in India and their powers: Supreme Court, High Court, Sessions Court, Additional Sessions Court, Magistrate's Court, Family Court, Juvenile Court. Cognizable and Non-cognizable offences. Court procedures: Summons, conduct money, oath, affirmation, perjury, types of witnesses, recording of evidence, conduct of doctor in witness box. Medical certification and medico-legal reports including role of doctor in dying declaration. Death and its medicolegal aspects: Definition, types; somatic, cellular and brain-death, Natural and unnatural deaths, Suspended animation. Postmortem changes: Cooling of body, lividity, rigor mortis, cadaveric spasm, cold stiffening and heat stiffening. Putrefaction, mummification, adipocere and maceration. Estimation of time since passed death. Inquest: Inquest by Police, Inquest by Magistrate. Identification: Definition, enlist medicolegal aspects related to age. Principles involved in identification of unknown person, dead bodies and remains of a person by age, sex, stature, dental examination, scars, moles, tattoos, dactylography, foot-prints, hairs, poroscopy, DNA typing and personal belonging including photographs, superimposition techniques, dental examination including Forensic Odontology. Medico-legal autopsies: Definitions of medico-legal and clinical/pathological autopsies. Objectives, procedures, formalities of medico-legal autopsies. Preservation of articles of importance, during autopsy. Preservation of body fluids & viscera in suspected poisoning. Mechanical injuries or wounds: Definition, classification of mechanical injuries; description of blunt force, sharp force and firearm injuries. Medico-legal aspects of injuries, differences between antemortem and post-mortem injuries, estimation of age of different types of injuries, defense injuries, hesitation cuts; fabricated injuries; simple and grievous hurt, suicidal/accidental/homicidal injuries; causes of death by mechanical injuries. Regional injuries: Injuries to Head, Neck, Thorax, Abdomen, Pelvis, Genitalia, Vertebral column and Bones. Injuries due to physical agents, and their medico-legal importance. Injuries due to cold, heat, electricity and lightning, explosions and radioactive substances. Asphyxial deaths: Definition, causes, types, post-mortem appearances and medico-legal significance of hanging, strangulation, suffocation and drowning. Deaths due to starvation. Sexual Offences: Virginity, rape, other natural sexual offences and unnatural sexual offences; sexual perversions; POCSO Act, 2012, Criminal Amendment Act, 2013. Impotence, Sterility and Virginity. Medico-legal aspects of marriage, divorce, pregnancy and delivery. Abortion: Criminal abortion, Medical Termination of Pregnancy, Act 1971 with amendments. Infanticide: Infant and childhood deaths: Viability, determination of age of foetus, live birth, still birth and dead born child, sudden infant death syndrome, child abuse, medico-legal aspects of precipitate labour. Biological fluids: Blood – Preservation, dispatch of samples, importance of blood group in disputed paternity, hazards of blood transfusion. Seminal stains – Preservation and dispatch of samples. Forensic Psychiatry: Definition and brief overview of common mental illnesses including post-traumatic stress disorder (PTSD). True and feigned mental illness. Who can certify insanity. Civil and criminal responsibilities of a mentally ill person. Restraint of a mentally ill person. Medical Jurisprudence: Indian Medical Council and State Medical Councils; their functions and disciplinary control. Rights and privileges and duties of a registered medical practitioner, disciplinary proceedings and penal erasure, rights of a patient. Principles of medical ethics: Autonomy, Beneficence, Non-maleficence, justice, veracity. Hippocratic oath, Code of Medical ethics, International Code of ethics, Modified declaration of Geneva and its relevance, Code of Medical ethics 2002 (MCI regulations on Professional conduct, Etiquette and Ethics in medical practice). Professional secrecy, privileged communication. Medical Negligence: civil and criminal negligence, contributory negligence, vicarious liability, res ipsa loquitur, prevention of medical negligence and defense's in medical negligence suits. Consent: Types, ingredients of informed consent,

age in relation to consent, consent in relation to mental illness and alcohol intoxication, emergency and consent. Certification of births, deaths, illness and fitness. Consumer Protection Act, 1994, Medical indemnity insurance, Civil Litigations and compensations. Toxicology: General aspects of poisoning: Duties of doctor in cases of poisoning, medico-legal autopsy in poisoning, sample collection, preservation, labelling and dispatch of viscera for chemical analysis including interpretation of reports. Types of poisons, diagnosis, principles of therapy and medicolegal aspects of: Corrosive poisons: Sulphuric acid, Hydrochloric acid, Nitric acid, Phenol, Oxalic acid. Metallic poisons: Lead, Arsenic. Inorganic non-metallic poisons: Aluminium and zinc phosphides. Animal poisons: Snake bites, scorpion, wasp and bee stings. Deliriant: Datura, Cannabis, Cocaine and LSD. Somniferous agents: Opium, Morphine and Pethidine. Inebriants: Methyl and ethyl alcohol. Asphyxiant poisons: Carbon monoxide, Methane and cyanides. Cardiac poisons: Cerebra thevetia and Nerium odorum. Miscellaneous: Aspirin, paracetamol, barbiturates, diazepam, antihistaminics, anti-depressants and kerosene oil. Insecticides: Organophosphorus compounds, Carbamates and Organochloro compounds. Food poisoning.

DESIRABLE TO KNOW CATEGORY

IPC, CrPC and IEA relevant to medical practice, Salient features of organ transplantation and the Human Organs Transplantation Act, 1994 and their ethical issues. Procedure and medicolegal formalities of exhumation. Examination of mutilated human remains and skeletal human remains. National human rights protocol. Torture and human rights including National Human rights Commission guidelines and protocols. Medicolegal issues related to artificial reproductive techniques (ART), paternity and surrogacy. Indian Mental Health Act, 1987. Legal and ethical aspects of euthanasia, HIV and Law. The Pre-Conception and Prenatal Diagnostic Techniques Act (PCPNDT) (Prohibition of sex selection) Act, 2003. Protection of women from Domestic violence and Domestic Violence Act, 2005. Emerging technologies in forensic medicine: Principle and Medicolegal importance of DNA Profiling, Polygraph (Lie detector), Narco-analysis, Brain Mapping, Digital autopsy, Virtual autopsy, Imaging technologies. Role of Forensic Science Laboratory in brief. Metallic poisons: Mercury and Copper. Inorganic non-metallic poisons: Phosphorous. Organic vegetable irritants: Abrus precatorious, Capsicum, Calotropis, Semicarpus anacardium, Ricinus communis, Croton. Cardiac Poisons: Aconite, Convulsants: Strychnine. Paralytic agents, Curare. War gases and Industrial gases. Chloral hydrate. Mechanical poisons. Anaesthetic agents. Drug abuse and dependence

PRACTICAL SKILLS

Able to perform independently: (1) Proper documentation and intimation of birth and death to appropriate authority; (2) Diagnose and manage common acute and chronic poisonings; (3) Age estimation from bones, x-rays and dentition (mock exercise); (4) Examination of injuries, weapons and report writing (mock exercise); (5) Examination of an alcohol intoxicated person and report writing (mock exercise).

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

Observe: Ten medico-legal autopsies and enter the reports in practical record.

FORENSIC MEDICINE INCLUDING TOXICOLOGY - DISTRIBUTION OF MARKS

Theory (one paper)	40 marks
Oral (Viva)	10 marks
Practical / Clinicals	30 marks

Internal assessment (Theory-10 marks; Practical-10 marks)	20 marks
Total	100 marks

Pass: In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including oral and internal assessment (Theory) and minimum of 50% in Practicals / clinicals and internal assessment (Practicals).

FORENSIC MEDICINE INCLUDING TOXICOLOGY – THEORY PAPER

Total 40 marks (Forensic Medicine & Forensic Psychiatry 20 marks, Medical Jurisprudence 10 marks Toxicology 10 marks).

Time: 2 hours

Q1. Long Answer Question 10 Marks.

Q2. Short Answer Questions: 6 Short Notes of 5 marks each (30 marks).

Note: Long Answer Questions (LAQ) should be from must know area. Total number of SAQs is 6 of which 1 or 2 should be from desirable to know areas.

MODEL QUESTION PAPER:

FORENSIC MEDICINE

ANSWER ALL QUESTIONS

Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 40

1. A 16-year old unmarried girl was found hanging in her home from a ceiling fan with the help of a nylon dupatta, the ligature mark was found over anterior aspect of the neck, running obliquely to merge with the hair line posteriorly. Write about the types of hanging, causes of death and postmortem appearance in the above case. (2+2+6= 10)

2. Write short notes on: (6x5=30)

- Punishment for rape as per Criminal Amendment Act 2013.
- Plumbism
- Civil and Criminal Responsibilities of a Mentally ill person
- Duties of a doctor in suspected case of poisoning
- Professional Misconduct
- Subpoena

PRACTICAL EXAM (30 MARKS)

OSPE's: (1) Injury certificate; (2) Drunkenness Certification; (3) Examination of Accused and Potency certification in a case of sexual assault/ Examination of the Victim in a case of sexual assault; (4) Age Certification from physical and dental examination; (5) Age or Sex determination from bones with reasons; (6) Age determination from X-ray with reasons; (7) Medical sickness or Fitness from medical leave certificate; (8) Viscera Packing; (9) Interpretation of the age of foetus; (10) Death certificate or Interpretation of the autopsy reports; (11) Wet specimen; (12) Weapon; (13) Photograph; (14) Poison; (15) Appliance/Autopsy instrument. All stations are compulsory and carries equal marks i.e. **15 x**

2 = 30 marks.

OTO-RHINO- LARYNGOLOGY (ENT)

OTO-RHINO-LARYNGOLOGY (ENT)

GOAL

The broad goal of the teaching of undergraduate students in Otorhinolaryngology is that the undergraduate student have acquired adequate knowledge and skills for optimally dealing with common disorders in ENT and emergencies and principles of rehabilitation of the impaired hearing.

OBJECTIVES

Knowledge

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

1. Describe the basic pathophysiology of common ENT diseases and emergencies.
2. Adopt the rational use of commonly used drugs, keeping in mind their adverse reactions.
3. Suggest common investigative procedures and their interpretation.

Skills

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

1. Examine and diagnose common ENT problems including the pre-malignant and malignant disorders of the head and neck.
2. Manage ENT problems at the first level of care and be able to refer whenever necessary.
3. Assist/carry out minor surgical procedures like ear syringing, ear dressings, nasal packing etc.
4. Assist in certain procedures such as tracheostomy, endoscopies and removal of foreign bodies.

Integration

The undergraduate training in ENT will provide an integrated approach towards other disciplines especially neurosciences, ophthalmology and general surgery.

COURSE CONTENT

MUST KNOW CATEGORY

Basic sciences:

Anatomy of External ear, Middle Ear Cleft, Eustachian tube. Physiology of Hearing, Anatomy and Physiology of Nose and Para nasal sinuses, Nasopharynx, Anatomy of Oral cavity and Pharynx, Anatomy of Larynx and Oesophagus.

Diseases/conditions of ENT:

Examination of Ear, Nose, Oral cavity, Oropharynx and Neck.

Ear:

Causes of Otolgia, Wax, Otomycosis, Otitis externa, Acute Suppurative otitis media, Chronic Suppurative otitis media Safe and unsafe type, causes of ear discharge, Complications of chronic Suppurative otitis media, Hearing loss(causes, diagnosis, types), Otosclerosis, causes of facial palsy, Bell's palsy, Meniere's disease, National programme for Prevention and Control of Deafness, Rehabilitation of hearing loss(Hearing Aids/Cochlear Implants)

Nose:

Causes of Nasal obstruction, Deviated nasal septum, Nasal polyps, Adenoids, Causes of Nasal discharge, Allergic rhinitis, Acute and chronic Rhinitis, Epistaxis causes and management, Juvenile Nasopharyngeal Angiofibroma, acute and chronic sinusitis.

Oral cavity, pharynx, larynx & esophagus:

Ludwig's angina, causes of Dysphagia, Acute and chronic tonsillitis, acute and chronic abscesses in relation to pharynx, causes of hoarseness of voice ,acute and chronic laryngitis, Benign lesions of vocal cord, malignancy of larynx, causes of Stridor, foreign bodies in air and food passages, emergency management of the airway, Plummer Vinson syndrome.

Recent advances and miscellaneous:

Radiology in ENT, Pure tone Audiometry, Impedance Audiometry, Oto Acoustic Emission(OAE), Brain stem Evoked Response Audiometry(BERA), Premalignant lesions of head and neck, Basic principles of surgeries of ENT, Community Programmes(Detection of congenital and childhood deafness and Hearing rehabilitation) Prevention and identification of ENT malignancies.

PRACTICAL SKILLS

Skill of using a head mirror and know how to focus the light, Skill of using the different instruments in the ENT OPD as diagnostic tools (eg.Tongue depressor, nasal speculum, ear speculum),Skill to examine the Ear, Nose, Throat and Neck, Skill to identify and palpate the anatomical landmarks in ENT and neck, Skill to distinguish the types of hearing loss by tuning fork tests and Pure tone audiograms, Skill of performing of Valsalva manoeuvre, Skill of testing the functions of all cranial nerves , Skill to check for spontaneous nystagmus, Skill for doing the test for nasal patency, Observation of wax removal, Observe indirect laryngoscopy and Posterior Rhinoscopy Observation of removal foreign bodies from the ear and nose Observation of Performing Nasal packing, Observe Tracheostomy, Observe Adenotonsillectomy, Observe Myringoplasty, Observe Myringotomy, Observe Mastoidectomy, Observe Endoscopic sinus surgery. Observation of Puretone Audiometry, Observe Diagnostic nasal Endoscopy and Videolaryngoscopy.

DESIRABLE TO KNOW CATEGORY

Basic sciences:

Anatomy and physiology of Inner ear, equilibrium, Phonation, Anatomy of neck.

Diseases/ Conditions of ENT:

Examination of Nasopharynx and Larynx

Ear:

Sudden Sensorineural hearing loss, Noise induced hearing loss, Traumatic lesions of facial palsy, Causes of Vertigo, Differences between central and peripheral vertigo, Tinnitus, Acoustic Neuroma, Tumours of Middle ear and Mastoid, Screening of Neonatal hearing loss, Middle ear implants, Bone Anchored Hearing Aid (BAHA), Auditory Brain Stem Implants (ABI).

Nose:

Vasomotor Rhinitis, Carcinoma and other Neoplasms of the Para nasal sinuses, Carcinoma of Nasopharynx.

Oral cavity, pharynx, larynx & esophagus:

Diseases of salivary glands, Malignancy of Hypopharynx, Laryngeal paralysis (vocal cord palsy), diagnosis of voice disorders, Motility disorders of Oesophagus, corrosive Burns of Oesophagus.

Recent advances and miscellaneous:

Lasers in ENT, Sleep Apnea, Trauma to the face and neck, HIV manifestations in ENT, Community Programmes-Prevention of deafness-National Programme for Prevention and Control of Deafness (NPPCD), detection of congenital and childhood deafness.

PRACTICAL SKILLS

Skill of using the laryngeal mirror & post nasal mirror, skill of using Otoscope to visualize the ear drum and its mobility and able to distinguish a healthy and unhealthy ear drum and to differentiate safe and unsafe ear disease. Skill to clean the ear, doing a ear syringing. Skill to suction a tracheostomy Observation of Septoplasty, Oesophagoscopy, Rigid Bronchoscopy, Antral wash, Caldwell Luc surgery and Direct Laryngoscopy.

OTO-RHINO-LARYNGOLOGY (ENT)

Theory (one paper) - 40 marks (should contain one question on pre-clinical and para-clinical aspects, of 10 marks)

Oral (Viva)	10 marks
Clinicals	30 marks
Internal assessment (Theory-10 marks; Practical-10 marks)	20 marks
Total	100 marks

Pass: In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including oral and internal assessment (Theory) and minimum of 50% in Practicals / clinicals and internal assessment (Practicals).

OTO-RHINO-LARYNGOLOGY (ENT) – THEORY PAPER

Time: 2 hours

Max. Total 40 marks

Q1. Long Answer Question 10 Marks.

Q2. Short Answer Questions: 6 Short Notes of 5 marks each (30 marks).

Note: Long Answer Questions (LAQ) should be from must know area. Total number of SAQs is 6 of which 1 or 2 should be from desirable to know areas.

MODEL QUESTION PAPER:

OTO-RHINO-LARYNGOLOGY (ENT)

(Nose, Ear, Larynx, Pharynx)

ANSWER ALL QUESTIONS

Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 40

1. A 12 year old patient presented with complaints of bilateral otorrhoea of 4 years duration. The discharge was copious and mucoid. Discuss the diagnosis and management of the above patient. (5+5 = 10)

2. Write short notes on: (6X5 = 30)

- a. Rhinosporidiosis
- b. Little's area of septum
- c. Vocal cord nodules
- d. Acute retropharyngeal abscess
- e. Complications following adenoidectomy
- f. Laryngocoele

PRACTICAL EXAMINATION

TOTAL 30 MARKS

Long Case – 2 x 10 (20 minutes each) = 20 marks
Spotters* – 2 x 5 (5 minutes each) = 10marks
Total = 30 marks

***SPOTTERS:**

1. Audiogram charts

2. Clinical photographs-Facial palsy(LMN type), Vocal cord polyp/nodule, Peritonsillar abscess, Preauricular sinus, Post aural abscess, Perichondritis Pinna, Malignancy of oral cavity

VIVA

TOTAL 10 MARKS

Instruments-3 marks & Viva (ear, nose)-2 marks = 5 marks

X rays- 3 marks & Viva (larynx, pharynx, neck)-2 marks = 5 marks

OPHTHALMOLOGY

OPHTHALMOLOGY

GOAL

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

OBJECTIVES

Knowledge

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

1. Common problems affecting the eye.
2. Principles of management of major ophthalmic emergencies.
3. Main systemic diseases affecting the eye.
4. Effects of local and systemic diseases on patient's vision and the necessary action required to minimise the sequelae of such diseases;
5. Adverse drug reactions with special reference to ophthalmic manifestations;
6. Magnitude of blindness in India and its main causes;
7. National programme of control of blindness and its implementation at various levels.
8. Eye care education for prevention of eye problems.
9. Role of primary health centre in organization of eye camps.
10. Organization of primary health care and the functioning of the ophthalmic assistant.
11. Integration of the national programme for control of blindness with the other national health programmes;
12. Eye bank organization.

