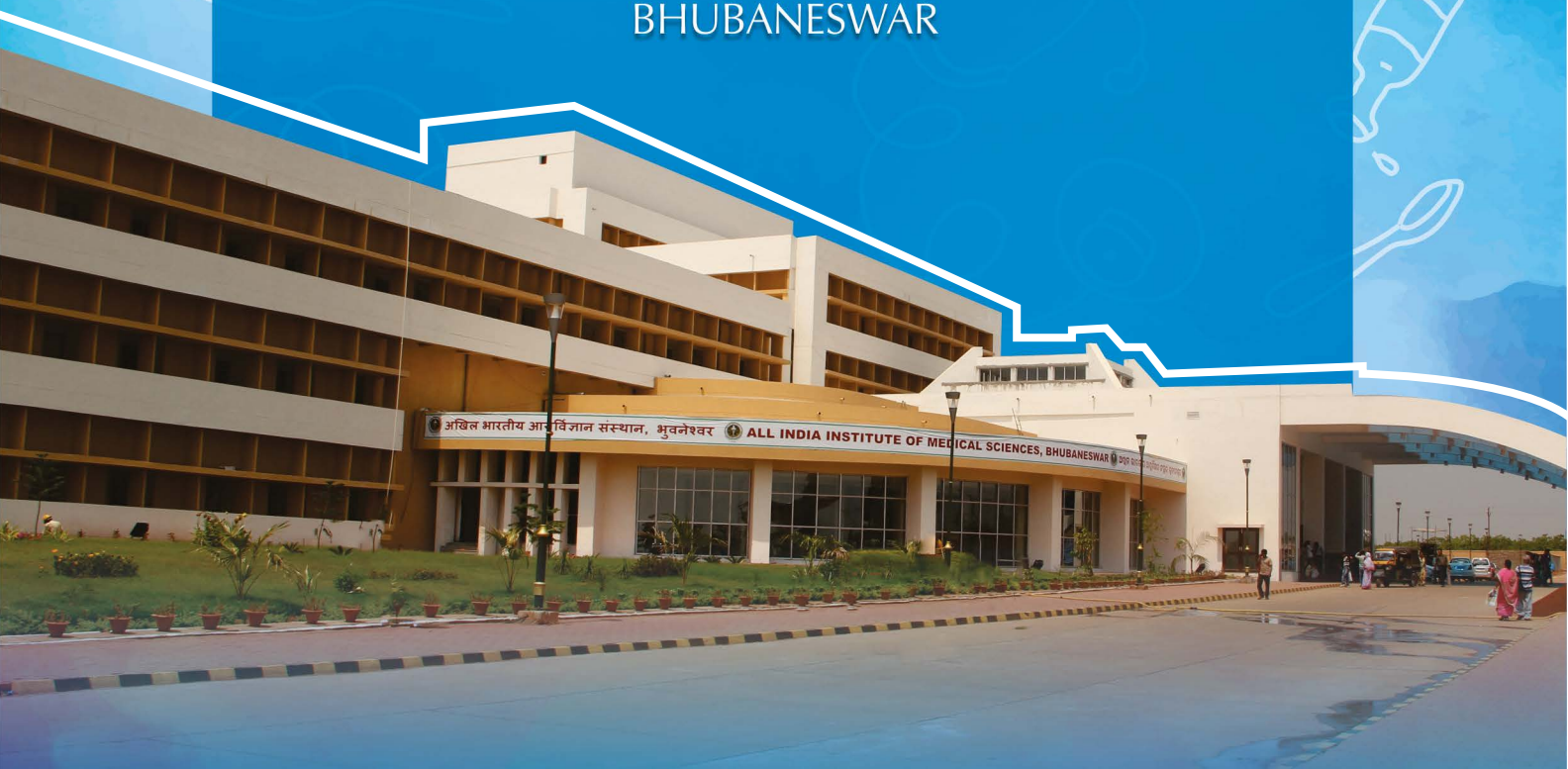
MBBS CURRICULUM 2017-18

ALL INDIA INSTITUTE OF MEDICAL SCIENCES
BHUBANESWAR



FOREWORD

It gives me immense pleasure to write the foreword for the AIIMS Bhubaneswar undergraduate medical curriculum 2018. Since its inception in 2012, AIIMS Bhubaneswar was following the curriculum of AIIMS, New Delhi. The curriculum for community and family medicine was prepared by the faculty of that department in collaboration with all the six new AIIMS and incorporated. After my joining the institute nearly two years ago, an effort was made to critically analyse the curriculum, receive feedback from stake holders, identify the elements that needed to be removed, introduced or changed and come up with a modified, revamped curriculum, taking in the best elements of different curricula in India and elsewhere.

Claude Bernard once said “it is what we know already that often prevents us from learning“. This is so true of curricular development. Not only must the content be relevant and current, it must also be delivered in a manner that is attractive and can relate to the aspirations of the new age learner. Assessment methods should not only be appropriate but also feasible so that faculty are not overloaded and can manage their teaching assignments with the focus and commitment they deserve. Changing a curriculum becomes very challenging because many faculty have learnt and have been exposed to limited types of curricula and hence find it difficult to accept and adapt to what is not familiar to them. Therefore, change should be made with care and due diligence should be paid to whether the infrastructure, logistic support and faculty training are in place to effect the envisaged changes. I strongly believe these are in place at AIIMS Bhubaneswar.