Skills

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

1. Elicit a history pertinent to general health and ocular status.
2. Assist in diagnostic procedures such as visual acuity testing, examination of eye, Schiotz tonometry, Staining for Corneal pathology, confrontation perimetry, Subjective

refraction including correction of presbyopia and aphakia, direct ophthalmoscopy and conjunctival smear examination and Cover test.

3. Diagnose and treat common problems affecting the eye;
4. Interpret ophthalmic signs in relation to common systemic disorders;
5. Assist/observe therapeutic procedures such as subconjunctival injection, Corneal/ Conjunctival foreign body removal, Carbolic cautery for corneal ulcers, Nasolacrimal duct syringing and tarsorrhaphy;
6. Provide first aid in major ophthalmic emergencies.
7. Assist to organise community surveys for visual check up;
8. Assist to organise primary eye care service through primary health centres;
9. Use effective means of communication with the public and individual to motivate for surgery in cataract and for eye donation.
10. Establish rapport with his seniors, colleagues and paramedical workers, so as to effectively function as a member of the eye care team.

Integration

The undergraduate training in Ophthalmology will provide an integrated approach towards other disciplines especially neurosciences, Otorhino-laryngology, General Surgery and Medicine.

CURRICULUM CONTENT

MUST KNOW CATEGORY

Introduction: Anatomy of the eye – including visual pathway, Extraocular muscles. Physiology – Aqueous humour formation, fields. Pharmacology –, modes of administration, Antibiotics, antivirals, antifungals, antiglaucoma drugs, mydriatics and cycloplegics, ocular toxicity of systemic, ocular medication. **Conjunctiva:** Acute Conjunctivitis, Trachoma, Allergic conjunctivitis, Pinguecula, Pterygium, Xerosis/bitot spots. **Cornea** - Corneal inflammations: Corneal Ulcers – bacterial, fungal, viral. Vitamin A Deficiency and keratomalacia. Exposure keratitis, Neuroparalytic keratitis. Corneal blindness, Eye banking, eye donation, Keratoplasty, Arcus senilis. **Sclera:** Scleritis, episcleritis. **Uveal tract:** Iridocyclitis, Panophthalmitis, Endophthalmitis. **Lens:** Age related cataract and its management, Congenital Cataract, Awareness of amblyopia, Diabetic Cataract, Cataract Surgery, complicated cataract, Metabolic, traumatic, toxic cataract, posterior capsular opacification. **Vitreous:** Vitreous hemorrhage – causes. **Glaucoma:** Angle Closure glaucoma, Open angle glaucoma, Lens induced glaucoma. **Retina:** Fundus changes in Diabetes, Hypertension, Pregnancy induced hypertension, Myopia. Management of diabetic retinopathy. Retinal Vascular diseases – Central retinal artery occlusion, Central retinal vein occlusion. Retinoblastoma. **Optic nerve:** Papilledema, Optic neuritis. **Squint:** Awareness of amblyopia. **Orbit:** Common causes of proptosis, Orbital cellulitis. **Lacrimal system:** Dacryocystitis – Congenital, Acute, Chronic. **Lids:** Inflammations, ptosis, lagophthalmos, symblepharon. **Refractive errors:** Myopia, hypermetropia, Astigmatism, Presbyopia, aphakia. **Injuries:** Chemical injuries and first aid treatment, clinical features of Open globe injuries and closed globe injuries. **Ophthalmic surgeries:** Must observe cataract surgery, pterygium surgery. **Community ophthalmology:** Definition and types of blindness. Causes of blindness. Promotion of eye donation. NPCB, Vision 2020, Eye camps. **Miscellaneous:** Symptomatic disturbances of vision.

DESIRABLE TO KNOW CATEGORY

Conjunctiva: Chronic conjunctivitis, Dry eye, Membranous conjunctivitis, Inclusion conjunctivitis. **Cornea:** Deep/Interstitial keratitis, Degenerations, Overview of Keratorefractive surgery. **Uveal tract:** Systemic associations of uveitis, Choroiditis, Coloboma iris. **Vitreous:** Synchysis syntillans, Asteroid hyalosis. **Glaucoma:** Secondary glaucomas, Congenital glaucoma. **Retina:** Retinopathy of prematurity, Retinitis pigmentosa. **Optic nerve:** Optic atrophy. **Squint:** Types of squint (Paralytic, Non paralytic). **Orbit:** Cavernous sinus thrombosis. **Lacrimal system:** Tear film and dry eye. **Lids:** Ectropion, entropion, trichiasis. **Refractive errors:** Anisometropia. **Injuries:** Intra ocular foreign body, medico legal aspects. **Ophthalmic surgeries:** Desirable to watch Keratoplasty, trabeculectomy. **Miscellaneous:** Overview of Recent Advances in Ophthalmology. Lasers in Ophthalmology.

PRACTICAL SKILLS

A student shall observe the following skills: To diagnose common ophthalmological conditions such as:-Trauma, Acute conjunctivitis, allergic conjunctivitis, xerosis, corneal ulcer, myopia, hypermetropia, cataract, glaucoma, ocular injury and sudden loss of vision; To diagnose ocular changes in common systemic disorders; To perform investigative procedures such as:-Tonometry, syringing, direct ophthalmoscopy, and fluorescein staining of cornea; Observe the following procedures:Ocular bandaging, Removal of concretions, Epilation, Corneal foreign body removal, Chalazion removal, Glaucoma surgery – assisted, Enucleation of eye in cadaver – assisted; Shall have full knowledge on available methods for rehabilitation of the blind.

OPHTHALMOLOGY – DISTRIBUTION OF MARKS

Theory (one paper) - 40 marks (should contain one question on pre-clinical and para-clinical aspects, of 10 marks)

Oral (Viva)	10 marks
Clinicals	30 marks
Internal assessment (Theory-10 marks; Practical-10 marks)	20 marks
Total	100 marks

Pass: In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including oral and internal assessment (Theory) and minimum of 50% in Practicals / clinicals and internal assessment (Practicals).

OPHTHALMOLOGY – THEORY PAPER

Time: 2 hours

Total 40 marks

Q1. Long Answer Question 10 Marks.

Q2. Short Answer Questions: 6 Short Notes of 5 marks each (30 marks).

Note: Long Answer Questions (LAQ) should be from must know area. Total number of SAQs is 6 of which 1 or 2 should be from desirable to know areas.

Anterior segment – 20 marks
Posterior segment & orbit – 15 marks
Refraction – 5 marks

MODEL QUESTION PAPER:

OPHTHALMOLOGY

ANSWER ALL QUESTIONS
Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 40

1. Describe symptoms, signs, complications and management of bacterial keratitis. Also write the differentiating features between bacterial and fungal corneal ulcers. (2+2+4+2= 10)

2. Write short notes on: (6X5=30)

- a) Congenital Glaucoma
- b) After cataract
- c) Myopia
- d) Chronic dacryocystitis
- e) Fundus changes in diabetic retinopathy
- f) Optic neuritis

CLINICAL EXAM

30 MARKS

2 cases - 10 marks each

Spotters - 10 marks

GENERAL MEDICINE

GENERAL MEDICINE

GOAL

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

OBJECTIVES

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

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

14. Respect patients' rights and privileges including patients' right to information and right to seek a second opinion.

15. Demonstrate empathy and humane approach towards patients and their families and respect their sensibilities.

16. Demonstrate communication skills in interviewing patients, providing explanations to patients and families about the management and prognosis, providing counseling and giving health education messages to patients, families and communities.

17. Have an open attitude to the developments in Medicine so as to be aware of the need to keep abreast of new knowledge.

18. Learn and adopt new ideas and new situations where resources may be limited.

19. Comprehend, accept and manage the uncertainties in scientific knowledge and medical practice.

20. Understand the ethical and legal implications of his/her medical decisions.

COURSE CONTENTS

MUST KNOW CATEGORY

Clinical methods in the practice of medicine:

A. Clinical approach to patients: The art of medicine, doctor-patient relationship, communication skills, and doctor's responsibilities.

B. Clinical approach to disease and care of patients: Clinical diagnostic reasoning i.e. diagnostic possibilities based on the interpretation of history, physical findings and laboratory investigations.

C. Principles of rational management: Keeping in mind the best evidence in favor of, or against different remedial measures (EBM).

Common symptoms of disease:

Pain: pathophysiology, clinical types, assessment and management. Fever: clinical assessment and management. Cough, wheezing, chest pain, dyspnoea, orthopnea, paroxysmal nocturnal dyspnea & hemoptysis. Edema, facial puffiness, anasarca and ascites. Pallor and jaundice. Bleeding-gum bleed, epistaxis, skin bleed and others. Anorexia, nausea and vomiting. Abdominal pain and distension. Constipation and diarrhea. Hematemesis, melena and hematochezia. Common urinary symptoms- dysuria, pyuria, anuria, oliguria, and loin pain. Polyuria, nocturia, and enuresis. Body pains and joint pains. Headache, seizures, fainting, syncope, dizziness, and vertigo. Disturbances of consciousness and coma. Weight loss and weight gain. Clinical genetics - common types, clinical presentation, investigation and prevention of genetic diseases and genetic counselling. Maternal disorders and pregnancy.

Nutrition and nutritional disorders:

Nutritional assessment and needs. Protein energy malnutrition. Obesity. Vitamin deficiency & excess. Mineral deficiency and excess. Diet therapy.

Fluid, electrolyte and acid base imbalance:

Fluid and electrolyte balance; acidosis and alkalosis in particular relevance to diarrhea, vomiting, dehydration, uremia and diabetic ketoacidosis.

Poisoning, stings and bites:

General approach to the poisoned patient. Poisoning by specific pharmaceutical agents-organophosphorus compounds, methyl alcohol, narcotics, aluminium phosphide, sedatives / hypnotics, and other poisonings that are common locally (e.g. yellow oleander). Drugs of misuse. Snake bite and Envenomation. Other bites and stings -scorpion and spider.

Specific environmental and occupational hazards:

Heatstroke and hypothermia. Chemicals and pesticides. Drowning and near drowning. Electrical injuries. Radiation injury. Heavy metal poisoning.

Immune response and infections:

Approach to infectious diseases-diagnostic and therapeutic principles. Immune defence mechanisms. Laboratory diagnosis of infections. Principles of immunization and vaccine use. Immunodeficiency disorders-acquired. Clinical syndromes -diagnostic and therapeutic approach. The febrile patient. Fever and rash. Fever of unknown origin. Infective endocarditis. Intra-abdominal infections and abscesses. Acute infectious diarrhoeal diseases and food poisoning. Sexually transmitted diseases-overview and clinical approach. Infections of skin, muscle & soft tissues. Osteomyelitis. Hospital acquired infections. Infections in immuno-compromised hosts.

Specific infections-epidemiology, clinical features, laboratory diagnosis, rational use of antimicrobial therapy against the following and their prevention

Protozoal infections: Amoebiasis, Giardiasis, Malaria, Leishmaniasis Trichomoniasis, Toxoplasmosis, and Trypanosomiasis.

Bacterial infections: Common gram positive infections. Common gram-negative infections. Enteric fever. Tetanus. Cholera. Shigellosis and bacillary dysentery. Leptospirosis. Helicobacter pylori. Infections due to pseudomonas & other gram- negative bacteria. Anaerobic infections.

Mycobacterial infections: Tuberculosis, Leprosy.

Viral infections: Common exanthemata e.g. Measles, mumps, rubella, and varicella. Herpes simplex and herpes zoster. Influenza and other common viral respiratory infections. Human immunodeficiency virus (HIV). Viral gastroenteritis. Dengue fever. Rabies.

Other organisms: Rickettsia, Mycoplasma and Chlamydial diseases.

Common fungal infections: Candidiasis, Aspergillosis, Histoplasmosis, Cryptococcosis, Mucormycosis, and Pneumocystis jirovecii.

Common parasitic infestations: Hookworm, roundworm, and thread worm.

Cardiovascular system:

Clinical examination of the cardiovascular system. Functional anatomy, physiology and investigations. Major manifestations of cardiovascular disease- Chest pain, breathlessness, palpitation, acute circulatory failure (cardiogenic shock), presyncope and syncope, Cardiac arrest and sudden cardiac death, abnormal heart sounds and murmurs. ECG, x ray chest with reference to common cardiovascular diseases. Acute and chronic congestive cardiac

failure. Rheumatic fever and rheumatic heart disease. Valvular heart disease. Infective endocarditis. Coronary artery disease. Common congenital heart disease in the adults: ASD, VSD, and PDA. TOF and coarctation of aorta. Cor pulmonale. Hypertension and hypertensive heart disease. Common cardiac arrhythmias. Deep vein thrombosis. Atherosclerosis and peripheral vascular disease. Pericardial disease: pericardial effusion and cardiac tamponade.

Respiratory system:

Clinical examination of the respiratory system. Respiratory physiology and diagnostic investigations- x ray chest, sputum examination, pulmonary function tests. Cough, dyspnoea, wheezing, chest pain, haemoptysis, the solitary radiographic pulmonary lesion, acute and chronic respiratory failure. Upper respiratory infections. Pneumonias. Bronchial asthma. Chronic obstructive pulmonary disease. Pulmonary tuberculosis: different presentations. Suppurative lung diseases: bronchiectasis and lung abscess. Pleural diseases- effusion, empyema, and pneumothorax. Interstitial and infiltrative lung diseases. Common occupational lung diseases. Tumors of the bronchus and lung. Pulmonary vascular diseases - Pulmonary hypertension & pulmonary thromboembolism. Acute respiratory distress syndrome.

Renal and genitourinary system:

Renal physiology and common renal function tests: urine examination, renal function tests and common imaging methods. Major manifestations of renal and urinary tract disease: Dysuria, pyuria, urethral symptoms, disorders of urine volume, hematuria, proteinuria, oedema, incontinence and obstruction of the urinary tract. Acute kidney injury. Chronic kidney disease. Urinary tract infections and pyelonephritis. Glomerulonephritides and nephrotic syndrome. Renal involvement in systemic disorders. Drugs and the kidney.

Gastrointestinal tract:

Clinical examination of the abdomen. Basic investigations: stool examination, role of imaging, endoscopy and tests of functions. Abdominal pain (acute and chronic), dysphagia, dyspepsia, vomiting, constipation, diarrhea, abdominal lump, weight loss, gastrointestinal bleeding-upper and lower and approach to the patient with gastrointestinal disease. Diseases of the mouth and salivary glands- oral ulcers, candidiasis and parotitis. Diseases of the oesophagus- GERD, other motility disorders, oesophagitis, carcinoma oesophagus. Diseases of the stomach and duodenum-gastritis, peptic ulcer disease and tumors of stomach. Disease of small & large intestine-Acute gastroenteritis & food poisoning, acute, sub-acute and chronic intestinal obstruction, inflammatory bowel disease. Malabsorption syndrome. Bacillary dysentery, amoebic colitis, ulcerative colitis. Irritable bowel syndrome. Abdominal tuberculosis: peritoneal, nodal, and gastrointestinal.

Disease of pancreas:

Acute and chronic pancreatitis.

Hepatobiliary disease:

Clinical examination of the abdomen for liver and biliary disease. Functional anatomy, physiology, liver function tests, basics of role of imaging of the hepatobiliary disease. Major manifestations of liver disease-Asymptomatic abnormal liver function tests, Jaundice, Acute (fulminant) hepatic failure, Portal hypertension and ascites and Hepatic (porto-systemic encephalopathy). Liver abscess- amoebic & pyogenic. Acute and chronic hepatitis-viral and toxic. Alcoholic liver disease. Cirrhosis of liver and chronic liver disease. Acute and chronic cholecystitis, and cholelithiasis.

Endocrine and metabolic diseases:

Diabetes mellitus: etiopathogenesis, diagnosis, management, recognition of acute and chronic complications, and immediate management of acute complications, special problems in management. Hypo and hyperthyroidism-major manifestations, recognition, interpretation of thyroid function tests. Iodine deficiency disorders. Cushing's syndrome and Addison's disease – recognition. Calcium and phosphorus metabolism: parathyroid and metabolic bone disease.

Hematological disorders

Definition, prevalence, etiological factor, pathophysiology, pathology, recognition, investigations and principles of treatment of: Anemias: iron deficiency, megaloblastic and common haemolytic anemias (thalassemia, sickle cell and acquired hemolytic). Common bleeding disorders (thrombocytopenia and hemophilia). Agranulocytosis and aplastic anemia.

Leukemias: Recognition, diagnosis, differential diagnosis and broad principles of management.

Lymphomas: Recognition, diagnosis, differential diagnosis and broad principles of management.

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. Disorders of coagulation and venous thrombosis. Bone marrow transplantation/stem cell transplantation.

Disorders of the immune system, connective tissue and joints:

Introduction to the immune system and autoimmunity. HIV, AIDS and related disorders. Recognition of major manifestations of musculoskeletal disease: Joint pain, bone pain, muscle pain and weakness, regional periarticular pain, back and neck pain. Approach to articular and musculoskeletal disorders. Inflammatory joint disease. Infectious arthritis. Systemic connective tissue diseases – systemic lupus erythematosus, rheumatoid arthritis, progressive systemic sclerosis. Sarcoidosis. Amyloidosis. Musculoskeletal manifestations of disease in other systems.

Neurological diseases:

Clinical examination of nervous system. Functional anatomy, physiology and investigations: EEG, basics of brain and spinal cord imaging. Major manifestations of nervous system disease: Headache and facial pain, raised intracranial tension, faintness, dizziness, syncope & vertigo, sleep disorders, disorders of movement, ataxia, sensory disturbances (numbness, tingling and sensory loss), acute confusional states, coma and brain death, aphasia, and other focal cerebral disorders, speech, swallowing and brain stem disturbance, visual disturbances, and sphincter disturbances. Migraine and cluster headaches. Seizures and epilepsy. Cerebrovascular disease. Dementias including Alzheimer's disease. Acute and chronic meningitis. Diseases of cranial nerves. Diseases of spinal cord - transverse myelitis and cord compression. Cerebellar disorders. Peripheral neuropathy. Neurological manifestations of system diseases. Nutritional and metabolic diseases of the nervous system. Recognition of brain death.