My sincere thanks to the Department of Medical Education, Jawaharlal institute of Post-Graduate Medical Education & Research, Puducherry for training our faculty members on curriculum development and various principles of medical education. My thanks are also due to the members of the Board of Studies (UG) and to the Academic Committee for their comments and criticism which improved this document immensely. My appreciation goes to the Medical Education Unit of AIIMS Bhubaneswar for undertaking this enormous task and successfully completing it despite many hurdles. I believe every curriculum should come with an expiry date and I hope, after three years, we will redo this exercise so that, our medical UG curriculum will always stay updated.

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AIIMS Bhubaneswar

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UNDERGRADUATE CURRICULUM
AIIMS BHUBANESWAR
2018

A. 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 and rehabilitative aspect of medicine.
2. The training would be broad based and flexible, aiming to provide an educational experience of the essentials required for health care in our country as well as be of such quality so as to be able to meet internationally acceptable standards.
3. The educational experience would emphasize health, wellness and community orientation.
4. Enough experiences will be provided for self-learning. Methods and techniques that would ensure this process would become a part of teaching-learning process.
5. Adequate emphasis would be placed on cultivating logical and scientific habits of thought, clarity of expression and independence of judgment,as well as the ability to collect and analyse information and correlate them. Every attempt would be made to encourage students to participate in small group discussions and seminars, to enable them to develop personality, character, expression of ideas and other characteristics which are necessary for a medical graduate to function either in solo practice or as a team leader.
6. Faculty members should avail of modern educational technology while teaching the students and in order to attain this objective. The Medical Education Unit shall organise CMEs and Workshops for faculty development and provide learning experinces and traning to the teachers.
7. 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 course.
8. Students will be trained to be a:
    - Clinician who understands and provides preventive, promotive, curative, palliative and holistic care with compassion.
    - Leader and member of the health care team and system with capabilities to collect, analyze and synthesize health data.
    - Communicator with patients, families, colleagues and community.
    - Lifelong learner committed to continuous improvement of skills and knowledge.
    - Professional, who is committed to excellence, is ethical, responsive and accountable to patients, community, and the profession.

B. Goals and objectives of undergraduate course (MBBS)

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

1. Diagnose and manage common health problems of the individual and the community appropriate to his/her position as a member of the health team at primary, secondary and tertiary levels.
2. Practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems;
3. Practice Evidence Based Medicine, appreciating the rationale for different therapeutic modalities and be familiar with the administration of “essential drugs” and their common side effects;
4. Appreciate the psycho-social, cultural, economic and environmental factors affecting health and develop humane attitude towards the patients/relatives, in discharging one’s professional responsibilities;
5. Be familiar with the various National Health Programs, and the ways in which they are being implemented, and actively participate in implementation of these programmes;
6. Acquire basic management skills in the area of materials, financial and human resources;
7. Demonstrate communication skills, both verbal and written to establish effective communication with the clients (patients, relatives and general public), health team partners, and scientific community;
8. Practice medical ethics in patient care, service delivery, and research.
9. Develop attitude for self learning and acquire necessary skills including the use of appropriate technologies, for pursuing self directed learning for a life time.

Duration of the Undergraduate medical course years

The total duration of undergraduate MBBS course will be including Internship

New Elements to be introduced

1. Foundation Course
2. Horizontal and vertical integration of systems and topics
3. Early clinical exposure
4. Early community exposure
5. Electives for 8 weeks
6. Skill Development & Training including Basic Life Support, First Aid, Trauma care etc.
7. Patient safety protocols
8. Adoption of contemporary education technologies
9. Humanities and languages

10. Computer and technology in Medicine
11. Exit OSCE at the end of internship
12. Evening clinics and clerkship
13. Feedback after each Professional exam and Internship
14. Only internal examiners for Professional examinations

Examination:

Regulations –

Examination Regulations –

Minimum criteria for qualifying to appear in professional examinations.

1. ***Attendance:***

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

   b. Even if there is shortage of attendance in one subject, he/ she will be detained for the full examination and will appear in supplementary examination.

   c. A 3% relaxation in attendance may be considered in special cases depending on the Director's discretion on a case to case basis, provided the candidate has passed his/her internal examination

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

   e. If a student is debarred to appear in the first Professional Examination due to insufficient attendance, he/she would require to start the classes afresh for the next regular examination of next batch.

   f. For other Professional examination he/ she should have to show the required number of hours before being allowed to sit in the next Professional Examination.

2. ***Marks for passing examination:***

   a. Students must secure at least 50% of total marks to pass in any examination conducted in any subject (theory and practical separately).

   b. If a candidate fails either in theory or in practical/clinical Examination of a subject he / she will be declared failed in that subject and he / she will have to appear for both theory and practical / clinical Examination again.

3. ***Internal Assessment/Formative Assessment:***

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

   b. Regular periodical examinations shall be conducted throughout the course, by individual Departments.

   c. At the end of each semester, an end-semester examination would be conducted by the department concerned.

   d. Dean's office will notify the dates of the end semester examination

   e. A student has to pass a minimum of n-1 tests conducted in the department and the end semester examination (n= total number of exams). The calculation would be as per the formula ∑(n-1)/ n-1.

   f. **For first M.B.,B.S. students, the pattern of internal assessment will be as below:** Weekly tests – Each week there will be a test which may consist of either Theory/ Viva/ Practical. It is expected that there will be at least 15 theory/viva tests and 5 practical tests (total of at least 20 tests/academic year). Each test will carry 25 marks. The total number of tests are designated as "n".

End-semester examinations –

1st end semester (in January):	2 Theory papers: 100 marks each Practical and viva: 80 +20 = 100 marks
Pre- professional exam (in 1st week of June):	2 Theory papers: 100 marks each Practical and viva: 80 +20 = 100 marks

Calculation of Internal marks -

Eligibility for 1st MBBS

1. "Weekly tests (if "X" is the marks):
   - Each test carries 25 marks
   - $X_{Obtained}$
     - Total marks obtained by the candidate minus 3 least scores or, ∑n-3 least scores
   - X_{total}
     - If n is the total number of tests conducted, then total marks for all weekly tests is nX25 minus 75
2. 1st End Semester exams
   - $Y_{obtained}$
     - Total marks obtained by the candidate
   - Y_{total}
     - 300 OR 200 (Theory)+ 100 (Practical)

3. 1st End Semester exams

- $Z_{obtained}$
  - Total marks obtained by the candidate
- Z_{total}
  - 300 OR 200 (Theory)+ 100 (Practical)

The candidate is eligible if

$X_{Obtained} + Y_{Obtained} + Z_{obtained} \geq 50\%$ of $X_{Total} + Y_{Total} + Z_{Total}$

g. An improvement examination will be conducted by the concerned department for candidates failing to qualify for a professional examination. If a candidate scores > 50% for theory and practical separately, he/she will be allowed to appear in the Supplementary examination of the current batch(This will be reflected in the result and attempt certificate). Failing which he/she will have to appear with the next batch.

h. 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.

i. Marks from internal assessment will not be carried into Professional examination.

j. Pre professional examination is mandatory.

1. Students not coming for pre professional examination will loose out on (n-1).
2. For Director's discretion these students would not be considered.

k. Students sitting in supplimentary examination without appearing professional examination would be reflected in certificate.

NB:

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

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.

Roster for End Semester Examinations to be notified by Dean's Office

1st End Semester Examination: Commences 4th January

1st Pre-professional Examination: Commences 1st week of June

3rd End Semester Examination: Commences 2nd week of December

4th End Semester Examination: Commences 3rd week of April

5th End Semester/Pre-professional Examination: Commences 2nd week of October

6th End Semester Examination: Commences 1st week of May

7th End Semester/Pre-professional Examination: Commences 1st week of November

8th End Semester Examination: Commences 1st week of May

9th End Semester/ Pre-professional Examination: Commences 2nd week of October

4. Professional Examinations:

a. All professional examinations shall be conducted by Controller of Examination, AIIMS, Bhubaneswar.

b. Theory papers will be prepared by external subject experts as prescribed in each subject, which would be vetted by in house faculty. For setting of question paper, external subject expert shall use the model question paper as a guide. At least 70% of the theory paper should be from 'must know' portions, 25% from 'desirable to know' portions and 5% from 'nice to know' portions.

c. The distribution of marks across subjects in the various Professionals (Theory and Practical) is given in the table later, along with the assessment scheme of theory and practical for the various subjects in subsequent pages.

d. Examiners – 4 faculty from the individual departments would be the examiners for the Professional examination. The senior most internal examiner may be designated as Chairman of the exam in that subject. The Chairman shall draw the guidelines for conduct of examination to be followed by other examiners to ensure uniformity. In allied subjects (e.g orthopaedics, dermatology etc) 1 examiner would be there for a particular subject. In case there are less than 4 faculty in a Department then external examiners may be called for.

e. Except Head of the department of subject concerned, all other faculty with requisite qualifications and experience shall be appointed internal examiners by rotation in their subjects. An Assistant Professor of 5 years of teaching experience after obtaining PG degree may be considered for appointment as examiner.

Observers (External Subject Experts) –

All examiners shall be appointed by the Controller of Examination from the panel of examiners with the approval of the Director or by the controller of examination only provided the Director may at his discretion delegate the authority to him. The appointed external subject expertwould be invited to check the examination process. He/She would be from a Government Medical College Hospital preferably from an INI. He/She would pay a surprise visit to the department during the course of Professional examination for a day or two. The observer would submit

a confidential report to the Director of the Institute on the conduct of the examination. The Director would assess the report and inform the Department, concerned if required.

No person shall be appointed as external subject expert, unless he/she has at least five year teaching experience after obtaining PG degree in the subject concerned from recognised medical institution/college.

Honorary/Emeritus/Visiting Professors or part time/ad-hoc teachers are not eligible to be appointed as internal examiners

N:B. The internal examiner in a subject shall not accept external examiner ship for a college from which external subject expert appointed in the same year. External observers shall rotate at an interval of 2 years.

5. Rules for supplementary examination:

1st Professional students – Those candidates who are unsuccessful in 1st Professional examination will be permitted to appear in the supplementary examination in the concerned subject, which will be held after 6 weeks of final exams.

A student has to pass in all 3 subjects in the 1st Professional examination (including supplementary examination) in order to be allowed to attend classes/clinics of 3rd semester.

A student, who has failed both; i.e. professional and supplementary examination, will have to attend classes with the junior batch and qualify as per rules

2nd Professional students - Those candidates who are unsuccessful in 2nd Professional examination will be permitted to appear in the supplementary examination in the concerned subject, which will be held after 6 weeks of final exams.