Clinical pharmacology and therapeutics:

Principles of drug therapy. Adverse drug reactions. Drug interactions. Monitoring drug therapy. Rational prescription writing. Concept of essential drugs.

Critical care medicine:

Physiology of the critically ill patient. Recognition of major manifestations of critical illness- circulatory failure, shock, respiratory failure, renal failure, coma, sepsis, and disseminated intravascular coagulation. General principles of critical care management. Ethical issues related to critical care.

Pain management and palliative care:

General principles of pain. Assessment and treatment of pain.

Geriatrics:

Principles of Geriatric Medicine. Normal ageing. Clinical assessment of frail elderly. Decisions about investigations and rehabilitation. Major manifestations of diseases in elderly. Special issues for care of elderly.

Medical ethics:

Principles of medical ethics- Beneficence, non-maleficence, patient autonomy, equity. Different concepts- health ethics, bioethics and public health ethics. Brief introduction to perspectives of medical ethics: Hippocratic Oath, declaration of Helsinki, WHO declaration of Geneva, International code of Medical Ethics (1983), Medical Council of India Code of Ethics. Ethics of the individual: Confidentiality, physician-patient relationship, patient autonomy, organ donation. Death and dying, and Euthanasia. Ethics of human life: In vitro fertilization, prenatal sex-determination, surrogate motherhood, genetic engineering. Professional ethics: Code of conduct, fee charging and splitting, and allocation of resources in health care. Family and society in medical ethics: Family planning, Care of terminally ill/dying patient. Ethical work up of cases: Gathering information, gain confidentiality, shared decision making, informed consent. Research ethics: animal and experimental research, human experimentation, informed consent, and drug trials. Practice of universal precautions. Bio medical waste: types, potential risks and their safe management. PEP Prophylaxis. Hand washing.

Medical psychiatry:

Classification of psychiatric disorders. Aetiological factors in psychiatric disorders. The clinical interview and mental state examination.

Major manifestations of psychiatric illness: Disturbed and aggressive behaviour. Delusions and hallucinations. Depressive Symptoms. Anxiety symptoms. Deliberate self-harm and suicidal ideation. Alcohol misuse and withdrawal. Medically unexplained physically symptoms and functional somatic syndromes. Psychiatric and psychological aspects of chronic and progressive disease.

Clinical syndromes: Organic brain syndromes. Substance abuse-Alcohol and drugs. Bipolar disorders. Depressive disorders. Schizophrenia.

Treatments used in psychiatry: Psychological treatments. Physical treatments.

Neurotic, stress-related somatoform disorders: Anxiety. Obsessive compulsive disorders. Dissociative disorders. Sleep disorders. Legal aspects of psychiatry.

DESIRABLE TO KNOW CATEGORY

Immune response and infections:

Immunodeficiency disorders- congenital.

Specific infections-epidemiology, clinical features, lab diagnosis, rational use of antimicrobial therapy against the following and their prevention

Bacterial infections: Pertussis and diphtheria, Legionella infections, Botulism, Gas gangrene and clostridial infections, Brucellosis, Plague, Donovanosis (Granuloma inguinale).

Viral infections: Infectious mononucleosis, Viral encephalitis.

Cardiovascular system

Aortic aneurysm, Myocarditis and cardiomyopathy.

Respiratory system:

Bronchoscopy, Obstructive sleep apnoea. Diseases of the nasopharynx, larynx and trachea. Diseases of the mediastinum, diaphragm and chest wall.

Renal and genitourinary system:

Congenital abnormalities of the kidneys and urinary system. Tubulo-interstitial diseases. Renal vascular diseases. Urinary tract calculi and nephrocalcinosis. Tumors of the kidney and genitourinary tract. Renal replacement therapy-Basics.

Gastrointestinal tract:

Tumors of small intestine. Tumors of the colon & rectum. Ischaemic gut injury. Anorectal disorders.

Diseases of the peritoneal cavity: acute and chronic peritonitis.

Disease of pancreas:

Tumors of the pancreas.

Hepatobiliary disease:

Hepatorenal failure/syndromes. Fatty liver and non alcoholic steatohepatitis. Infiltrative diseases of liver. Tumors of gall bladder and bile ducts.

Endocrine and metabolic diseases:

Pituitary disorders: Acromegaly and Sheehan's syndromes. Hypogonadism. Hypopituitarism and hyperpituitarism. Hypothalamic disorders. Hypoparathyroidism and hyperparathyroidism.

Disorders of the immune system, connective tissue and joints:

Primary immune deficiency diseases. Inflammatory muscle disease. Osteoarthritis. Vasculitides. Ankylosing spondylitis, reactive arthritis and undifferentiated spondyloarthropathy. Diseases of bone.

Neurological diseases:

Viral encephalitis. Intracranial tumours. Multiple sclerosis and other demyelinating diseases. Parkinson's disease and other extrapyramidal disorders. Motor neuron disease. Myasthenia gravis and other diseases of neuromuscular junction. Diseases of muscle.

Critical care medicine:

Scoring systems of critical care. Outcome and costs of intensive care.

Pain management and palliative care: Palliative care.

Medical psychiatry: Misuse of drugs other than alcohol.

MEDICINE - DISTRIBUTION OF MARKS

Theory: Two papers of 60 marks each 120 marks

Includes Paper I- Systemic Medicine and Paper II- Systemic Medicine including Infectious, Tropical Medicine, Psychiatry and Dermatology. Shall contain one question on basic sciences and allied subjects.

Oral (Viva) Interpretation of X-ray ECG, etc.	20 marks
Clinical	100 marks
Internal assessment (Theory -30; Practical-30)	60 marks
Total	300 marks

Pass: In each of the subjects a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in practicals/clinicals.

MEDICINE THEORY PAPER

Paper I (Systemic Medicine) 60 marks

Time: 3 hours

Section A

Q1. Long Answer Question 10 marks (must be structured)

Q2. Short Answer Questions: 4 Short Notes of 5 marks each (20 marks)

Section B

Q1. Long Answer Question 10 marks (must be structured)

Q2. Short Answer Questions: 4 Short Notes of 5 marks each (20 marks)

Paper II (Systemic Medicine including Infectious, Tropical Medicine, Psychiatry and Dermatology) 60 marks

Time: 3 hours

Section A

Q1. Long Answer Question 10 marks (must be structured)

Q2. Short Answer Questions: 4 Short Notes of 5 marks each (20 marks)

Section B

Q1. Long Answer Question 10 marks (must be structured)

Q2. Short Answer Questions: 4 Short Notes of 5 marks each (20 marks)

Note: Long Answer Questions (LAQ) should be from must know area. Total number of short notes is 16 of which 4 or 5 should be from desirable to know areas.

Only one question from Psychiatry and Dermatology each is permissible, which should be from must know area.

MODEL QUESTION PAPERS:

GENERAL MEDICINE PAPER I
(Systemic Medicine)

ANSWER ALL QUESTIONS
Each Section to be answered in separate Answer Book
Illustrate your answer with suitable diagrams

Time: 3 hours

Maximum marks: 60

SECTION A

1. Discuss briefly the aetiology, Clinical Features, Complications and management of Infective Endocarditis (2+3+2+3 = 10)
2. Write short notes on: (4 x 5 = 20)
 - a) Secondary Hypertension
 - b) Diagnosis and Clinical features of Chronic Renal Failure
 - c) DOTS
 - d) Precipitating factors and management of hepatic encephalopathy.

SECTION B

3. A 25 year old female patient came with history of sudden onset of weakness of the right half of the body (3+3+4=10)
 - a. What is your diagnosis and possible causes in this young patient?
 - b. How will you arrive at the diagnosis?
 - c. How will you manage this patient?
4. Write short notes on: (4 x 5 = 20)
 - a) Immunological markers of Hepatitis 'B' infection and their significance
 - b) Clinical features and management of cushings syndrome.
 - c) Classification and aetiology of Portal Hypertension
 - d) Aetiology and diagnosis of Nephrotic syndrome

GENERAL MEDICINE PAPER II

((Systemic Medicine including Infectious, Tropical Medicine, Psychiatry and Dermatology)

ANSWER ALL QUESTIONS
Each Section to be answered in separate Answer Book
Illustrate your answer with suitable diagrams

Time: 3 hours

Maximum marks: 60

SECTION A

1. Describe briefly the pathogenesis, clinical features and management of Diabetic Ketoacidosis. (3+4+3 = 10)
2. Write short note on: (4 x 5 = 20)
 - a) A man has been bitten by a stray dog on his face. The wound is lacerated. Outline

the management

- b) Classification of Hansen's Disease
- c) Management and extra articular complications of Rheumatoid Arthritis
- d) Sex linked recessive inheritance

SECTION B

3. A 22 year old female patient has been brought to the hospital with alleged history of ingestion of an insecticide. Her pupils are small (pin point) and she has profuse sweating.

(3+4+3 = 10)

- a) What is your diagnosis? What other signs do you look for in this patient?
- b) Outline the management of this case
- c) What complications can occur in this patient?

4. Write short notes on:

(4 x 5 = 20)

- a) Bipolar disorder
- b) Complications of Falciparum Malaria
- c) Clinical feature and management of Swine flu
- d) Immune mediated acute transfusion reaction

PRACTICAL PAPER

Practical marks = 100

- 1. Long case – 40 marks (45 minutes)
- 2. Short cases – 2x25=50 (20 minutes each)
- 3. OSCE stations – 2x5=10 (5 minutes each)

LONG CASE

1. The long case can be taken from any system- CNS, cardiovascular and respiratory and the abdomen. Students are expected to take a detailed history, examine the patient, give a provisional diagnosis (anatomical, morphological and etiological) and differential diagnosis, and formulate a management plan (relevant investigations and appropriate therapy, empirical or definitive).

2. The candidate should write a case sheet with the above details, present the history and examination details to the examiners, and justify the rationale for the diagnosis and management. Time allotted for the long case will be 45 minutes.

3. The ability to defend their diagnosis, depth and extent of his/her knowledge regarding the patient and the candidate's qualities such as confidence and attitude should be assessed.

Topics:

Nervous system - Cerebrovascular accident (Anterior circulation- cortical and capsular hemiplegia) Spastic paraparesis.

Cardiovascular system - Valvular heart disease (mitral/aortic), Infective endocarditis (subacute) Dilated Cardiomyopathy with atrial fibrillation, Valvular heart disease with atrial fibrillation, Right heart failure with anemia/jaundice, VSD with heart failure, Tetralogy of Fallot.

Respiratory system - Cor pulmonale with COPD, Bronchiectasis, Resolving pneumonia/consolidation, Interstitial lung disease, Fibrocavitary disease (Tuberculosis), Pleural effusion (Infective/non infective), Hydropneumothorax.

Abdomen/Lymphoreticular - Anemia+ hepatosplenomegaly, Generalised lymphadenopathy+ anemia, Generalised lymphadenopathy +bleeding, Lymphadenopathy+hepatosplenomegaly, Jaundice+ hepatosplenomegaly, Anasarca+ anemia/jaundice, Anasarca +hypertension, Jaundice +Ascites, Ascites +early encephalopathy, Ascites +pleural effusion.

SHORT CASE

Candidates are allowed to take a very short succinct history to justify the diagnosis, instead of having no history at all, since medical examination always follows history. The time for the two semi-long cases will be 40 minutes (2 x 20). **Case sheet writing is not necessary.**

Topics:

Systemic - Acute febrile illness, Fever with splenomegaly (mild), Fever with hepatomegaly, Fever with exanthema, Acute gastroenteritis/ diarrhea, Dengue fever, Scrub typhus-eschar with fever Chikungunya-acute fever with arthritis.

Cardiovascular – Hypertension, Hypertensive urgency, Hypertension with edema/ facial puffiness Rheumatic fever, Coronary artery disease (stable angina), Peripheral artery disease, VSD, Single valve disease (MS/MR/AS/AR), Pulmonary hypertension.

Hematological/Lymphoreticular- Localised lymphadenopathy, Anemia-IDA/ Megaloblastic/ Hemolytic, Massive splenomegaly.

Musculoskeletal - Rheumatoid arthritis hand, SLE.

Nervous system - Cranial nerve examination, CN 2,3,4 and 6, CN 7, CN 9 and 10, Radial nerve palsy, Claw/ape hand, Small muscle wasting (hand), Foot drop, Peripheral neuropathy, Motor system examination, Cerebellar system examination, Seizure disorder, Parkinsonism, Meningitis, recovering.

Skin - Cellulitis(infective/filarial), Psoriasis, Hansen's disease, Tinea versicolor, Herpes zoster, SLE rash, Oral candidiasis, Pellagra, Scabies with complications.

Environmental - Snake bite/cellulitis, Scorpion sting/pain/cellulitis, Needle stick injury, STD exposure Yellow oleander poisoning, Rodenticide poisoning.

Other emergencies- Alcohol withdrawal syndrome (ADS/AWS).

Endocrinology – Hypothyroidism, Hyperthyroidism, Hypoglycemia, Diabetes mellitus (DM), DM with edema, DM with trophic ulcer/neuropathic pain, DM with claudication, DKA recovering, Obesity/acanthosis, Obesity/hirsutism.

Respiratory – COPD, Bronchial asthma, URI with fever/ influenza.

OSCE

Respiratory - Chest AP/Transverse diameter, Chest expansion, Palpation of chest movements, Percussion of lung areas, Shifting dullness, Tidal percussion, Auscultation of lung areas.

Abdomen - Splenomegaly palpation, Splenomegaly percussion, Liver palpation, Liver span, Free fluid abdomen, Shifting dullness, Fluid thrill

Nervous system - Cranial nerve palsy (2,3, 4,5 6,7,11, 12), Power grading of any limb, Reflexes (DTRs; Plantar; Abdominal reflex; Cremasteric reflex), Joint position sense, Rombergs test, Wartenburg test, Hoffman sign, Glabellar tap, Cog wheel rigidity, Meningeal sign (Kernig/Brudzinski).

RESPIRATORY MEDICINE

RESPIRATORY MEDICINE

GOAL

The aim of teaching the undergraduate student in Tuberculosis and Chest Diseases is to impart such knowledge and skills that may enable him/her to diagnose and manage common ailments affecting the chest with the special emphasis on management and prevention of Tuberculosis and especially National Tuberculosis control programme.

OBJECTIVES

Knowledge

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

1. Demonstrate sound knowledge of common chest diseases, their clinical manifestations, including emergent situations and of investigative procedures to confirm their diagnosis.
2. Demonstrate comprehensive knowledge of various modes of therapy used in treatment of respiratory diseases;
3. Describe the mode of action of commonly used drugs, their doses, side-effects/toxicity, indications and contra-indications and interactions;
4. Describe commonly used modes of management including medical and surgical procedures available for treatment of various diseases and to offer a comprehensive plan of management inclusive of National Tuberculosis Control Programme.

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-ray and respiratory

function test;

4. Interpret and manage various blood gases and PH abnormalities in various respiratory diseases.

5. Manage common diseases recognizing need for referral for specialized care, in case of inappropriateness of therapeutic response;

6. Assist in the performance of common procedures, like laryngoscopic examination, pleural aspiration, respiratory physiotherapy, laryngeal intubation and pneumo-thoracic drainage/aspiration.

Integration

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

COURSE CONTENTS

MUST KNOW CATEGORY

Tuberculosis:

Students must know the following aspects of tuberculosis: Clinical signs and symptoms of pulmonary TB and extra pulmonary TB (pleura, lymph node, pericardium, mediastinum, abdominal, nervous system, genitourinary and skeletal tuberculosis. Laboratory diagnosis of Tuberculosis – microscopy, culture, X-rays & molecular diagnosis. Treatment of TB including drugs, dosages, adverse effects. TB in special situations (HIV, DM, pregnancy, cirrhosis liver, chronic renal failure). Management of drug susceptible tuberculosis under RNTCP.

Airway diseases:

Asthma, COPD, bronchiectasis.

Pneumonias including lung abscess

Pleural diseases:

Effusion, empyema, pneumothorax

Respiratory emergencies:

Management of acute severe asthma, hemoptysis, tension pneumothorax, pulmonary embolism, acute respiratory failure and interpretation of ABG's.

Occupational lung diseases:

Coal workers' pneumoconiosis(CWP), Silicosis, hypersensitivity pneumonitis.

DESIRABLE TO KNOW CATEGORY

Pulmonary function tests ie. Spirometry. Lung cancer. Interstitial lung diseases. Obstructive sleep apnea.

PRACTICAL SKILLS

Learning Objectives for clinical posting (2 weeks): At the end of the posting the student should know the following: Discuss Respiratory symptoms – Cough, Sputum, Hemoptysis, Breathlessness, Chest pain. Broncho – Pulmonary Segments. Surface Markings of Lungs, Pleura, Oblique fissure, and Horizontal fissure. Examination of respiratory system by inspection, palpation, percussion and auscultation. Inhalation Therapy - advantages & devices. Approach to a Chest Symptomatic. ZN Staining and Reporting. Mantoux test – procedure, interpretation, false negative causes. Indications for bronchoscopy. Chest X-ray description of – pleural effusion, pneumothorax, hydro-pneumothorax, cavity, consolidation, bronchiectasis, pancoast tumour.

PSYCHIATRY AND BEHAVIOURAL SCIENCES

PSYCHIATRY AND BEHAVIOURAL SCIENCES

BEHAVIOURAL SCIENCES

OBJECTIVES

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

1. Understand the nature and development of different aspects of normal human behaviour like learning, memory, motivation, emotion, personality and intelligence
2. Recognise differences between normal and abnormal behaviour.
3. Understand how psychological and social factors influence human behaviour throughout his life cycle, and how they affect his response to health and illness.
4. Conduct psychosocial evaluation of the patient in respect to attributes like socio-economic status; attitude to health and disease and health services.
5. Establish harmonious doctor-patient relationship.
6. Communicate effectively with patient, his family and community.
7. Possess and utilise the knowledge and skills of behavioural sciences / techniques for adoption of health practices.