3rd Professional students - Those candidates who are unsuccessful in 3rd Professional examination will be permitted to appear in the supplementary examination in the concerned subject, which will be held after 6 weeks of final exams.

Appearance for a supplementary examination will be counted as an attempt

4th Professional - Compartmental examination will be conducted for the 4th Professional MBBS candidates who have failed in only one subject of the 4th professional.
This compartmental examination will not be counted as an attempt.

Students who could not appear in December because of emergency issues like:

a. Bereavement in immediate family
b. Illness at the time or just preceding
c. Accident

The compartmental examination will be conducted in 2nd/3rd week of February

Supplementary examination will be conducted in May for candidates who fail in more than 1 subject.

6. Candidates who fail in an examination but obtain pass marks in one or more individual subjects shall be exempted from re-examination in the passed subjects.

7. The candidates have to pass in all the subjects of a particular professional examination, in order to be allowed to appear in the next professional examination

8. Rules for re-evaluation of Answer papers

There is no provision for revaluation of answer papers. However, re-totaling is allowed in the failed subjects after paying requisite fee (non-refundable) in account section.

9. Number of attempts:

The student who does not qualify/ pass MBBS 1st Professional examination in 3 attempts including regular and supplementary exams OR 3 years after joining whichever is later and 2nd Professional examination, 3rd Professional and 4th Professional examination in 4 attempts ie. 2 regular plus 2 supplementary examination (for all subjects), in each phase, then the name of such student will be struck off from the rolls of the institute.

10. If a candidate does not appear in an examination due to illness,he/she should be required to submit certificate from the consultant of AIIMS for first time and if repeated then it should be certified by the medical board of the institute (Medical board is to be constituted by the Dean). The Dean is authorised to take a decision whether it is a genuine case or not. If the Dean is satisfied, then this will not be counted as an attempt, otherwise it will be counted as an attempt on account of absenteeism.

11. Punishment for malpractice:

Sl.No.	Crime	Punishment
1.	Electronic gadget found in exam hall(including smart watch)	Student should be debarred from subsequent exam of same subject for 1 year till next annual/supplementary exam, whichever is earlier.
2.	Printed material / including (any sort of) writing on body part, question paper	Student should be debarred from subsequent exam of same subject for 1 year till next annual/supplementary exam, whichever is earlier.
3.	Transfer of answer sheet/ copies	Student should be debarred from subsequent exam of same subject for 1 year till next annual/supplementary exam, whichever is earlier.
4.	Talking inside examination hall	10% deduction of marks Invigilator will inform and endorse in the answer sheet. Controller of examination and HOD concerned should be informed.

12. In case of any unforeseen situation not covered under these guidelines the decision of the Director, AIIMS, Bhubaneswar shall be final.

Distribution of marks in the various Professional Examinations

Subject	Theory	Theory Marks	Practicals and Viva Voce Marks
Anatomy	2 papers	200	100
Physiology	2 papers	200	100
Biochemistry	2 papers	200	100
Pharmacology	2 papers	200	100
Pathology	2 papers	200	100
Microbiology	2 papers	200	100
FMT	1 paper	100	100
CM	2 papers	200	200
ENT	1 paper	100	100
Ophthalmology	1 paper	100	100
Medicine	2 papers	200	200
Surgery	2 papers	200	200
OG	2 papers	200	200
Paediatrics	1 paper	100	100
Total		**2400**	**1800**

Summative Examination

Theory Examination

Anatomy, Physiology, Biochemistry, Pathology, Pharmacology, Microbiology, FMT, Ophthalmology, ENT, CM&FM, OBG, Paediatrics.

Each Paper will offer 100 marks (be it 1 paper or 2 papers)

Section A

Long Answer Question (Structured)	10 marks
Short Notes/Short Answers	(8 x 5 marks) 40 marks

Section B

Long Answer Question (Structured)	10 marks
Short Notes/Short Answers	(8 x 5 marks) 40 marks

Medicine Paper I & Paper II 100 marks each

Section A

Long Answer Question (Structured)	10 marks
Short Notes/Short Answers	(6 x 5 marks) 30 marks

Section B

Long Answer Question (Structured)	10 marks
Short Notes/Short Answers	(6 x 5 marks) 30 marks
Section C(Dermatology - Paper I)/ D(Psychiatry - Paper II)	
Short Notes/Short Answers	(4 X 5 marks) 20 marks

Surgery Paper I & Paper II 100 marks eac*h*

Section A

Long Answer Question (Structured)	10 marks
Short Notes/Short Answers	(6 x 5 marks) 30 marks

Section B

Long Answer Question (Structured)	10 marks
Short Notes/Short Answers	(6 x 5 marks) 30 marks

Section C (Orthopaedics - Paper I)/(Anaesthesia - Paper II)

Short Notes/Short Answers	(4 x 5 marks) 20 marks

Practical Examination

Anatomy, Physiology, Biochemistry, Pathology, Pharmacology, Microbiology, FMT

Practical – 80 marks (Customised as per Departmental Requirement)

Viva – 20 marks (Must face all examiners)

Ophthalmology & ENT	**100 marks**
Practical	80 marks
Long Case – 1	30 marks
Short Case – 2	(2 x 10 marks) 20marks
Spotters	(2 x 5 marks) 10marks
Instruments	(2 x 5 marks) 10marks
X ray & Chart	(2 x 5 marks) 10marks
Viva	20 marks
CM & FM	**200 marks**
Long Case – 1	40 marks
Short Case – 1	20 marks
Viva	40 marks
Problem Solving	100 marks
Surgery	**200 marks**
General Surgery	**160 marks**
Long Case – 1	60 marks
Short Case – 2	(2 x 30 marks) 60 marks
Viva & Skills	(4 x 10 marks) 40 marks
Orthopaedics	20marks
Cases	(2 x 10 marks) 20 marks
Anaesthesia	20 marks
Viva	
Medicine	**200 marks**
General Medicine	160 marks
Long Case – 1	60 marks
Short Case – 2	(2 x 30 marks) 60 marks
Spotters – 2	(2 x 10 marks) 20 marks
Viva	20 marks

Dermatology	20 marks
Spotters	
Psychiatry	20 marks
Viva	
Paediatrics	***(100 marks)***
Cases	60 marks
Long Case – 1	30 marks
Short Case – 2	(2 x 15 marks) 30 marks
Viva (4 Stations)	(4 x 10 marks) 40 marks
Neonatal Resuscitation	
Instruments & Drugs	
X Ray	
Nutrition/ Immunisation/ Social paediatrics	
Obstetrics & Gynaecology	***200 marks***
Obstetrics	100 marks
Long Case	50 marks
Practical & Viva voce	40 marks
Pelvis & Skull	10 marks
Drugs	10 marks
USG & specimen	10 marks
CTG, Instruments, Partograph	10 marks
Record	10 marks
Gynaecology	100 marks
Long Case	50 marks
Practical & Viva voce	40 marks
Contraceptive	10 marks
Instruments	10 marks
Specimen	10 marks
HSG & USG	10 marks
Record	10 marks

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
							1	2	3	4	5
6	7	8	9	100	11	12 1st Prof	1	2	3	4	5
6	7	8	9	10	11	12	13	14	15	16 2nd Prof	1
2	3	4	5	6	777	8	4	10	11	12	3rd Prof
1	2	3	4	5	6	7	8	9	10	11	4th Prof
I	N	T	E	R	N	S	H	I	P		

1st Prof: Anatomy, Physiology, Biochemistry

2nd Prof: Pathology, Pharmacology, Microbiology, FMT

3rd Prof: Ophthalmology, CM&FM, Otorhinolaryngology

4th Prof: Medicine, Surgery, O&G, Paediatrics

1st & 2nd SEMESTER (11 months)

	8-9 AM	9-10 AM	10-11 AM	11-12 PM	12PM -1 PM	1-2 PM	2-3 PM	3-4 PM	4-5 PM
Mon	Internal Assessment (All Mondays except 3rd) Every 3rd Monday – Integrated teaching/Early Clinical Exposure			Dissection		**LUNCH**	L -P	L-A	Co-scholastic activities
Tues	L-P	L-B	Dissection/ Histology		L-A		Biochemistry (Practical / Tutorials)		
Wed	L-A	L-P	Dissection/ Histology		Demonstration/ Tutorials- Anatomy		L-B	Biochemistry (Practical /Tutorials)	
Thurs	L-P	L-A	Dissection/ Histology		L-A		Physiology (Practical /Tutorials)		
Fri	L-B	L-P	Dissection/ Histology		Demonstration/ Tutorials- Anatomy		Physiology (Practical /Tutorials)		
Sat(**2nd and 4th**)		Medical Humanities							
Sat(**1st,3rd and 5th**)		Early Community Exposure (Community Medicine Department)							

ANATOMY:

LECTURES: 5 hours/week; 5x4/month; 5x4x11= 220 hours

PRACTICAL/DISSECTION: 2 hours/day; 2x5/week; 2x5x4/month; 2x5x4x11= 440 hours

DEMOSTRATION/ TUTORIAL : 2 hours/weak, 2x4/month; 2x4x11 = 88 hours

Total clock hours = 220+440+88= 748 hours

PHYSIOLOGY :

LECTURES: 5 hours/week; 5x4/month; 5x4x11= 220 hours

PRACTICAL/TUTORIALS: 6 hours / week; 6x4/ month; 6x4x11= 264 hours

Total clock hours = 220 + 264 = 484 hours

BIOCHEMISTRY :

LECTURES: 3 hours/week; 3x4/month; 3x4x11= 132 hours

PRACTICAL/TUTORIALS: 5 hours / week; 5x4/ month; 5x4x11= 220 hours

Total clock hours = 132 + 220 = 352 hours

INTEGRATED TEACHING/ EARLY CLINICAL EXPOSURE : 3 hours / month ; 3x11= 33 hours

WEEKLY EXAMS : 3 hours / week ; 3x3/month; 3x3x11= 99 hours

EARLY COMMUNITY EXPOSURE: 5 hours/week; 10 hours /month; 5x2x11 = 110 hours

MEDICAL HUMANITIES: 5 hours/week; 10 hours /month; 5x2x11 = 110 hours

3rd SEMESTER 5 MONTHS

	8-9	9-10	10-1	1-2	2-3	3-4	4-5
MON	PATHO	PHARMA	CLINICS	LUNCH	PRACTICALS: PATHO/MICRO		
TUES	MICRO	SURG/FMT	CLINICS		PRACTICALS: PHARMA/FMT		
WED	MED	PHARMA	CLINICS		PATHO	O&G	(DENTAL/FMT) PAEDS
THURS	CM&FM	MICRO	CLINICS		PRACTICALS: PATHO/MICRO		
FRI	PATHO	PHARMA	CLINICS		PRACTICALS: PHARMA/FMT		
SAT	FMT	CM&FM	CLINICS				