COURSE CONTENTS

MUST KNOW CATEGORY

Introduction to types of behavioural sciences: sociology, psychology, anthropology relevant to health and disease. Family studies : role of family in health and disease. Illness and health: Mores about health and illness. Socio-economic status: Relationship of socio-economic status with health and mental illness. Communication skills: interview techniques, methods of communication with patients and their relatives, role of communication in interpersonal relationship. Methods of social work: social case work. Introduction to psychology – Basis of human behaviour, application of psychology to medicine. Human development: Infancy to adolescence: Stages of development and individual differences. Human development: adulthood to old age – development tasks of adulthood and old age; adjustment problems of old age. Personality development : types of personality and pre-morbid personality and its relationship with illness and behaviour. Death and dying:

Reactions of terminally ill patient and family; breaking news of fatal illness /death to the family. Learning and conditioning: Nature of learning; performance role of motivation in learning and methods to make learning effective. Cognitive process: Sensory process-attention, perception, sensation and thinking; sensory process and psychopathology; problem solving decision making and communication in thinking process; salient features of abnormal thinking. Emotion: relationship of emotion to illness. Intelligence: Nature of intelligence; role of genetic and environmental influences in intelligence. Behavioural medicine: behavioural aspects applied to illness. Coping and stress: different stressors and their effects. Doctor- patient relationship. Illness behaviour. Psychological methods of treatment: counselling. To be aware of the security aspects as per the demands of the situation, region: Security of the person, the citizen; physical trauma; Psychological trauma; 'psychological support and first aid-psychological support during disasters.

DESIRABLE TO KNOW CATEGORY

Attitudes : Nature and development of attitudes. Introduction to types of behavioural sciences :Aspects of health, economics and management sciences. Family studies: Types of families: structure and functioning; social problems. Illness and health: Beliefs, customs, norms. Socio-economic status: Measurement of socio-economic status. Communication skills: Communication medias. Methods of social work: social group work and community organisation. Introduction to psychology – Role of nature vs. nurture in shaping. Human behaviour. Human development: Infancy to adolescence: Behavioural expectancies and problems. Human development: adulthood to old age – adjustment in old age to old age diseases. Learning and conditioning: Learning of adaptive and maladaptive behaviours; Various learning methods like association, cognitive, verbal, motor and social. Cognitive process: Methods of improving memory; forgetting and its determinants; thinking process-concept formation; role of language. Emotion: Development of emotive behaviour and its physiological basis. Intelligence: Assessment of intelligence in clinical setting; growth of intelligence from birth to old age. Behavioural medicine: Methods of behavioural treatment for psychosomatic diseases. Coping and stress: Methods of adaptive and maladaptive coping and stress management. Illness behaviour: Sick role; role of socio- cultural background in illness behaviour. Attitudes: theories and methods to change attitudes; measurement of attitudes. Optimal Communication with one another in team and with patients and their families, regarding security of the citizen, as per the demands of the region and situation. Social security: Social assistance and social insurance; social security schemes. To be aware of the disasters man-made or natural and the preparedness to disaster & management of disasters in team-work paradigm. Mock-drill participation in disaster, in team work paradigm, behavioural aspects.

PRACTICAL SKILLS

- 1. Perform independently** - Behavioural changes in Anxiety; Normal Anxiety and Generalised Anxiety Disorder. Detection of unhappiness, hopelessness, helplessness, worthlessness. Meaning of Bio-psycho-social in Causation and in Interventional Approaches.
- 2. Perform under Supervision** – Understanding Normal and abnormal behaviour, Unconscious, Subconscious, Conscious mind; Id, Ego, Superego (Psychoanalytic Approaches) Behavioural Analysis.

PSYCHIATRY & DRUG / ALCOHOL DE-ADDICTION

OBJECTIVES

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

1. Able to identify signs and symptoms of common psychiatric illnesses.
2. Able to identify developmental delays including Cognitive delays.
3. Aware of common psychopharmacological interventions in Psychiatry.

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

COURSE CONTENTS

MUST KNOW CATEGORY

Substance Abuse. Ask about alcohol use, identify problem drinking, educate and advise, refer appropriately. Depression and Anxiety disorders Ask about Depression and Anxiety, Diagnose depression, assess suicide risk, educate and advise, prescribe rationally and discuss referral. Unexplained Physical complaints Identify Physical symptom without Medical cause, Elicit stress and coping related Information, Educate, Reassure and refer appropriately. Cognitive Delays Identify developmental delay, Basic education and advise, Discuss referral. Sleep Educate regarding Sleep Hygiene, Prescribe rationally, Look for other psychiatric Possibilities Mental functions: primary and higher Elicit signs and symptoms of delirium. Identify Early Cognitive decline Educate family, Plan referral. Agitated/Violent patient Emergency management keeping forensic and transportation needs in mind. Psychoses - Identify, provide immediate care and refer. Educate regarding Continued care in discussion with the psychiatrist. Concept of mental hygiene and Mental Health promotional issues related to Death and Dying Breaking Bad news, Eliciting reactions and support. Signs and symptoms of Alcoholism, Its Medical and Psychosocial impact, treatments available. Signs and symptoms of common mental illnesses- Depression, anxiety, somatoform disorders including conversion disorders and psychoses, dementia. Common antidepressants and tranquilisers. Basic Counselling Principles. Child Development and Common developmental disorders. Interplay of Psychological and Physical aspects in Medical presentations. Common causes of delirium, behavioural management and safe sedation methods. Forensic aspects of violence, attempted suicide and suicide.

DESIRABLE TO KNOW CATEGORY

Prevalent Social and Psychological concepts around death and dying. WHO Primary care classification of mental disorders. Psychosocial barriers to Help-Seeking for mental illnesses. Educational and Statutory provisions regarding psychiatric illnesses and disability. Principles of Psycho-education. Basic psychotherapeutic skills. Mass hysteria, PTSD. Chronic Organic Brain Syndrome (Dementia). Issues related to Death and Dying Breaking Bad news, Eliciting reactions and support

PRACTICAL SKILLS

- 1. Perform independently** - Psychiatric history taking. Mental status examination (primary mental functions). Mental status examination (higher mental functions).

Diagnosis of common straight forward. Psychiatric disorders. Mental Hygiene. Sleep Hygiene. Brief Psychotherapy. Counselling. Suspect clinically and refer to the speciality(Psychiatrist)allied speciality (like, neurologist). Behavioural and psychological analysis of Self Destructive Behaviour. Initial and primary care for the children and adolescents and then refer to the psychiatrist/ child & Adolescent psychiatrist/ Geriatric Psychiatrist. Exercising empathy , compassion and establishing rapport and maintaining rapport, which is a must for all psychiatric interventions (need not necessarily in a long term psycho-therapeutic contract).

2. Perform under Supervision - Dealing with PTSD. Developmental delay assessment. Geriatric Mental status examination (Primary and higher mental functions).

3. Assist the expert - Dealing with Mass Hysteria. Child Psychiatric history taking. Child and Adolescent Mental status examination (Primary and higher mental functions). Geriatric History taking. Terminal care. Psychotherapeutic and behaviour modification approaches for treating neurotic disorders.

4. Observe - Physical Methods of Treatment (E.g. ECT – Electro Convulsive Therapy). Abreaction.

DERMATOLOGY

DERMATOLOGY

OBJECTIVES

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

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

COURSE CONTENTS

MUST KNOW CATEGORY

Skin Infections: Bacterial - including Leprosy and STD, Viral - including Retroviral diseases, Fungal infestations – Scabies, Pediculosis. **Nutritional Disorders:** Pellagra, Riboflavin deficiency, Vitamin A deficiency. **Allergies:** Drug induced – such as acute urticaria, angioedema, drug rash. FDE, Erythema Multiforme, Maculopapular rash, SJ Syndrome. Environmental – contact dermatitis. Constitutional – atopic dermatitis, eczema and seborrhoeic dermatitis. **Dermatological emergencies:** (Diagnosis and Referrals) -Toxic Epidermal Necrolysis. Other common skin diseases – Acne Vulgaris, Lichen Planus. Psoriasis, Vitiligo, Melasma, Herpes Zoster.

DESIRABLE TO KNOW CATEGORY

Pemphigus vulgaris and its variants. Erythroderma. Staphylococcal Scalded Skin Syndrome.

PRACTICAL SKILLS

1. Perform independently - Good and complete skin examination including hairs and nails. Good and complete examination of the genitalia, and oral mucosa. **Leprosy:** Must be able to demonstrate anaesthesia in patches and extremities. Demonstration thickened nerves. Classify and manage Hansen's disease and differentially diagnose a hypopigmented patch. Clinically identify Type I and Type II Reactions in Leprosy and manage acute reactions. Prevent deformities in Leprosy, through counseling etc. Care of

deformities in limbs and ulcer care. **STD syndromes:** Syndromic management, HIV counselling, Contact tracing, Treatment of contacts, Skills for various compresses.

2. Perform under Supervision - Incision and drainage. Molluscum contagiosum and Warts removal techniques. Management of allergies. Perform Bedside diagnostic tests: Tzanck smear Tissue Smear Gram staining.

3. Assist the expert - Management of Dermatological Emergencies. Slit smear for AFB.

4. Observe - Dark Ground Microscopy. Skin Biopsies. **LASERs Handling:** PUVA Therapy including Narrow Band UVB therapy. Chemical peels. Patch Testing. Minor Dermatological surgical procedures.

PAEDIATRICS

PAEDIATRICS

GOALS

The broad goal of the teaching of undergraduate students in Pediatrics is to acquire adequate knowledge and appropriate skills for optimally dealing with major health problems of children to ensure their optimal growth and development.

OBJECTIVES

Knowledge & Skills

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

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

including neonates.

Integration

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

COURSE CONTENTS

MUST KNOW CATEGORY

Vital Statistics:

Maternal, Perinatal, neonatal, infant and preschool mortality rates. Current National programs such as ICDS, RCH, Vitamin A prophylaxis, IDA, IDD, AFP, UIP, Pulse polio, ARI, Diarrhea Control Program, etc.

Growth and Development:

Normal growth from conception to maturity. Anthropometry: measurement and interpretation of weight, length/height, head circumference, mid-arm circumference. Use of weighing machines, infantometer. Interpretation of Growth Charts: Road to Health card and percentile growth curves. Growth patterns of different organ systems such as lymphoid, brain and sex organs. Normal pattern of teeth eruption. Principles of normal development. Important milestones in infancy and early childhood in the areas of gross motor, fine motor, language and personal social development. 3-4 milestones in each of the developmental fields, age of normal appearance and the upper age of normal. Preventable causes and assessment of developmental retardation. Sexual maturity rating.

Nutrition:

Normal requirements of protein, carbohydrates, fat, minerals and vitamins for newborn, children, adolescents and pregnant and lactating mother. Common food sources. Breastfeeding—physiology of lactation, composition of breast milk, colostrum, initiation and technique of feeding. Exclusive breastfeeding - Definition and benefits. Characteristics and advantages of breast milk. Hazards and demerits of prelacteal feed, top milk and bottle feeding. Feeding of LBW babies. Problems in breastfeeding, BFHI, IMS act. Complementary feeding, National Guidelines on Infant and Child Feeding (IYCF). Assessment of nutritional status of a child based on history and physical examination. Protein energy malnutrition - Definition, classification according to IAP/ Wellcome Trust/WHO, acute versus chronic malnutrition. Clinical features of marasmus and kwashiorkor. Causes and management of PEM including that of complications. Planning a diet for PEM., Severe acute malnutrition. Vitamins—Recognition of vitamin deficiencies (A, D, K, C, B-Complex). Etiopathogenesis, clinical features, biochemical and radiological findings, differential diagnosis and management of nutritional rickets and scurvy. Hypervitaminosis A and D. Characteristics of transitional and mature milk (foremilk and hind milk). Prevention and management of lactation failure and feeding problems.

Immunization:

National Immunization Programme. Principles of Immunization. Vaccine preservation and cold-chain. Types, contents, efficacy storage, dose, site, route, contra-indications and adverse reactions of vaccines — BCG, DPT, OPV, Measles, MMR, Hepatitis B and Typhoid: Rationale and methodology of Pulse Polio Immunization. Investigation and reporting of vaccine preventable diseases. AFP (Acute Flaccid Paralysis) surveillance. Special vaccines like H. influenzae b, Pneumococcal, Hepatitis A, Chicken pox, Meningococcal, Rabies.

Infectious Diseases:

Epidemiology, basic pathology, natural history, symptoms, signs, complications, investigations, differential diagnosis, management and prevention of common bacterial, viral and parasitic infections in the region, with special reference to vaccine-preventable diseases: Tuberculosis, poliomyelitis, diphtheria, whooping cough, tetanus including neonatal tetanus, measles, mumps, rubella, typhoid, viral hepatitis, cholera, chickenpox, giardiasis, amebiasis, intestinal helminthiasis, malaria, dengue fever, rickettsial infections, leptospirosis, AIDS. Rational management of fever, PUO, fever without focus.

Hematology:

Causes of anemia in childhood. Classification based on etiology and morphology. Epidemiology, recognition, diagnosis, management and prevention of nutritional anemia-iron deficiency, megaloblastic
Clinical approach to a child with anemia with/without lymphadenopathy and/or hepatosplenomegaly. Epidemiology, clinical features, investigations and management of thalassemia. Approach to a bleeding child.

Respiratory system:

Clinical approach to a child with cyanosis, respiratory distress, stridor, wheezing. Significance of recession, retraction. Etiopathogenesis, clinical features, complications, investigations, differential diagnosis and management of acute upper respiratory infections, pneumonia. With emphasis on bronchopneumonia, bronchiolitis, bronchitis. Acute and chronic otitis media. Etiopathogenesis, clinical features, diagnosis, classification and management of bronchial asthma. Treatment of acute severe asthma. Recent guidelines. Pulmonary tuberculosis- infection versus disease, difference between primary and post-primary tuberculosis. Etiopathogenesis, diagnostic Criteria in children versus adults. Diagnostic aids - technique and interpretation of Mantoux test and BCG test. Radiological patterns, chemoprophylaxis and treatment including the DOTS schedule. Diagnosis and management of foreign body aspiration. Pathogenesis, clinical features and management of pneumothorax, pleural effusion and empyema.

Gastrointestinal tract:

Clinical approach to a child with jaundice, vomiting, abdominal pain, bleeding, hepatosplenomegaly. Acute diarrhea disease - Etiopathogenesis, clinical differentiation of watery and invasive diarrhea, complications of diarrheal illness. Assessment of Dehydration, treatment at home and in hospital. Fluid and electrolyte management. Oral rehydration, composition of ORS. Clinical features and management of acute viral hepatitis, causes and diagnosis of chronic liver disease; neonatal cholestasis. Common causes of constipation.

Central Nervous System:

Clinical approach to a child with coma, convulsions. Clinical diagnosis, investigations and treatment of acute pyogenic meningitis, encephalitis and tubercular meningitis. Seizure disorders - Causes and types of convulsions at different ages. Diagnosis, categorization and management of epilepsy (broad outline). Febrile convulsions - definition, types, management. Acute flaccid paralysis -Differentiation between Polio and Guillain-Barre syndrome.

Cardiovascular system:

Clinical features, diagnosis, investigation, treatment and prevention of acute rheumatic fever. Common forms of rheumatic heart disease in childhood. Differentiation between rheumatic and rheumatoid arthritis
Recognition of congenital acyanotic and cyanotic heart disease. Hemodynamics, clinical features and

management of VSD, PDA, ASD and Fallot's tetralogy. Recognition and management of congestive cardiac failure and cyanotic spells in infants and children.

Genitourinary system:

Approach to a child with proteinuria/hematuria. Etiopathogenesis, clinical features, diagnosis, complications and management of acute post-streptococcal glomerulonephritis and nephrotic syndrome.

Etiology, clinical features, diagnosis and management of urinary tract infection - related problems. Etiology, diagnosis and principles of management of acute renal failure.

Endocrinology:

Etiology, clinical features and diagnosis of diabetes and hypothyroidism, and goiter in children.

Neonatology:

Definition - live birth, neonatal period, classification according to weight and gestation, mortality rates. Delivery room management including neonatal resuscitation and temperature control. Etiology, clinical features, principles of management and prevention of birth asphyxia. Birth injuries - causes and their recognition. Care of the normal newborn in the first week of life. Normal variations and clinical signs in the neonate. Breastfeeding - physiology and its clinical management. Identification of congenital anomalies at birth with special reference to anorectal anomalies, tracheo-esophageal fistula, diaphragmatic hernia, neural tube defects. Neonatal jaundice: causes, diagnosis and principles of management. Neonatal infection - etiology, diagnosis, principles of management. Superficial infections, sepsis. Low birth weight babies - causes of prematurity and small-for-date baby, clinical features and differentiation. Principles of feeding and temperature regulation. Problems of low birth weight babies. Kangaroo mother care. Identification of high risk/sick newborn (i.e., detection of abnormal signs - cyanosis, jaundice, respiratory distress, bleeding, seizures, refusal to feed, abdominal distension, failure to pass meconium and urine. Recognition and management of specific neonatal problems-hypoglycemia, hypo-calcemia, anemia, seizures, necrotizing enterocolitis, hemorrhage.

Pediatric Emergencies:

Status epilepticus. Status asthmaticus / acute severe asthma. Shock and anaphylaxis. Comatose child
Congestive cardiac failure. Common poisonings and snakebite, scorpion sting. Acute renal failure. Diabetic ketoacidosis. Pneumothorax. Acute laryngotracheobronchitis.

Fluid-Electrolyte:

Principles of fluid and electrolyte therapy in children.

Genetics:

Principles of inheritance and diagnosis of genetic disorders, Down's syndrome.

Behavioral Problems:

Breath holding spells, nocturnal enuresis, temper tantrums, pica, refusal to feed.

IMNCI:

Management of a Young child below 2 months. Management of a child between 2 months - 5 year of age.

DESIRABLE TO KNOW CATEGORY

Vital Statistics:

Definition and overview of Pediatrics with special reference to age-related disorders. Population structure, pattern of morbidity and mortality in children. Definition, causes, present status and measures for attainment of goals. Other National programs and Health related Millenium Development Goals.

Growth and Development:

Psychological and behavioral problems. Approach to a child with developmental disabilities. Abnormal growth patterns-failure to thrive, short stature. Measurement and interpretation of sitting height, US:LS ratio and arm span. Age-independent anthropometric measurement-principles and application.

Nutrition:

Definition, causes and management of obesity.

Infectious Diseases:

Kala-azar, leprosy, chlamydia infection.

Hematology:

Diagnosis of acute lymphoblastic leukemia and principles of treatment. Clinical features and management of hemophilia, ITP, and aplastic anemia. Diagnosis and principles of management of lymphomas. Types, clinical features and management of acute hemolytic anemia.

Respiratory system:

Multidrug resistant tuberculosis, bronchiectasis, cystic fibrosis.

Gastrointestinal tract:

Features and management of liver failure. Gastroesophageal reflux, GI bleeding, portal hypertension. Persistent diarrhea, Reye's syndrome, Celiac disease, malabsorption syndrome. Drug induced hepatitis. Abdominal tuberculosis, Wilson's disease.

Central Nervous System:

Neurocysticercosis. Microcephaly, hydrocephalus, rheumatic chorea. Intracranial space occupying lesions, infantile hemiplegia. Neuroblastoma.

Cardiovascular system:

Diagnosis and management of bacterial endocarditis, pericardial effusion, myocarditis. Hypertension in children-recognition, etiology, referral.

Genitourinary system:

Hemolytic-uremic syndrome, Vesicouretric reflux, Renal and bladder stones. Causes and diagnosis of obstructive uropathy in children. Diagnosis and principles of management of chronic renal failure.

Endocrinology:

Delayed and precocious puberty. Short stature. Ambiguous genitalia.

Neonatology:

Transportation of a sick neonate. Common intra-uterine infections.

Pediatric Emergencies:

Burns. Hypertensive emergencies. Gastrointestinal bleeding.

Fluid-Electrolyte:

Pathophysiology of acid-base imbalance and principle of management.

Behavioral Problems:

Learning disabilities, Autism

Pediatric Surgical Problems:

Diagnosis and timing of surgery of cleft lip/palate, hypospadias, undescended testis, tracheo-esophageal fistula, hydrocephalus, CTEV, umbilical and inguinal hernia, anorectal malformations, hypertrophic pyloric stenosis.

Therapeutics:

Pediatric doses, drug combinations, drug interactions, age specific choice of antibiotics, etc.

Adolescent Medicine:

Changes during adolescence, factors affecting adolescent health.

PRACTICAL SKILLS

1. Perform independently - Prepare ORS IMNCI Case Management. Nasogastric tube insertion. Infant young child feeding counseling. Anthropometry. Injections (IM, IV, S/C, I/D). Vaccine administration. Blood transfusion and monitoring.

2. Perform under Supervision - Lumbar puncture, IV cannula insertion and Blood sampling, Peritoneal dialysis.

3. Assist the expert - Pleural tap, Ascitic tap, Neonatal resuscitation, Intraosseous infusion.

4. Observe - Bone marrow aspiration, Liver biopsy, Kidney biopsy, Exchange transfusion

PAEDIATRICS - DISTRIBUTION OF MARKS

Theory (one paper)	40 marks
(Shall contain one question on basic sciences and allied subjects)	
Oral (Viva)	10 marks
Practical / Clinicals	30 marks
Internal assessment (Theory-10 marks; Practical-10 marks)	20 marks
Total	100 marks

Pass: In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including oral and internal assessment (Theory) and minimum of 50% in Practicals / clinicals and internal assessment (Practicals).

PAEDIATRICS - THEORY PAPER

Total 40 marks

Time: 2 hours.

Q1. Long Answer Question 10 Marks.

Q2. Short Answer Questions: 6 Short Notes of 5 marks each (30 marks).

Note: Long Answer Questions (LAQ) should be from must know area. Total number of SAQs is 6 of which 1 or 2 should be from desirable to know areas.

MODEL QUESTION PAPER:

PAEDIATRICS

ANSWER ALL QUESTIONS

Illustrate your answer with suitable diagrams

Time: 2 hours

Maximum marks: 40

1. A 4 year old child weighing 8kg is brought with a history of fever and dysentery of 3 days duration. Her height is 98cms and midarm circumference 11 cms. She is drowsy and not able to take anything orally. She last voided urine 18 hours ago. (2+1+5+2=10)

- a) What is the nutritional status of this child as per WHO classification?
- b) What is the hydration status of this child?
- c) How will you manage this child?
- d) Mention 4 bacterial pathogens causing dysentery?

2. Write briefly on the following:

(6X5 =30)

- a) Kangaroo mother care
- b) Management of cyanotic spell
- c) Simple febrile convulsions
- d) Management of acute severe asthma
- e) Microcephaly
- f) Vesicouretric reflux

CLINICALS (TOTAL MARKS - 30)

Long case (general pediatrics) 15 Marks
Short case (newborn) 10 Marks
Spotters (2) 5 Marks (2.5X2)

VIVA VOCE (Total marks: 10)

4 stations

Station 1 : X-RAYS

Station 2 : Vaccines and drugs

Station 3 : Instruments

Station 4 : Nutrition

GENERAL SURGERY

GENERAL SURGERY

GOALS

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

OBJECTIVES

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

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

9. Perform simple surgical procedures.

COURSE CONTENT

MUST KNOW CATEGORY

System Based:

Wound healing, Asepsis, antisepsis, sterilization and universal precaution, Surgical knots, sutures, drains, bandages and splints, Surgical infections, causes of infections, prevention common micro organisms causing infections, Tetanus, gas gangrene treatment & prevention, Chronic specific infections Tuberculosis, Filariasis, Boils, cellulites, abscess, necrotising fasciitis, Principles of Antibiotic therapy in surgery, Hospital acquired infections, AIDS and Hepatitis , prevention and precautions, Fluid and electrolyte balance, Shock, etiology, Pathophysiology and management, Blood transfusion indication and hazards, Common preoperative preparation and postoperative complication, Surgical aspects of diabetes mellitus, diabetic Foot, Bites and stings, Common skin and subcutaneous conditions, Sinus and fistulae, pressure sores, Acute arterial occlusion, diagnosis and initiate management, Types of gangrene, Burgers disease and atherosclerosis, Venous disorders: varicose veins, Diagnosis, principles of therapy, prevention, of Deep venous Thrombosis, Lymphatics: Diagnosis and principles of management of lymphatic malformations, lymphatic malformations, lymphangitis and lymphedema, Medical and surgical management of Lymphatic Filariasis, Burns: causes, prevention and management, Wounds of scalp and their management, Recognition, diagnosis, monitoring and principles of management of patients with Head injury, Glasgow coma scale, Recognition of acute cerebral compression, indication for referrals, Cleft lip and palate principles of diagnosis and management, Leukoplakia, retention cysts, ulcers of tongue, Oral malignancies, recognition, prevention and principles of management, Salivary gland Neoplasm's, Cervical lymphadenitis nonspecific and tuberculous,. Metastatic lymph nodes and lymphomas, Diagnosis and principles of management of Thyroid swellings, Thyroglossal cyst and fistula, Thyrotoxicosis, Management of solitary thyroid nodule, Management of nipple discharge, Breast abscess, Clinical breast examination, breast self examination, Screening and investigation of breast lump, Cancer breast diagnosis, staging and principles of management, Recognition and treatment of pneumothorax, haemothorax, Pulmonary embolism: prevention / recognition and treatment, Flail chest, stove in chest. Postoperative pulmonary complication, Empyema thoracis, Neoplasm's of the lung, Cancer oesophagus: principles of management, Gastro esophageal refflux, Hiatus Hernia Principles of management, Achalasia cardia principles of management, Congenital hypertrophic pyloric stenosis, Aetiopathogenesis, diagnosis and management of; peptic ulcer, Sings and tests of liver function, Amoebic liver abscess, Hydatid cyst, Obstructive jaundice, Clinical features, diagnosis, complications and principles of management of cholelithiasis and cholecystitis, Acute pancreatitis, Peritonitis: causes, recognition, diagnosis, complications and principles of management, Tuberculous peritonitis, Abdominal pain types and causes, Intestinal amoebiasis, Tuberculosis of intestine, Intestinal obstruction, Principles of management of Neonatal Intestinal obstruction, Appendix: diagnosis and management of acute appendicitis, Appendicular lump and abscess, Clinical features of the rectal diseases, Rectum: Carcinoma rectum, Principles of management of colostomy, Anal canal: Surgical anatomy , features and management of fissures, fistula in ano, Perianal and ischiorectal abscess, Haemorrhoids, Clinical features, diagnosis, complication and principles of management of inguinal hernia, Umbilical, femoral, hernia and epigastric hernia, Premalignant conditions of large bowel, Anal carcinoma, Urinary

symptoms and investigations of urinary tract, Diagnosis and principles of management of urolithiasis, Renal tuberculosis, Lower Urinary tract symptoms or prostatism, Benign prostatic hyperplasia: diagnosis and management, Genital tuberculosis in male, Phimosis and paraphimosis, Diagnosis and principles of treatment of undescended testis, Torsion testis, Hydrocele, haematocele and pyocele, Acute and chronic epididymo – orchitis, Principles of management of Urethral injuries.

Symptoms based:

Ulcers in oral cavity, Solitary nodule of the thyroid, Lymph node swellings in the neck, Suspected breast lump, Acute abdominal pain, Dysphagia, Chronic abdominal pain, Epigastric mass, Right hypochondrium mass, Right hypochondrium mass, Right iliac fossa mass, Renal mass, Inguino – Scrotal swelling, Gastric outlet obstruction, Upper gastrointestinal bleeding, Lower gastrointestinal bleeding, Anorectal symptoms, Acute intestinal obstruction, Obstructive jaundice, Acute retention of Urine, Bladder outlet obstruction, Haematuria, Peripheral Vascular disease, Varicose veins, New born with developmental anomalies.

DESIRABLE TO KNOW CATEGORY

System Based:

Mechanisms and management of missile, blast and gunshot injuries, Organ transplantation: Basic principles, Nutritional support to surgical patients, Investigations in case of arterial obstruction, amputation vascular injuries basic principles and management, Branchial cyst, cystic hygroma, Thyroiditis, Thyroid neoplasm's, Thoracic outlet syndrome, Recognition of oesophageal atresia and principles of management, Congenital diaphragmatic Hernia, Principles of management, Cancer stomach, Portal hypertension, Neoplasm's of liver, Rupture spleen, Indications for splenectomy, Carcinoma gall bladder, Choledochat cyst, Chronic pancreatitis, Carcinoma pancreas, Ulcerative colitis, Carcinoma colon, Anorectal Anomalies, Hirschprung's disease, principles of management, Abdominal wall defects in children, Carcinoma rectum, Prolapse of rectum, Hydronephrosis, Pyonephrosis, perinephic abscess, Renal tumors, Neonatal urinary obstruction, Carcinoma penis, Varicocele, Testicular tumours.

PRACTICAL SKILLS

1. Perform independently - Obtain a proper relevant history, and perform a humane and thorough clinical examination including internal examinations (per-rectal and per vaginal) and examinations of all organs / systems in adults and children. Arrive at a logical working diagnosis after clinical examination. Order appropriate investigations keeping in mind their relevance (need based) and cost effectiveness. Write a complete case record with all necessary details. Write a proper discharge summary with all relevant information. Obtain informed consent for any examination / procedure. At the end of the learners should be able to perform: Start iv lines and Monitor infusions, Start and monitor blood transfusion, Venous cut-down, Manage a C.V.P. line, Conduct CPR (Cardiopulmonary resuscitation), Basic life support / ITLS, Endotracheal intubation, Pass nasogastric tube, Perform digital rectal examination and proctoscopy, Urethral catheterisation, Dressing of the wounds, Suturing of the simple wounds.

2. Perform under Supervision - Remove small subcutaneous swellings, Various types of biopsies, Relieve pneumothorax, Infiltration, surface and digital Nerve blocks, Incise and drain superficial abscesses, Manage Lacerated wounds, Control external haemorrhage.

3. Assist the expert – Vasectomy, Circumcision, Surgery for hydrocele, Surgery for hernia, Infection /banding of piles, Management of shock, Assessment and management of burns.

4. Observe - All the operations performed by surgeons during surgical posting during general surgical postings.

SURGERY & ITS ALLIED SPECIALITIES- DISTRIBUTION OF MARKS

Theory : Two papers of 60 marks each 120 marks

Includes Paper-1-General Surgery (Section 1) Orthopaedics (Section 2) and Paper II- Surgical Gastroenterology, Oncology (Section 1), Urology, Paediatrics, Neuro- Surgery, Plastic surgery, Trauma, Anaesthesia, Dentistry (Section 2).

Oral (Viva) Interpretation of Investigative data	20 marks
Clinical	100 marks
Internal assessment (Theory -30; Practical-30)	60 marks
Total	300 marks

Paper 1 of Surgery shall have one section in Orthopaedics. The questions on Orthopaedic Surgery be set and assessed by examiners who are teachers in the Orthopaedic surgery.

Pass: In each of the subjects a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in practicals/clinicals

SURGERY & ITS ALLIED SPECIALITIES THEORY PAPER

Paper I – 60 marks

Time: 3 hours

Section A (General Surgery, Burns, Shock, Blood Transfusion, Breast & Endocrines)

Q1. Long Answer Question 10 Marks (must be structured)

Q2. Short Answer Questions: 4 Short Notes of 5 marks each (20 marks)

Section B (Orthopaedics)

Q1. Long Answer Question 10 Marks (must be structured)

Q2. Short Answer Questions: 4 Short Notes of 5 marks each (20 marks)

Paper II – 60 marks

Time: 3 hours

Section A (Surgical Gastroenterology, Oncology)

Q1. Long Answer Question 10 Marks (must be structured)

Q2. Short Answer Questions: 4 Short Notes of 5 marks each (20 marks)

Section B (Urology, Paediatrics, Neuro- Surgery, Plastic surgery, Trauma, Anaesthesia, Dentistry)

Q1. Long Answer Question 10 Marks(must be structured)

Q2. Short Answer Questions: 4 Short Notes of 5 marks each (20 marks)

Note: Long Answer Questions (LAQ) should be from must know area. Total number of short notes is 16 of which 4 or 5 should be from desirable to know areas.

MODEL QUESTION PAPERS:

SURGERY PAPER I

ANSWER ALL QUESTIONS

**Each Section to be answered in separate Answer Book
Illustrate your answer with suitable diagrams**

Time: 3 hours

Maximum marks: 60

SECTION A

General Surgery (Burns, Shock, Blood transfusion, Breast and Endocrine)

1.A 60 year old woman is brought to casualty with near total burns sustained in a closed room. (3+2+5=10)

- a)How will you evaluate this patient to assesextent and depth of burns?
- b)What other complication she can have due to the nature of the injury?
- c)Outline the management of the case. Discuss how you will evaluate the fluid requirement.

2. Write short note: (4 x 5 = 20)

- a. Blood stained discharge from the nipple
- b. Triage
- c. Glasgow coma scale
- d. Prophylactic antibiotics in surgery

**SECTION B
(OrthopaedicSurgery)**

3. A 50 year old woman reports to the outpatient department with back pain of 3 months duration. She was found to be having a kyphotic deformity with local tenderness at D10 level. She had loss of weight and weakness in the lower limbs with spaticity. (2+2+3+3=10)

- a) What is the most probable diagnosis.
- b) Give the differential diagnosis.
- c) Give three relevant investigative procedures.
- d) Outline the management and prognosis.

4. Write short notes on: (4x5 = 20)

- a. Barlow's test
- b. Soft tissue pathology in congenital talipes equinovarus
- c. Management of fracture of the scaphoid
- d. Radiological signs of scurvy

SURGERY PAPER II

ANSWER ALL QUESTIONS

**Each Section to be answered in separate Answer Book
Illustrate your answer with suitable diagrams**

Time: 3 hours

Maximum marks: 60

SECTION A

(Surgical Gastroenterology, Oncology)

1. A young man comes to the hospital with sudden onset abdominal pain and vomiting, abdominal distention and obstipation of 2 days duration. On examination he has diffuse tenderness and abdominal guarding and rigidity. (3+2+5=10)

- a) Discuss briefly the differential diagnosis.
- b) What investigations would help in diagnosis?
- c) Outline the principles of management.

2. Write short notes on: (4 x 5 = 20)

- a) Oschner-Sherren regime for appendicitis
- b) Courvoisier's law
- c) Staging of Hodgkin's disease
- d) Indications for splenectomy

SECTION B

Allied specialities (Urology, Paediatric Surgery, Neurosurgery, Plastic Surgery, Trauma, CTVS, Anaesthesiology, Dentistry)

3. A 60 year old man presents with passage of fresh, painless blood stained urine for the past five days. (3+3+4=10)

- a) Enumerate the possible causes.
- b) What investigations would be required in this patient to determine the cause?
- c) Outline the principles of management.

4 Write short notes on: (4 x 5 = 20)

- a) Flail Chest.
- b) Meconium Ileus.
- c) Epidural anesthesia.

d) Lucid interval in head trauma.

CLINICAL / PRACTICAL

(One Long case and three short cases including orthopaedics)
(40+20+20+20)

100 marks

ORTHOPEDICS

ORTHOPEDICS

OBJECTIVES

Knowledge

The student should be able to:

1. Explain the principles of recognition of bone injuries and dislocation.
2. Apply suitable methods to detect and manage common infections of bones and joints.
3. Identify congenital, skeletal anomalies and their referral for appropriate correction or rehabilitation. Recognize metabolic bone diseases as seen in this country.
4. Explain etiogenesis, manifestations, diagnosis of neoplasm affecting bones.