4th SEMESTER 5 MONTHS

	8-9	9-10	10-1	1-2	2-3	3-4	4-5
MON	PATHO	PHARMA	CLINICS	LUNCH	PRACTICALS: PATHO/MICRO		
TUES	MICRO	PATHO	CLINICS		PRACTICALS: PHARMA/CM&FM		
WED	MED	O&G	CLINICS		***MODULAR TEACHING 4TH SEM***		
THURS	CM&FM	MICRO	CLINICS		PRACTICALS: PATHO/MICRO		
FRI	PATHO	PHARMA	CLINICS		PRACTICALS: PHARMA/CM&FM		
SAT	SURG/FMT	CM&FM	CLINICS				

5th SEMESTER 4.5 MONTH

	8-9	9-10	10-1	1-2	2-3	3-4	4-5
MON	PATHO	PHARMA	CLINICS	LUNCH	FMT	PRACTICALS: PATHO/MICRO	
TUES	MICRO	CM&FM	CLINICS		MED	PRACTICALS: PHARMA/FMT	
WED	FMT	PHARMA	CLINICS		OG	PRACTICALS: PATHO/ FMT	
THURS	PHARMA	MICRO	CLINICS		SURG	PRACTICALS: PHARMA/FMT	
FRI	PATHO	SURG	CLINICS		PATHO	PRACTICALS: FMT/ MICRO	
SAT	MICRO	CM&FM	CLINICS				

PATHOLOGY:

3rd & 4th SEMESTER: **LECTURES:** 3/Week= 3X4/Month= 12X10= **120 Hours**

PRACTICALS: 2/Week = 2X4/Month = 8X10= 80/YR=

80X 3 Hours =240 Hours/2= **120 Hours**

5th SEMESTER: **LECTURES:** 3/Week= 4X12/Month= 12X 4.5 = **54 Hours**

RACTICALS: 2/Week= 2X4/Month= 8X4.5X2 =
72 Hours/2= **36 Hours**

Total Clock Hours (3rd 4th & 5th SEMESTER)

LECTURES : 120+54= 174 Hours

PRACTICALS : 120+36 = 156 Hours

330 Hours

MICROBIOLOGY:

3rd & 4th SEMESTER: **LECTURES:** 2/Week; 2X4=8/Month; 8X10 = **80 Hours**

PRACTICALS: 2/Week = 2X4/Month = 8X10= 80 X 3 Hours =

240 Hours/2= **120 Hours**

5th SEMESTER: **LECTURES:** 3/Week, 3X4=12/Month= 12X4.5 = **54 Hours**

PRACTICALS: 2/Week= 2X4/Month= 8X4.5X2 =
72 Hours/2=**36 Hours**

Total Clock Hours (3rd 4th & 5th SEMESTER)=

LECTURES: 80+54= 134 Hours

PRACTICALS: 120+36= 156 Hours

272 Hours

PHARMACOLOGY:

3rd SEMESTER: **LECTURES:** 3/Week= 3X4/Month= 12X5= **60 Hours**

4th SEMESTER: **LECTURES:** 2/Week= 2X4/Month= 8X5 = **40 Hours**

PRACTICALS: 2/Week = 2X4/Month = 8X10=
80 X 3 Hours= 240 Hours/2= **120 Hours**

5th SEMESTER: **LECTURES:** 2/Week, 2X4=8/Month= 8X4.5 = **36 Hours**

PRACTICALS: 2/Week= 2X4/Month= 8X4.5X2 =
72 Hours/2= **36 Hours**

Total Clock Hours (3rd 4th & 5th SEMESTER)

LECTURES= 100 + 36 = 136 Hours

PRACTICALS= 120 + 36= 156 Hours

292 Hours

FMT:

3rd SEMESTER: **LECTURES:** 3/2 Week= 3X2=6/Month= 30 Hours
30+5= 35 Hours

PRACTICALS: 2/Week = 2X4/Month = 8X5 = 40 X 3 Hours= 120 Hours/2= **60 Hours**

4th SEMESTER: **LECTURES:** 1/2 Week= 1X2/Month= 2X5 = **10 Hours**

5th SEMESTER: **LECTURES:** 2/Week= 2X4/Month= 8X4.5= **36 Hours**

PRACTICALS: 4/Week= 4X4/Month= 16X4.5X2 = 144 Hours/2= **72 Hours**

Total Clock Hours (3rd, 4th & 5th SEMESTER)

LECTURES= 25+20+36= 81 Hours

PRACTICALS= 60+72= 132 Hours

213 Hours

COMMUNITY MEDICINE:

1st and 2nd SEMESTER: EARLY COMMUNITY AND CLINICAL

EXPOSURE: 2/Week= 2x11X5**= 110 Hours**

3rd SEMESTER: **LECTURES** : 2/Week= 2X4/Month= 8X5= **40 Hours**

4th SEMESTER: **LECTURES**: 2/Week= 1X4/Month= 8X5= **40 Hours**

PRACTICALS: 2/Week= 2X4/Month = 8X5X3 Hours= 120/2 = **60Hours**

5th SEMESTER: **LECTURES** – 2/Week= 2X4/Month= 8X4.5 Hours= **36 Hours**

Total Clock Hours (3rd, 4th & 5th SEMESTER)

LECTURES: 80+36 = 116 Hours

PRACTICALS: 60 Hours

176 Hours

MEDICINE:

3rd SEMESTER: **LECTURES:** 1/Week=4/Month=4X5= **20 Hours**

4th SEMESTER: **LECTURES:** 1/Week=1X4/Month=4X5= **20 Hours**

5th SEMESTER: **LECTURES:** 1/Week=1X4/Month=4X4.5= **18 Hours**

58 Hours

SURGERY:

3rd SEMESTER: **LECTURES**: 1/2 Week; 2/Month =2X5= **10 Hours**

4th SEMESTER: **LECTURES**: 1/2 Week; 2/Month=2X5= **10 Hours**

5th SEMESTER: **LECTURES**: 2/Week; 8/Month; 8X4.5= **36 Hours**

OBSTETRICS & GYNAECOLOGY:

3rd SEMESTER: **LECTURES:** 1/Week; 4/Month; 4X5= **20 Hours**

4th SEMESTER: **LECTURES:** 1/Week; 4/Month; 4X5= **20 Hours**

5th SEMESTER: **LECTURES:** 1/Week; 4/Month; 4X4.5= **18 Hours**

38 Hours

PAEDIATRICS:

3rd SEMESTER: **LECTURES:** 1/ 2Week; 2/Month; 2X5= **10 Hours**

TOTAL = 10 Hours

MODULAR TEACHING 4th SEM WEDNESDAY POST LUNCH):

1/Week; 4/Month; 4X5X3 Hours= **60 Hours**

DENTAL:

3rd SEMESTER: **LECTURES: 5 Hours**

MEDICINE:

Would inculd other medical Departments like Cardiology, Neurology, Pulmonary Medicine, Endocrinology, Nephrology, Gastroenterology, Transfusion Medicine, Nuclear Medicine, Emergency Medicine.

6th SEMESTER (5.5 MONTHS)

3 months

	8-9	9-1	1-2	2-3	3-4	4-5
MON	OPHTH	CLINICS	LUNCH	PRACTICALS: CM&FM/EYE TUTORIALS/RADIOLOGY/ INSTRUMENTS/OPERATIVES		
TUES	MED / PAED	CLINICS		PRACTICALS: CM&FM/EYE TUTORIALS/RADIOLOGY/INSTRUMENTS/OPERATIVES		
WED	SURG	CLINICS		***BLS/ TLS/ FIRST AID/ ETHICS/ PATIENT SAFETY/ COMMUNICATION/ DIETETICS 6th SEM***		
THU	CM&FM	CLINICS		CM&FM	ENT	OPHTH
FRI	OPHTH	CLINICS		OPHTH/CMFM	O&G	CM&FM
SAT	MED	CLINICS				

2.5 months

	8-9	9-1	1-2	2-3	3-4	4-5
MON	ENT	CLINICS	LUNCH	PRACTICALS: CM&FM/EYE TUTORIALS/RADIOLOGY/ INSTRUMENTS/OPERATIVES		
TUES	MED / PAED	CLINICS		PRACTICALS: CM&FM/EYE TUTORIALS/RADIOLOGY/INSTRUMENTS/OPERATIVES		
WED	O&G	CLINICS		***BLS/ TLS/ FIRST AID/ ETHICS/ PATIENT SAFETY/ COMMUNICATION/ DIETETICS 6th SEM***		
THU	CM&FM	CLINICS		CM&FM	PRACTICALS: CM&FM/ ENT TUTORIALS/RADIOLOGY/ INSTRUMENTS/OPERATIVES	
FRI	OPHTH	CLINICS		OPHTH/CMFM	PRACTICALS: CM&FM/ ENT TUTORIALS/RADIOLOGY/ INSTRUMENTS/OPERATIVES	
SAT	SURG	CLINICS				

7th SEMESTER (5.5 MONTHS)

3 months

	8-9	9-1	1-2	2-3	3-4	4-5
MON	OPHTH	CLINICS	LUNCH	PRACTICALS: CM&FM/EYE TUTORIALS/RADIOLOGY/ INSTRUMENTS/OPERATIVES		
TUES	MED / PAED	CLINICS		PRACTICALS: CM&FM/EYE TUTORIALS/RADIOLOGY/INSTRUMENTS/OPERATIVES		
WED	SURG	CLINICS		***ELECTIVES 7th SEM***		
THU	CM&FM	CLINICS		CM&FM	ENT	OPHTH
FRI	OPHTH	CLINICS		OPHTH/CMFM	O&G	CM&FM
SAT	MED	CLINICS				

2.5 months

	8-9	9-1	1-2	2-3	3-4	4-5
MON	ENT	CLINICS	LUNCH	PRACTICALS: CM&FM/EYE TUTORIALS/RADIOLOGY/ INSTRUMENTS/OPERATIVES		
TUES	MED/ PAED	CLINICS		PRACTICALS: CM&FM/EYE TUTORIALS/RADIOLOGY/INSTRUMENTS/OPERATIVES		
WED	O&G	CLINICS		***ELECTIVES 7th SEM***		
THU	CM&FM	CLINICS		CM&FM	PRACTICALS: CM&FM/ ENT TUTORIALS/RADIOLOGY/INSTRUMENTS/ OPERATIVES	
FRI	OPHTH/ CMFM	CLINICS			PRACTICALS: CM&FM/ ENT TUTORIALS/RADIOLOGY/INSTRUMENTS/ OPERATIVES	
SAT	SURG	CLINICS				