Skills

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

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

Application

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

Integration

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

RADIODIAGNOSIS & RADIOTHERAPY

RADIODIAGNOSIS

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 should be aware of the techniques required to be undertaken in different situations for the diagnosis of various ailments as well as during prognostic estimations.

OBJECTIVES

Knowledge

The student should be able to:

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

Skills

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

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

RADIOTHERAPY

GOAL

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

OBJECTIVES

Knowledge

The student should be able to:

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

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

Skills

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

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

DENTISTRY

DENTISTRY

GOAL

The goal of the training is to provide an understanding of common dental pathologies and to equip medical students to effectively diagnose common dental diseases and refer them to concerned dental specialist at the earliest to avoid any treatment delay.

OBJECTIVES

1. To introduce common dental infectious diseases to Medical Students.
2. To teach the diagnosis of common maxillofacial fractures and refer them to maxillofacial surgeons.
3. To teach the role of emergency medical officers in performing emergency maxillofacial trauma care.
4. To introduce to common Odontogenic Jaw pathologies.
5. To diagnose oral premalignant lesions.
6. Introduction to management of oral cancer.

COURSE CONTENTS

Dental caries and alveolar Abscess, Common tumour of jaws, malignancies of oral cavities, maxillofacial injuries and management, differential diagnosis of neck swellings.

OBSTETRICS AND GYNAECOLOGY

OBSTETRICS AND GYNAECOLOGY

GOAL

The broad goal of the teaching of undergraduate students in Obstetrics and Gynaecology is that he/she should acquire understanding of anatomy, physiology and pathophysiology of the reproductive system and gain the ability to optimally manage common conditions affecting it.

OBJECTIVES

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

14. Understand the implications of medico-legal and ethical issues concerning the speciality.

15. Acquire communication, decision making and managerial skills.

16. Acquire skills to perform – Obstetrical & Gynaecological examinations and certain minor investigations and therapeutic operative procedures.

COURSE CONTENTS

MUST KNOW CATEGORY

OBSTETRICS

Anatomy of female reproductive tract:

Anatomy of internal and external reproductive organs including their relation ship to other pelvic organs. Applied anatomy as related to Obstetrics and Gynaecology.

Physiology of conception:

Gametogenesis, Ovulation, menstruation, fertilisation and implantation. Spermatogenesis. Normal semen parameters

Development of fetus and Placenta:

Basic embryology. Development and structure and functions of placenta. Teratogenic agents and drugs to be avoided / contraindicated in early pregnancy

Diagnosis of Pregnancy:

Clinical symptoms and signs of early pregnancy. Dating in early pregnancy including USG dating various tests to diagnose pregnancy. Congenital anomalies that can be diagnosed in early pregnancy.

Maternal Changes during Pregnancy:

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

Antenatal care:

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

Complications of Early pregnancy:

Various types of abortions, definitions, causes, investigations and their management. Diagnosis of Ectopic pregnancy and management. Modern management of ectopic pregnancy.

Hyperemesis Gravidarum:

Aetiopathogenesis, investigations and management

Antepartum haemorrhage:

Classification, clinical features, differential diagnosis, investigation including USG features, management and complications. Diagnosis of DIC.

Malpresentations and malpositions and CPD:

Causes, clinical findings, definitive diagnosis of malpresentations and malpositions. Mechanism of labour in vertex, breech and occipitoposterior positions contracted pelvis causes, diagnosis and management. Various types of Pelvis. Diagnosis of CPD and Trial of labour. Definition of Obstructed labour and rupture uterus, causes, clinical features and management. Prevention of rupture uterus.

Multiple pregnancy:

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

Hydramnios and oligohydramnios:

Causes, diagnosis, investigations and management

Hypertensive disorders of Pregnancy:

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

Anaemia during pregnancy:

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

Diabetes mellitus and pregnancy:

Classification, Diagnosis, Screening for GDM and management of Diabetes during pregnancy and labour. Management of neonate of diabetic mother.

Heart disease and pregnancy:

Classification, evaluation, complications and management during pregnancy and labour
Contraception.

Intrauterine- Growth restriction and Intra uterine death:

Causes, diagnosis and management.

Infections during pregnancy:

UTI, Malaria, Syphilis, Tuberculosis, Hepatitis, HIV, H1N1 and TORCH infections during pregnancy and their management.

Preterm labour and Post-dated pregnancy:

Causes, diagnosis and principles of management of preterm labour and delivery. Evaluation and management of Post-dated pregnancy. Neonatal problems of Preterm and post-term babies. Prevention of Preterm labour, various Tocolytics.

Rh Negative Pregnancy:

Diagnosis, evaluation and management. Prevention of Rh Isoimmunisation. Management of Haemolytic disease of New born

Normal labour:

Physiology of initiation of labour (not induction). Physiology, mechanism and conduct of normal labour. Monitoring in various stages and abnormal labour or dysfunctional labour. Diagnosis and management of fetal distress. Pain relief during labour. Active management of third stage of labour and complications of IIIrd stage.

Postpartum haemorrhage:

Definition, types, Diagnosis and management of PPH. Retained placenta, Manual removal of placenta.

Induction/Augmentation of labour:

Pre-requisites for induction. Various methods of cervical ripening. Successful induction and failed induction. Complications and contra-indications for induction. Various methods /drugs for augmentation of labour.

Operative Obstetrics:

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

Post-caesarean pregnancy:

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

Puerperium:

Course of Normal Puerperium and complications of Puerperium like Puerperal sepsis and its diagnosis and management and prevention Breastfeeding and common problems like lactational failure. Contraindications for breast feeding. Suppression of lactation. Care of neonate.

Contraception:

Cafeteria approach, various methods of contraception, advantages and sideeffects, and failure rates, Selection of patients and counseling. IUCD Insertion and removal. Emergency contraception.

Medical termination of Pregnancy:

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

Perinatal and Maternal mortality in INDIA:

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

GYNAECOLOGY**Vaginal discharge:**

Physiological and pathological causes of vaginal discharge. Clinical characteristics, Investigations for diagnosis, predisposing conditions and management.

Amenorrhoea:

Classification of Primary and Secondary amenorrhoea, investigations and principles of management.

Abnormal uterine bleeding:

Normal menstrual pattern and physiology of menstrual cycle. Various bleeding patterns like menorrhagia, metrorrhagia and polymenorrhoea - Causes, investigations, diagnosis of AUB. Definition, Etiology and classification of DUB and its management. Transvaginal sonography.

Infertility:

Definition of Infertility and sterility. Causes and investigation of a couple with infertility; semen analysis Causes of anovulation and induction of ovulation, Tests for ovulation & tubal patency, IUI.

Pelvic organ prolapse:

Classification, causes, diagnosis, investigations and management in relation to age and parity. Preventive aspects of pelvic organ prolapsed.

Urinary Incontinence:

Classification and differential diagnosis. Investigations and management of Stress urinary incontinence.

Benign tumours of internal reproductive organs:

Causes, investigations, complications and management of fibroid uterus. Ovarian cysts, Endometriosis. Conservative surgery.

Uterine anomalies:

Classification and diagnosis and reproductive outcome and indications for surgical management.

Pelvic Inflammatory disease:

Definition, causes, sequelae and management of PID. Sexually transmitted infections and their prevention. Genital tuberculosis diagnosis and management (in detail). Prevention of PID.

Genital tract injuries and Genital fistulae:

Post-coital injuries and operative injuries especially to urinary tract. Causes, clinical features and diagnosis of genital fistulae.

Pre-malignant lesions and Malignancies of genital tract:

Etiology and Pathology, Classification, diagnosis of pre-malignant and malignant lesions of Cervix, uterus and ovary. Screening for carcinoma cervix. Clinical and Surgicopathological Staging and principles of management of cervical, endometrial cancer and ovarian cancer. Screening for Breast and endometrial and ovarian malignancies. Chemotherapy and Radiotherapy of Carcinoma cervix including adverse effects. Chemotherapy of Ovarian cancer.

Problems of Adolescence and menopause:

Menopausal symptoms and management of menopause, HRT. Causes and investigations of post-menopausal bleeding.

Operative Gynaecology:

Indications, technique and complications of Dilatation and Curettage and Fractional curettage, Vaginal hysterectomy, Ward Mayo's operation, Manchester repair, Abdominal Hysterectomy, Ovariectomy and diagnostic laparoscopy. Staging laparotomy for endometrial and ovarian malignancy Diagnosis and principles of management of post-operative complications. Indications and techniques of Colposcopy, Hysteroscopy and operative laparoscopy.

DESIRABLE TO KNOW CATEGORY

OBSTETRICS

Antenatal care:

Diagnosis and management of fetal congenital anomalies.

Hyperemesis Gravidarum:

Unusual complications of hyperemesis and management.

Antepartum haemorrhage:

Management of Complications like DIC.

Malpresentations and malpositions and CPD:

Management of face, brow and transverse lie.

Multiple pregnancy:

Mechanism of twin to twin transfusion and management. Management of single fetal demise.

Hydramnios and oligohydramnios:

Recent trends in management.

Hypertensive disorders of Pregnancy:

Predictive tests for gestational hypertension. Management of complications of Hypertensive disorders and chronic hypertension and renal disease. Differential diagnosis of convulsions in a pregnant woman.

Anaemia during pregnancy:

Management of Non-nutritional anaemias in pregnancy.

Diabetes mellitus and pregnancy:

Complications of diabetes and their management.

Heart disease and pregnancy:

Surgical management during pregnancy.

Intrauterine- Growth restriction and Intra uterine death:

Recent advances in management.

Rh Negative Pregnancy:

In-utero management of Rh iso-immunised fetus.

Postpartum haemorrhage:

Management of Inversion of uterus.

Operative Obstetrics:

Destructive operations in Obstetrics.

Contraception:

Recent advances vasectomy//NSV.

Medical termination of Pregnancy:

Management of complications of various methods of MTP.

Perinatal and Maternal mortality in INDIA:

PNMR & MMR in our Institute and Puducherry.

GYNAECOLOGY**Amenorrhoea:**

Details of management.

Abnormal uterine bleeding:

Sonosalpingography ablative procedure.

Infertility:

Management of tubal factors of infertility including re-canalisation, Counseling for ART. ART and their success.

Pelvic organ prolapse:

Nulliparous prolapsed.

Urinary Incontinence:

Surgical therapy of Stress urinary incontinence.

Benign tumours of internal reproductive organs:

Recent advances in management.

Uterine anomalies:

Surgical procedures for specific anomalies.

Genital tract injuries and Genital fistulae:

Genital fistulae management.

Pre-malignant lesions and Malignancies of genital tract:

Vulva, vaginal cancers.

Problems of Adolescence and menopause:

Precocious causes and investigation. Management of Precocious puberty

Operative Gynaecology:

Detailed management of various post-operative complications. Tubal recanalisation.

SKILLS**Must acquire - Communication skills:**

History taking skills- Present and past Obstetric history. History of Medical and Surgical disorders if any. Family history and treatment history. Counseling for contraception, Breast feeding.

Must acquire - Clinical skills:

General Physical examination and Systemic Examination. Obstetric examination: Speculum and vaginal examination, Diagnosis of early pregnancy, Measurement of symphysis fundal height, Plotting Gravidogram to monitor fetal growth, Obstetric palpation to know the lie, Presentation and position of fetus, Pelvic assessment to know grossly contracted pelvis .
Diagnosis and Monitoring Labour: Appreciate Normal Uterine contractions by palpation. Fetal heart normality. Cervical dilatation. Station of presenting part. Plotting a Partogram and recognition of deviations from normal. Catherisation of bladder during labour. Technique of ARM. Conduct of normal labour including active management of III stage. Technique of

Episiotomy and its suturing. Recognition of Perineal tears. Care of Normal New-born and resuscitation of asphyxiated New-born

Desirable to acquire Clinical skills:

Techniques of Assisted breech delivery and breech extraction
Vacuum application and extraction
Out-let forceps application, repair of cervical tears, vaginal packing

Must acquire Gynecological examination skills:

Inspection and recognition of various parts of external genitalia. Recognition of perineal body and anus. Per speculum examination and recognition of Unhealthy cervix and growth on cervix. Technique of Pap smear collection. Bimanual pelvic examination to know the size and position of uterus and presence and absence of adnexal mass. Identification of cystocele, rectocele and enterocele and descent of cervix. Technique of rectal examination. Technique of cervix biopsy. Technique of Schiller's test and acetic acid test Technique of IUCD insertion and removal.

Desirable to acquire Gynecological examination skills:

Culdocentesis, Instrumental evacuation for incomplete abortion, Blood transfusion, Adult resuscitation.

Must know Managerial skills:

Transport of patient with convulsions, and Shock. How to co-ordinate with team members.

Desirable to know Managerial skills:

Organisation of antenatal clinics and arrangement for cervical cancer screening at camps.

OBSTETRICS AND GYNAECOLOGY- DISTRIBUTION OF MARKS

Theory-Two papers of 40 marks each

Includes Paper I- Obstetrics including social obstetrics and Paper II - Gynaecology, Family Welfare and Demography (Shall contain one question on basic sciences and allied subjects)
80 marks

Oral (Viva) including record of delivery cases (20+10) 30 marks

Clinical - 50 marks

Internal assessment (Theory-20; Practical-20) 40 marks

Total 200 marks

Pass: In each of the subjects, a candidate must obtain 50 % in aggregate with a minimum of 50% in Theory including oral and minimum of 50% in Practicals.

OBSTETRICS AND GYNAECOLOGY - THEORY PAPER

Paper I – 40 marks (Obstetrics including social obstetrics)

Time: 2 hours

Q1. Long Answer Question - 10 Marks (must be structured)

Q2. Short Answer Questions: 6 Short Notes of 5 marks each (30 marks)

Paper II – 40 marks (Gynaecology, Family Welfare and Demography)

(Shall contain one question on basic sciences and allied subjects)

Time: 2 hours

Q1. Long Answer Question - 10 Marks

Q2. Short Answer Questions: 6 Short Notes of 5 marks each (30 marks)

Note: Long Answer Questions (LAQ) should be from must know area. Total number of SAQs is 12 of which 2 or 3 should be from desirable to know areas.

In Obstetrics paper, one SAQ should be from social obstetrics and in Gynaecology paper, one SAQ should be from family welfare (including contraception) and demography.

MODEL QUESTION PAPERS:

**OBSTETRICS AND GYNAECOLOGY PAPER I
(Obstetrics including Social obstetrics)**

**ANSWER ALL QUESTIONS
Illustrate your answer with suitable diagrams**

Time: 2 hours

Maximum marks: 40

1. P1 G2 with 5 months amenorrhoea comes for antenatal check-up. Examination reveals that the uterus is 36 weeks size. (2+4+4=10)

- a. Enumerate the differential diagnoses.
- b. Mention the complications of multiple gestation.
- c. How will you manage twin pregnancy in active labour with first twin in vertex presentation?

2. Write short notes on: (6x5=30)

- a) Cardiovascular changes during pregnancy.
- b) Management of adherent placenta.
- c) Partogram.
- d) Maternal mortality in India.
- e) Iron therapy in anaemia in pregnancy.
- f) Prevention of PIH

**OBSTETRICS AND GYNAECOLOGY PAPER II
(Gynaecology, Family welfare and Demography)**

**ANSWER ALL QUESTIONS
Illustrate your answer with suitable diagrams**

Time: 2 hours

Maximum marks: 40

1. A 40 year old nulliparous woman complains of metrorrhagia. There is a suprapubic mass of 14 weeks per abdomen. (3+2+5= 10)

- a. Enumerate the differential diagnosis.
- b. What are the types of endometrium that can be seen in anovulatory DUB?
- c. If investigations reveal endometriosis in this woman, how will you manage?

2. Write shorts notes on:

(6x5= 30)

- a) Semen analysis
- b) Pap smear
- c) Staging laparotomy in ovarian cancer
- d) Non contraceptive benefits of OC pills
- e) Medical management of PCOS in unmarried woman
- f) Nulliparous prolapse

PRACTICAL MARKS - 50 marks

1 Long case in **Obstetrics** – 25 Marks

1 Long case in **Gynaecology** – 25 Marks

ANAESTHESIOLOGY

ANAESTHESIOLOGY

OBJECTIVE

Objective of the undergraduate curriculum in Anaesthesiology is to impart the knowledge of basic concepts of anesthesia, airway management, and science of resuscitation which will be useful for the students in various areas of medical practice. The student, therefore, should be taught to observe and study the physiological changes which take place in the anesthetized and also to recognize, respond and manage in the event of any deviation. Emphasis should also be laid on good preoperative preparation and optimization of patient's co morbid conditions and to introduce principles of patient care in the operating room and in the recovery unit.

COURSE CONTENT

MUST KNOW CATEGORY

Principles of applied physiology. Principles of applied pharmacology of drugs used perioperatively: Premedicants, Drugs used for induction - Intravenous induction agents : Thiopentone, Ketamine, Propofol; Inhalational agents - Halothane, Isoflurane, Sevoflurane, Nitrous oxide; Muscle relaxants - Depolarising agents: Succinyl choline and Nondepolarizing agents: Vecuronium, Atracurium ; Reversal agents: Neostigmine; Analgesics: - Opioids: Morphine, Pethidine, Fentanyl; Local anaesthetic agents - Lignocaine, Bupivacaine, Ropivacaine, Levobupivacaine. **Principles of airway management:** Anatomy, Manoeuvres used for airway management, Devices used in airway management (Basic): Oro and naso pharyngeal airways, Laryngoscopes, Endotracheal tubes, Supra glottic devices : LMA: Classic, Proseal, Igel Manual Resuscitators (AMBU bags). **Latest / Recent guidelines of cardiopulmonary resuscitation Evaluation of patients in relation to surgical and anaesthetic risk. Appropriate preoperative preparation of patients subjected to surgery and anesthesia. Introducing the students to various techniques of anaesthesiology:** Conduct of General Anaesthesia. Techniques of Regional anaesthesia - Central neuraxial blockades (Subarachnoid blockade, Epidural anaesthesia, Caudal epidural). **Peri operative care of surgical patient:** Perioperative monitoring standards, Perioperative hemodynamic alterations, Perioperative Pulmonary complications, Recovery criterias, Acute pain management modalities. **Equipments and drugs used in resuscitation:** Appropriate usage of IV cannulas, Fluids used during resuscitation, Defibrillators, Drugs used during resuscitation - Vasopressors, Vasodilators, Anti arrhythmic agents. **Oxygen therapy.**

DESIRABLE TO KNOW CATEGORY

History of Anaesthesia: Most important events and persons only. **Equipments used in Anaesthesia and critical care** - Anaesthesia delivery systems: Basic Boyles machine. **Management of acute respiratory failure:** Etiology, Signs and symptoms, Investigations and monitoring, Management (including basic concepts of mechanical ventilation). **Shock and Management:** Types and Causes, Evaluation of Shock victim, Initial management, Definitive management. **Management of blood, fluid, electrolyte and metabolic disturbances in a surgical patient. Concepts of drug interactions and adverse reactions.**

PRACTICAL SKILLS

Skills to be taught in maniquines /simulators: Maintenance of Clear airway, Bag Mask Ventilation, Starting A Venous Access (Mannequine), CPR — Basic and advanced. **Demonstration (Realtime /video session):** Maintenance of airway: Bag-Mask ventilation. Advanced airway placement: Endo tracheal Intubation, Supraglottic airway devices placement. Needle Cricothyroidotomy. Arterial line insertion, Central venous catheter insertion and Central venous pressure monitoring. Techniques of Regional anaesthesia: Central neuraxial blockades (Subarachnoid blockade, Epidural anaesthesia, Caudal epidural). Block procedures: Brachial plexus block, Transverse abdominus plane block, Ankle block and Other blocks (optional).

CHAPTER – V

14. INTERNSHIP

(1) GENERAL

In order to make trained work force 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 larger number of hands on session, practice on simulators including zones models.

(2) SPECIFIC OBJECTIVES

At the end of the internship training, the student shall be able to:

- i) Diagnose clinical common disease conditions encountered in practice and make timely decision for referral to higher level;
- ii) Use discreetly the essential drugs, infusions, blood or its substitutes and laboratory services.
- iii) Manage all type of emergencies-medical, surgical obstetric, neonatal and paediatric, by rendering first level care;
- iv) Demonstrate skills in monitoring of the National Health Programme and schemes, oriented to provide preventive and promotive health care services to the community;
- v) Develop leadership qualities to function effectively as a leader of the health team organised to deliver the health and family welfare service in existing socio-economic, political and cultural environment;
- vi) Render services to chronically sick and disabled (both physical and mental) and to communicate effectively with patient and the community.

(3) Time allocation to each discipline is approximate and shall be guided more specifically by the actual experience obtained. Thus a student serving in a district or taluk hospital emergency room may well accumulate skill in surgery, orthopaedics, medicine, obstetrics and Gynaecology and Paediatrics during even a single night on duty. Responsible authorities from the medical college shall adjust the intern experience to maximize intern's opportunities to practice skills in patient care in rough approximation of the time allocation suggested.

(4) INTERNSHIP - TIME DISTRIBUTION

COMPULSORY

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

Subjects for Elective posting will be as follows:

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

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

(5) OTHER DETAILS

i) All parts of the internship shall be done as far as possible in institutions of India. In case of any difficulties, the matter may be referred to the Medical Council of India to be considered on individual merit.

ii) Every candidate will be required after passing the final MBBS examination to undergo compulsory rotational internship to the satisfaction of the College authorities and University concerned for a period of 12 months so as to be eligible for the award of the degree of Bachelor of Medicine and Bachelor of Surgery (MBBS) and full registration.

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

iv) The State Medical Council will grant provisional registration to the candidate on production of the provisional MBBS pass certificate. The provisional registration will be for a period of one year. In the event of the shortage or unsatisfactory work, the period of provisional registration and the compulsory rotating internship may be suitably extended by the appropriate authorities.

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

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

vii) In recognition of the importance of hands-on experience, full responsibility for patient care and skill acquisition, internship should be increasingly scheduled to utilize clinical facilities available in District Hospital, Taluka Hospital, Community Health Centre and Primary Health Centre, in addition to Teaching Hospital. A critical element of internship will be the acquisition of specific experiences and skill as listed in major areas:

(6) ASSESSMENT OF INTERNSHIP

i) The intern shall maintain a record of work which is to be verified and certified by the medical officer under whom he works. Apart from scrutiny of the record of work, assessment and evaluation of training shall be undertaken by an objective approach using situation tests in knowledge, skills and attitude during and at the end of the training. Based on the record of work and date of evaluation, the Dean/Principal shall issue certificate of satisfactory completion of training, following which the University shall award the MBBS degree or declare him eligible for it.

ii) Satisfactory completion shall be determined on the basis of the following:

1) Proficiency of knowledge required for each case

SCORE 0-5

2) The competency in skills expected to manage each case

- a) Competency for performance of self performance,
- b) of having assisted in procedures,
- c) of having observed.

SCORE 0-5

3) Responsibility, punctuality, work up of case, involvement in treatment, follow-up reports.

SCORE 0-5

4) Capacity to work in a team (Behaviour with colleagues, nursing staff and relationship with paramedicals).

SCORE 0-5

5) Initiative, participation in discussions, research aptitude.

SCORE 0-5

Poor / Fair / below average / average / above average / excellent

0 1 2 3 4 5

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

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

(8) Some guidelines in the implementation of the training programme are given below.

(9) INTERNSHIP - DISCIPLINE RELATED

(i) Community Medicine

Interns shall acquire skills to deal effectively with an individual and the community in the context of primary health care. This is to be achieved by hands on experience in the district hospital and primary health Centre. The details are as under: -

1) Community Health Centre/District Hospital/Attachment to General Practitioner:

1) During this period of internship an intern must acquire

(a) clinical competence for diagnosis of common ailments, use of bedside investigation and primary care techniques;

(b) gain information on 'Essential drugs' and their usage;

(c) recognise medical emergencies, resuscitate and institute initial treatment and refer to suitable institution.

2) Undergo specific Government of India/Ministry of Health and Family Welfare approved training using Government of India prescribed training manual for Medical Officers in all National Health Programmes (e.g. child survival and safe motherhood-EPI, CDD, ARI, FP, ANC, safe delivery, Tuberculosis, Leprosy and others as recommended by Ministry of Health and Family Welfare:-

- (a) gain full expertise in immunization against infectious disease;
 - (b) participate in programmes in prevention and control of locally prevalent endemic diseases including nutritional disorders;
 - (c) learn skills first hand in family welfare planning procedures;
 - (d) learn the management of National Health Programmes;
- 3) Be capable of conducting a survey and employ its findings as a measure towards arriving at a community diagnosis.
- 4) (a)conduct programmes on health education,
 (b)gain capabilities to use Audiovisual aids,
 (c)acquire capability of utilization of scientific information for promotion of community health.
- 5) Be capable of establishing linkages with other agencies as water supply, food distribution and other environmental/social agencies.
- 6) Acquire quality of being professional with dedication, resourcefulness and leadership.
- 7) Acquire managerial skills, delegation of duties to paramedical staff and other health professionals.

II) TALUQA HOSPITAL

Besides clinical skill, in evaluation of patient in the environment and initiation of primary care, an Intern shall: -

- 1)effective participate with other members of the health team with qualities of leadership;
 - 2)make a community diagnosis in specific situations such as epidemics and institute relevant control measures for communicable diseases;
 - 3)develop capability for analysis of hospital based morbidity and mortality statistics.
 - 4)Use essential drugs in the community with the awareness of availability, cost and side effects;
- 5)Provide health education to an individual/community on:
- a) tuberculosis;
 - b) small family, spacing, use of appropriate contraceptives;
 - c) applied nutrition and care of mothers and children;
 - d) immunization;

e) participation in school health programme.

III) PRIMARY HEALTH CENTRE

- 1) Initiate or participate in family composite health care (birth to death), Inventory of events;
- 2) Participation in all of the modules on field practice for community health e.g. safe motherhood, nutrition surveillance and rehabilitation, diarrhea disorders etc.
- 3) Acquire competence in diagnosis and management of common ailments e.g. malaria, tuberculosis, enteric fever, congestive heart failure, hepatitis, meningitis acute renal failure etc.;
- 4) Acquire proficiency for Family Welfare Programmes (ante natal care, normal delivery, contraception care etc.)
- 5) A village attachment of atleast one week to understand issues of community health along with exposure to village health centres, ASHA Sub Centres should be added.

(ii) GENERAL MEDICINE

I) Interns shall acquire following training during their term.

- 1) acquire competence for clinical diagnosis based on history physical examination and relevant laboratory investigation and institute appropriate line of management;
- 2) this would include diseases common in tropics (parasitic, bacterial or viral infections, nutritional disorders, including dehydration and electrolyte disturbances) and system illnesses.

II) The intern shall have assisted as a care team in intensive care of cardiac, respirator, hepatic, neurological and metabolic emergencies.

III) The intern shall be able to conduct the following laboratory investigations:

- a) Blood: (Routine haematology smear and blood groups);
- b) Urine: (Routine chemical and microscopic);
- c) Stool: (for ova/cyst and occult blood);
- d) Sputum and throat swab for gram stain or acid fast stain and
- e) Cerebro Spinal Fluid (CSF) for smear.

IV) Conduct following diagnostic procedures:

- a) Urethral catheterisation;
- Proctoscopy;
- Ophthalmoscopy/Otoscopy;
- Indirect laryngoscopy;

b) therapeutic procedures;
Insertion of Ryles Tube;
Pleural, ascetic tap, Cerebro Spinal Fluid (CSF) tap, installing or air way tube, Oxygen administration etc.

V) Biopsy Procedures:

Liver, Kidney, Skin, Nerve, Lymph node, and muscle biopsy, Bone marrow aspiration, Biopsy of Malignant lesions on surface, Nasal/nerve/skin smear for leprosy.

VI) (a) Familiarity with usage of life saving procedures:

including use of aspirator, respirator and defibrillator,

(b) Competence in interpretation of different monitoring devices such as cardiac monitor, blood gas analysis etc.

VII) Participate as a team member in total health care of an individual including appropriate follow-up and social rehabilitation.

VIII) Other competencies as indicated in general objectives.

(iii) PAEDIATRICS

The details of the skills that an intern shall acquire during his/her tenure in the department of Paediatrics are as follows:

The intern shall be able to:

1) diagnose and manage common childhood disorders including neonatal disorders and acute emergencies(enquiry from parents of sick children), examining sick child making a record of information;

2) carry out activities related to patient care such as laboratory work, investigative procedures and use of special equipments. The details are given as under:

(a) diagnostic techniques: blood (including from femoral vein and umbilical cord), obscess, cerebrospinal fluid, urine, pleura and peritoneum and common tissue biopsy techniques;

(b) techniques related to patient care: immunization, perfusion techniques, feeding procedures, tuberculin testing & breast feeding counselling;

(c) use of equipment: vital monitoring, temperature monitoring, resuscitation at birth and care of children receiving intensive care;

(3) screening of newborn babies and those with objective risk factors for any anomalies and steps for prevention in future;

(4) plan in collaboration with parents and individual, collective surveillance of growth and development of new born babies, infants and children so that he/she is able to:

- (a) recognise growth abnormalities;
- (b) recognise anomalies of psychomotor development;
- (c) detect congenital abnormalities;

(5) assess nutritional and dietary status of infants and children and organise prevention, detection and follow up of deficiency disorders both at individual and community level such as:

- (a) protein-energy malnutrition
- (b) deficiencies of vitamins especially A, B, C and D;
- (c) Iron deficiency;

(6) institute early management of common childhood disorders with special reference to Paediatrics dosage and oral rehydration therapy.

(7) Participate actively in public health programme oriented towards children in the community.

(iv) GENERAL SURGERY

An intern is expected to acquire following skills during his/her posting:

A) Diagnose with reasonable accuracy all surgical illnesses including emergencies.

B)(a) resuscitate a critically injured patient and a severe burns patient;
(b) control surface bleeding and manage open wound;

C)(a) monitor patients of head, spine, chest abdominal and pelvic injury;
(b) institute first-line management of acute abdomen;

D)(a) perform venesection;
(b) perform tracheostomy and endotracheal intubation;
(c) catheterise patients with acute retention or perform trocar cystostomy,
(d) drain superficial abscesses,
(e) suturing of wound,
(f) perform circumcision,
(g) biopsy of surface tumours,
(h) Perform vasectomy

(v) CASUALTY

The intern after training in Casualty must be able to:

- (1) identify acute emergencies in various disciplines of medical practice;
- (2) manage acute anaphylactic shock;

- (3) manage peripheral-vascular failure and shock;
- (4) manage acute pulmonary oedema and Left Ventricular failure (LVF);
- (5) undertake emergency management of drowning poisonings and seizures;
- (6) undertake emergency management of bronchial asthma and status asthmaticus;
- (7) undertake emergency management of hyperpyrexia;
- (8) undertake emergency management of comatose patients regarding airways positioning, prevention of aspiration and injuries;
- (9) assess and administer emergency management of burns;
- (10) assess and do emergency management of various trauma victims;
- (11) identify medicolegal cases and learn filling up forms as well as complete other medicolegal formalities in cases of injury, poisoning, sexual offenses, intoxication and other unnatural conditions.

(vi) OBSTETRICS AND GYNAECOLOGY

Technical skills that interns are expected to learn:

- (1) diagnosis of early pregnancy and provision of ante-natal care;
- (2) diagnosis of pathology of pregnancy related to
 - (a) abortions;
 - (b) ectopic pregnancy;
 - (c) tumours complicating pregnancy;
 - (d) acute abdomen in early pregnancy;
 - (e) hyperemesis gravidarum;
- (3) detection of high risk pregnancy cases and suitable advise e.g. PIH, hydramnios, antepartum haemorrhage, multiple pregnancies, abnormal presentations and intra-uterine growth retardation;
- (4) antenatal pelvic assessment and detection of cephalopelvic disproportion;
- (5) induction of labour and amniotomy under supervision;
- (6) management of normal labour, detection of abnormalities, post-partum hemorrhage and repair of perennial tears;
- (7) assist in forceps delivery;
- (8) assist in caesarean section and postoperative care thereof;
- (9) detection and management of abnormalities of lactation;
- (10) perform non-stress test during pregnancy;
- (11) per speculum, per vaginum and per rectal examination for detection

of common congenital, inflammatory, neoplastic and traumatic conditions of vulva, vagina, uterus and ovaries;

(12) medicolegal examination in Gynecology and obstetrics.

(13) To perform the following procedures:

- (a) dilation and curettage and fractional curettage;
- (b) endometrial biopsy;
- (c) endometrial aspiration;
- (d) pap smear collection;
- (e) Intra Uterine Contraceptive Device (IUCD) insertion;
- (f) Minilap ligation;
- (g) Urethral catheterisation;
- (h) Suture removal in postoperative cases;
- (i) Cervical punch biopsy;

(14) to assist in major abdominal and vaginal surgery cases in Obstetrics and Gynaecology.

(15) to assist in follow-up postoperative cases of obstetrics and gynaecology such as:

- (a) Colposcopy;
- (b) Second trimester Medical Termination of Pregnancy (MTP) procedures e.g. Emcredyl Prostaglandin instillations;

(16) To evaluate and prescribe oral contraceptive.

(vii) OTO RHINO LARYNGOLOGY (ENT)

(1) Interns shall acquire ability for a comprehensive diagnosis of common Ear, Nose and Throat (ENT) diseases including the emergencies and malignant neoplasma of the head and neck;

(2) he/she shall acquire skills in the use of head mirror, otoscope and indirect laryngoscopy and first line of management of common Ear Nose and Throat (ENT) problems;

(3) he/she shall be able to carry out minor surgical procedures such as:

- (a) earsyringing antrum puncture and packing of the nose for epistaxis,
- (b) nasal douching and packing of the external canal,
- (c) Remove the foreign bodies from the nose and ear
- (d) Observed or assisted in various endoscopic procedures and trachesotomy;

(4) an item shall have participated as a team member in the community diagnosis e.g. Chronic Suppurative Otitis Media (CSOM) and be aware of national programme on prevention of deafness

(5) he/she shall possess knowledge of various ENT rehabilitative programmes.

(viii) OPHTHALMOLOGY

(1) he/she shall be able to diagnose common ophthalmological conditions such as:- Trauma, Acute conjunctivitis, allergic conjunctivitis, xerosis, corneal ulcer, myopia, hypermetropia, cataract, glaucoma, ocular injury and sudden loss of vision.

(2) he/she shall be able to diagnose ocular changes in common systemic disorders;

(3) he/she shall be able to perform investigative procedures such as: Tonometry, syringing, direct ophthalmoscopy, and fluorescein staining of cornea.

(4) he/she shall have carried out or assisted the following procedures:

- (a) Ocular bandaging;
- (b) Removal of concretions;
- (c) Epilation
- (d) Corneal foreign body removal;
- (e) Chalazion removal;
- (f) Glaucoma surgery - assisted
- (g) Enucleation of eye in cadaver - assisted

(5) he/she shall have full knowledge on available methods for rehabilitation of the blind.

(ix) ORTHOPAEDICS

GOAL

The aim of teaching the undergraduate student in Orthopaedics and Rehabilitation is to impart such knowledge and skills that may enable him to diagnose and treat common ailments. He shall have ability to diagnose and suspect presence of fracture, dislocation, acute osteomyelitis, acute poliomyelitis and common congenital deformities such as congenital talipes equinovarus (CTEV) and dislocation of hip (CDH).

(A) THERAPEUTIC - An intern must know:

- (a) Splinting (plaster slab) for the purpose of emergency splintage, definitive splintage and post operative splintage and application of Thomas splint;
- (b) Manual reduction of common fractures - phalangeal, metacarpal, metatarsal and Colles's fracture;
- (c) Manual reduction of common dislocations - interphalangeal, metacarpophalangeal, elbow and shoulder dislocations;
- (d) Plaster cast application for undisplaced fractures of arm, fore arm, leg and ankle;

- (e) Emergency care of a multiple injury patient;
- (f) Precautions about transport and bed care of spinal cord injury patients.

(B) Skill that an intern should be able to perform under supervision:

- (1) Advise about prognosis of poliomyelitis, cerebral palsy, CTEV and CDH;
- (2) Advise about rehabilitation of amputees and mutilating traumatic and leprosy deformities of hand;

(C) An intern must have observed or preferably assisted at the following operations:

- (1) drainage for acute osteomyelitis;
- (2) sequestrectomy in chronic osteomyelitis;
- (3) application of external fixation;
- (4) internal fixation of fractures of long bones.

(x) DERMATOLOGY AND SEXUALLY TRANSMITTED DISEASES

An intern must be able to: -

- (1) conduct proper clinical examination; elicit and interpret physical findings, and diagnose common disorders and emergencies.
- (2) Perform simple, routine investigative procedures for making bedside diagnosis, specially the examination of scraping for fungus, preparation of slit smears and staining for AFB for leprosy patient and for STD cases;
- (3) Take a skin biopsy for diagnostic purpose;
- (4) Manage common diseases recognizing the need for referral for specialized care in case of inappropriateness of therapeutic response.

(xi) PSYCHIATRY

An Intern must be able to:

- (1) diagnose and manage common psychiatric disorders;
- (2) identify and manage psychological reaction and psychiatric disorders in medical and surgical patients in clinical practice and community setting.

(xii) TUBERCULOSIS AND RESPIRATORY DISEASES

The student must acquire the following skills during internship:

1. Interview the patient, elicit relevant and correct information and describe the history in chronological order;
2. Conduct clinical examination, elicit and interpret clinical findings and diagnose common respiratory disorders and emergencies;
3. Perform simple, routine investigative and office procedures required for making the bed side diagnosis, especially sputum collection and examination for etiologic organisms especially Acid Fast Bacilli (AFB), interpretation of the chest x-ray and respiratory function test;
4. Interpret and manage various blood gases and PH abnormalities in various respiratory diseases.

5. Manage common diseases recognizing need for referral for specialized care, in case of inappropriateness of therapeutic response;
6. Assist in the performance of simple procedures like pleural aspiration, intercostal tube drainage
7. Communicate with and educate TB patients and their families about the nature of illness, drugs and duration of treatment and close contact screening.

(xiii) ANAESTHESIA

After the internship in the department of Anesthesiology an intern shall acquire knowledge, skill and attitude to:

- (1) perform pre-anaesthetic check up and prescribe pre-anaesthetic medications;
- (2) perform venepuncture and set up intravenous drip;
- (3) perform laryngoscopy and endotracheal intubation;
- (4) perform lumbar puncture, spinal anaesthesia and simple nerve blocks;
- (5) conduct simple general anaesthetic procedures under supervision;
- (6) monitor patients during anaesthesia and post operative period;
- (7) recognise and manage problems associated with emergency anaesthesia;
- (8) maintain anaesthetic records;
- (9) recognise and treat complication in post operative period;
- (10) perform cardio-pulmonary brain resuscitation (C.P.B.R.) correctly, including recognition of cardiac arrest.

(xiv) RADIO-DIAGNOSIS

An intern after training must be able to identify and diagnose:

- (1) all aspects of 'Emergency Room' Radiology like
 - (a) all acute abdominal conditions;
 - (b) all acute traumatic conditions with emphasis on head injuries;
 - (c) differentiation between Medical and surgical radiological emergencies;
- (2) Basic hazards and precautions in Radio-diagnostic practices.

(xv) PHYSICAL MEDICINE AND REHABILITATION

An intern is expected to acquire the following skills during his/her internship

- (1) competence for clinical diagnosis based on details history an assessment of common disabling conditions like poliomyelitis, cerebral palsy, hemiplegia, paraplegia, amputations etc;
- (2) participation as a team member in total rehabilitation including appropriate follow up of common disabling conditions;
- (3) principles and procedures of fabrication and repair of artificial limbs and appliances;

- (4) various therapeutic modalities;
- (5) use of self help devices and splints and mobility aids;

- (6) familiarity with accessibility problems and home making for disabled;

- (7) ability to demonstrate simple exercise therapy in common conditions like prevention of deformity in polio, stump exercise in an amputee etc.;

(xvi) FORENSIC MEDICINE AND TOXICOLOGY

The intern is to be posted in the casualty department of the hospital while attached under Forensic Medicine Department with the following objectives:

- (1) to identify medicolegal problem in a hospital and general practice;
- (2) to identify and learn medicolegal responsibilities of a medical man in various hospital situations;
- (3) to be able to diagnose and learn management of basic poisoning conditions in the community;
- (4) to learn how to handle cases of sexual assault;
- (5) to be able to prepare medico-legal reports in various medicolegal situations;
- (6) to learn various medicolegal post-mortem procedures and formalities during its performance by police.

APPENDICES

APPENDIX A

A comprehensive list of skills recommended as desirable for Bachelor of Medicine and Bachelor of Surgery (MBBS) Graduate:

I. Clinical Evaluation:

- (a) To be able to take a proper and detailed history.
- (b) To perform a complete and thorough physical examination and elicit clinical signs.
- (c) To be able to properly use the stethoscope, Blood Pressure, Apparatus Auroscope, Thermometer, Nasal Speculum, Tongue Depressor, Weighing Scales, Vaginal Speculum etc.:
- (d) To be able to perform internal examination-Per Rectum (PR), Per Vaginum (PV) etc.
- (e) To arrive at a proper provisional clinical diagnosis.

II. Bed side Diagnostic Tests:

- (a) To do and interpret Haemoglobin(HB), Total Count (TC), Erythrocytic Sedimentation Rate (ESR), Blood smear for parasites, Urine examination /albumin /sugar /ketones /microscopic.
- (b) Stool exam for ova and cysts;
- (c) Gram, staining and Siehl-Nielsen staining for AFB;
- (d) To do skin smear for lepra bacilli
- (e) To do and examine a wet film vaginal smear for Trichomonas
- (f) To do a skin scraping and Potassium Hydroxide (KOH) stain for fungus infections;
- (g) To perform and read Montoux Test.

III. Ability to Carry Out Procedures:

- (a) To conduct CPR (Cardiopulmonary resuscitation) and First aid in newborns, children and adults.
- (b) To give Subcutaneous (SC) /Intramuscular(IM) /Intravenous(IV) injections and start Intravenous (IV) infusions.
- (c) To pass a Nasogastric tube and give gastric leavage.
- (d) To administer oxygen-by masic/eatheter
- (e) To administer enema
- (f) To pass a ruinary catheter- male and female
- (g) To insert flatus tube
- (h) To do pleural tap, Ascitic tap & lumbar puncture
- (i) Insert intercostal tube to relieve tension pneumothorax
- (j) To control external Haemorrhage.

IV. Anaesthetic Procedure:

- (a) Administer local anaesthesia and nerve block
- (b) Be able to secure airway potency, administer Oxygen by Ambu bag.

V. Surgical Procedures:

- (a) To apply splints, bandages and Plaster of Paris (POP) slabs;
- (b) To do incision and drainage of abscesses;
- (c) To perform the management and suturing of superficial wounds;
- (d) To carry on minor surgical procedures, e.g. excision of small cysts and nodules, circumcision, reduction of paraphimosis, debridement of wounds etc.
- (e) To perform vasectomy;
- (f) To manage anal fissures and give injection for piles.

VI. Mechanical Procedures:

- (a) To perform thorough antenatal examination and identify high risk pregnancies.
- (b) To conduct a normal delivery;
- (c) To apply low forceps and perform and suture episiotomies;
- (d) To insert and remove IUD's and to perform tubectomy

VII. Paediatrics:

- (a) To assess new borns and recognise abnormalities and I.U. retardation
- (b) To perform Immunization;
- (c) To teach infant feeding to mothers;
- (d) To monitor growth by the use of 'road to health chart' and to recognize development retardation;
- (e) To assess dehydration and prepare and administer Oral Rehydration Therapy (ORT)
- (f) To recognize ARI clinically;

VIII. ENT Procedures:

- (a) To be able to remove foreign bodies;
- (b) To perform nasal packing for epistaxis;
- (c) To perform trachesotomy

IX. Ophthalmic Procedures:

- (a) To evert eye-lids;
- (b) To perform epilation of eye-lashes;
- (c) To perform nasolacrimal duct syringing for patency

X. Dental Procedures:

To perform dental extraction.

XI. Community Healthy:

- (a) To be able to supervise and motivate, community and para-professionals for corporate efforts for the health care;
- (b) To be able to carry on managerial responsibilities, e.g. Management of stores, indenting and stock keeping and accounting
- (c) Planning and management of health camps;
- (d) Implementation of national health programmes;
- (e) To effect proper sanitation measures in the community, e.g. disposal of infected garbage, chlorination of drinking water;
- (f) To identify and institute and institute control measures for epidemics including its proper data collecting and reporting.

XII.Forensic Medicine Including Toxicology:

- (a) To be able to carry on proper medicolegal examination and documentation of injury and age reports.
- (b) To be able to conduct examination for sexual offences and intoxication;
- (c) To be able to preserve relevant ancillary material for medico legal examination;
- (d) To be able to identify important post-mortem findings in common un-natural deaths.

XII.Management of Emergency:

- (a) To manage acute anaphylactic shock;
- (b) To manage peripheral vascular failure and shock;
- (c) To manage acute pulmonary oedema and LVF;
- (d) Emergency management of drowning, poisoning and seizures
- (e) Emergency management of bronchial asthma and status asthmaticus;
- (f) Emergency management of hyperpyrexia;
- (g) Emergency management of comatose patients regarding airways, positioning prevention of aspiration and injuries
- (h) Assess and administer emergency management of burns.

APPENDIX B

Curriculum in 'Family Welfare' for the Bachelor of Medicine and Bachelor of Surgery (MBBS) Course.

The Curriculum may be considered under various pre and para clinical heads and the following details are worked out for each of the disciplines.

1. Anatomy:

- (1) Gross and microscopic anatomy of the male and female generative organs.
- (2) The menstrual cycle.
- (3) Spermatogenesis and Oogenesis
- (4) Fertilization of the ovum.
- (5) Tissue and organ changes in the mother in pregnancy.
- (6) Embryology and Organogenesis.
- (7) Principles of Genetics.
- (8) Applied anatomy of mechanical methods of preventing conception.
 - a) in female - chemical contraceptive, pessaries, Intra-Uterine Contraceptive Device (IUCD), tubectomy etc.
 - b) in male - condom, vasectomy etc.

2. Physiology:

- (1) Physiology of reproduction.
- (2) Endocrines and regulations of reproduction in the female
- (3) Endocrines and physiology of reproduction in the male.
- (4) Physiology and Endocrinology of pregnancy, parturition and lactation.
- (5) Nutritional needs of mother and child during pregnancy and lactation.
- (6) The safe period-rhythm method of contraceptions.
- (7) Principles of use of oral contraceptive.

3. Pharmacology:

- (1) Mode of action and administration of:
 - (a) Chemical contraceptive
 - (b) Oral contraceptive
- (2) Contra indication for administration of contraceptives.
- (3) Toxic effects of contraceptives.

4. Community Medicine:

- (1) The need for family welfare Planning.
- (2) Organization of Family Welfare Planning service.
- (3) Health Education in relating to Family Welfare Planning.
- (4) Nutrition.
- (5) Psychological needs of the mother, the child and the family.
- (6) Demography and vital Statistics.

5. Obstetrics & Gynaecology:

(1) Contraceptive methods in male/female

(a) Mechanical

- A. Pessaries, Intra Uterine Contraceptive Device (IUCD), Condoms
- B. Tubectomy and vasectomy

(b) Chemical

(c) Oral

(d) Rhythm Method

(2) Demonstrations of use of Pessaries, IUCD, Condoms and technique of Tubectomy.

(3) Advice on family planning to be imparted to parents.

6. Paediatrics:

(1) Problems of child health in relation to large family.

(a) Organization of pediatric services.

(b) Nutritional problems of mother and child.

(c) Childhood diseases due to overcrowding.

7. Surgery:

Technique of Vasectomy.

I. Compulsory Internship

Placement of a student for in-service training in a family welfare planning clinic for a period of at least one month.

II. Examination

It is necessary that questions on family welfare planning be introduced in the theory, practical and oral examination throughout the MBBS course.

The curriculum content has been indicated subjectwise. However, it would be more advantageous to the student for purpose of integrated learning and for understanding of the subject if family welfare planning instruction with the curriculum content indicated could be divided into two parts.

Part-I

Anatomy, Physiology, Biochemistry and Pharmacology

There shall be close integration in the teaching of these subjects. It is suggested that during the early para-clinical years, two to three weeks may be set apart for instruction in Family Welfare Planning relating to these subjects; so that the student gets an overall understanding of the principles and practice of "Family Planning" within the limited time available for covering all the subjects of the medical course. The method suggested would save time and repetition of essential facts.

Part-II

This includes the later para-clinical and clinical courses. The practical aspects of Family Welfare Planning methods should be emphasized. The program of instruction shall be supervised by the Department of Obstetrics and Gynaecology. The department of Community Medicine Internal Medicine, Psychiatry, Paediatrics and Surgery must be closely associated in imparting instruction relating to the problems arising for want of family welfare planning and the advantages to society and the individual which will be gained by adopting the measures suggested.

Seminars:

The medical colleges shall organise occasional seminars in which staff from all departments and the in-service trainees shall participate.

APPENDIX C

Prescribed Teaching Hours and Suggested Model Time Tables

Following minimum teaching hours are prescribed in various disciplines:

A. Pre-Clinical Subjects: (Phase-1-First and Second Semester)

Anatomy	650 Hrs.
Physiology	480 Hrs.
Biochemistry	240 Hrs.
Community Medicine	60 Hrs.

B. Para-Clinical Subjects: (Phase-II 3rd to 5th Semester)

Pathology	300 Hrs.
Pharmacology	300 Hrs.
Microbiology	250 Hrs.
Community Medicine	200 Hrs. (including 8 weeks postings of 3 hrs each)
Forensic Medicine	100 Hrs.

Teaching of para-clinical subjects shall be 4 hrs per day in 3rd Hrs Semester and 3Hrs per day in 4th and 5th Semesters (See attached Time Table)

C. Clinical Subjects

1. Clinical postings as per chart attached.

2. Theory lectures, demonstrations and Seminars etc.in addition to clinical postings as under. The clinical lectures to be held from 4th Semester onwards (See attached Time Table)

- Gen-Medicine	300 Hours	Gen. Surgery	300 Hours
- Paediatrics	100 Hours	Orthopedics	100 Hours
- T.B. and Chest	20 Hours	Ophthalmology	100 Hours
- Psychiatry	20 Hours	ENT	70 Hours
- Skin and STD	30 Hours	Radiology	20 Hours
- Community Medicine	50 Hours	Dentistry	10 Hours
- Anaesthesia	20 Hours	Obst & Gynae.	300 Hours inclusive

Note

This period of training is minimum suggested. Adjustments where required depending on availability of time be made.

This period of training does not include university examination period. Extra time available be devoted to other Sub-specialities.

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

Subjects	3rd Semester weeks	4th Semester weeks	5th Semester weeks	6th Semester weeks	7th Semester weeks	8th Semester weeks	9th Semester weeks	Total
General Medicine	6	-	4	-	4	6	6	26
Paediatrics	-	2	-	2	2	4	-	10
TB & Chest	-	2	-	-	-	-	-	02
Skin & STD	-	2	-	2	-	2	-	06
Psychiatry	-	-	2	-	-	-	-	02
Radiology	-	-	-	-	2	-	-	02
Gen Surgery	6	-	4	-	4	6	6	26
Orthopaedics	-	-	4	4	-	-	2	10
Ophthalmology	-	4	-	4	-	-	-	08
ENT	-	4	-	4	-	-	-	08
Obst. &Gyn. And Family Planning	2	4	4	-	4	4	6	24
Comm. Med.	4	4	-	4	-	-	-	12
Casualty	-	-	-	2	-	-	-	02
Dentistry	-	-	-	-	2	-	-	02
Total	18	22	18	22	18	22	20	140

Clinical methods in Medicine and Surgery for whole class will be for 2 weeks each respectively at the start of 3rd semester. This posting will include training in Radiodiagnosis & Radiotherapy where existent.

This posting includes exposure to Rehabilitation Physiotherapy

This posting includes exposure to laboratory medicine and infectious diseases.

This includes exposure to dressing and Anaesthesia.

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

Phase – II
Third Semester

Days/ Time	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4
Mon	Para Clinical Lectures		Clinical Postings		Para Clinical Lectures		Practicals	
Tues	do		do		do		Para-Clinical	
Wed	do		do		do	L	Do	
Thurs	do		do		do	U	Do	
Fri	do		do		do	N	Do	
Sat	do		do		do	C	Do	
						H		

Note: These are suggested time tables. Adjustments where required, depending upon the availability of time and facility, be made.

Fourth and Fifth Semester

Days/ Time	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4
Mon	Lectures In Clinical Subjects		Clinical Postings		Lectures in Clinical Subjects		Practicals	
Tues	do		do		do		Para-Clinical	
Wed	do		do		do	L	Do	
Thurs	do		do		do	U	Do	
Fri	do		do		do	N	Do	
Sat	do		do		do	C	Do	
						H		

Seventh, Eighth and Ninth Semester

Days/ Time	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4
Mon	Lectures In Clinical Subjects		Clinical Postings		Lectures in Demonstration in Clinical Subjects		Practicals Demonstration In Clinical Subjects	
Tues	do		do		do	L U N C H	Para-Clinical	
Wed	do		do		do		Do	
Thurs	do		do		do		Do	
Fri	do		do		do		Do	
Sat	do		do		do		Do	

Note: These are suggested time tables. Adjustments where required, depending upon the availability of time and facility, be made.