OPHTHALMOLOGY:

LECTURE: 7/2 Week; =14 Hours =14X11= **144 Hours**;

CLINICS: 2 Month; 2X4=8 Week=8X6= 48 Days= 48X4= **192 Hours**

TUTORIALS/RADIOLOGY/INSTRUMENTS/OPERATIVES= 2/Week;

2X4=8/Month; 8X11Month=88 Days/2; 8X3/2=264Hours/2= **132 Hours**

Total Clock Hours:

LECTURE= 144 Hours

CLINICS= 192 Hours

TUTORIALS= 132 Hours

468 Hours

ENT:

LECTURE: 1/Week; 4/Month; 4X11= **44Hours**;

CLINICS: 1.5 MONTH; 1.5X4=6 Week= 6X6= 36 Days= 36X4= **144 Hours**

TUTORIALS/RADIOLOGY/INSTRUMENTS/OPERATIVES = 2/Week;

2X4=8/Month; 8X5 Month =40Days; 40X2=80 Hours/2= **40 Hours**

Total Clock Hours:

LECTURE= 44 Hours

CLINICS= 144 Hours

TUTORIALS= 40 Hours

228 Hours

COMMUINITY MEDICINE:

6th SEMESTER: ***3 MONTHS***

LECTURE: 7/2 Week; =14/Month; 14X3 =**42 Hours**;

PRACTICALS: 2/Week, 2X4/Month; 8X3X3=72Hours/2=**36 Hours**;

CLINICS: 3 Month = 3X4 Week = 3X4X6 Days = 3X4X6X4 =

0 Hours/2 = 144 Hours

2***.5 MONTHS***

LECTURE: 5/2Week;=10/Month; 10X2.5 =2**5 Hours**

PRACTICALS: 2/Week= 2X4/Month=8X2X2.5 = **20 Hours/2 = 10 Hours**

7th SEMESTER: ***3 MONTHS***

LECTURE: ***7***/2Week; =14/Month; 14X3 =42 **Hours**

PRACTICALS: 2/Week, 2X4/Month; 8X3X3=72Hours/2=**36 Hours**

CLINICS: 3Month= 3X4 Week = 3X4X6 Days = 3X4X6X4 =

288 Hours/2 = 144 Hours

2.5 MONTHS

LECTURE: 5/2Week; = 10/Month; 10X2.5 =2**5 Hours**

PRACTICALS: 2/Week= 2X4/Month=8X2X2.5 = **20Hours/2 = 10 Hours**

(6th & 7th SEMESTER) LECTURES= 134 Hours

PRACTICALS= 92 Hours

CLINICS= 288 Hours

TOTAL Hours = 514 Hours

(3rd 4th & 5th SEMESTER): TOTAL Hours = 176 Hours

(1st & 2nd SEMESTER): TOTAL Hours = 110 Hours

Total Clock Hours (1st TO 7th SEMESTER) = 110+ 514+ 176 = 800 Hours

MEDICINE:

6th SEMESTER: ***3 MONTHS:*** **LECTURE:** 3/2Week; =6/Month; 6X3 = **18 Hours**

2.5MONTHS: **LECTURE:** 1/2Week; 2/Month; 2X2.5 = **5 Hours**

7th SEMESTER: ***3MONTHS:*** **LECTURE:** 3/2Week; =6/Month; 6X3 = **18 Hours**

2.5MONTHS: **LECTURE:** 1/2Week; 2/Month; 2X2.5 = **5 Hours**

TOTAL CLOCK Hours= 46 Hours

PAEDIATRICS:

LECTURE: 1/2Week; 2/Month; 2X11= **22 Hours**

SURGERY:

6th SEMESTER: ***3MONTHS:*** **LECTURE:** 1/Week; 1X4=1/Month; 4X3 = **12 Hours**

2.5MONTHS: **LECTURE:** 2/Week; 2X4=8/Month; 8X2.5 = **20 Hours**

7th SEMESTER: ***3MONTHS:*** **LECTURE:** 1/Week; 1X4=4/Month; 4X3 = **12 Hours**

2.5 MONTHS **LECTURE:** 2/Week; 2X4=8/Month; 8X2.5 = **20 Hours**

TOTAL CLOCK Hours = 64 Hours

OBSTETRICS & GYNAECOLOGY:

LECTURE: 1/Week; 4/Month; 4X11= **44 Hours**

BLS/ TLS/ FIRST AID/ ETHICS/ PATIENT SAFETY/ COMMUNICATION/ DIETETICS

6th SEMESTER: 1/Week; 4/Month; 4X5.5= 22; 22X3= **66 Hours**

ELECTIVES

7th SEMESTER: 1/Week; 4/Month; 4X5.5=22; 22X3= **66 Hours**

8th and 9th SEMESTER (10 Months)

	8-9	9-1	1-2	2-3	3-4	4-5
MON	MED	CLINICS	**LUNCH**	MED ALL5Months/ SURG ALL 5Months	OPERATIVES/RADIOLOGY/ STUDENT SEMINAR/ MODEL QUESTIONS & ANSWERS/ TUTORIALS **MED**	
TUES	SURG	CLINICS		MED ALL	**O&G / PAEDS**	
WED	O&G	CLINICS		PAEDS / SURG	**SURG**	
THURS	PAEDS/ MED/	CLINICS		MED	**O&G**	
FRI	MED	CLINICS		SURG	**O&G**	**MED/SURG**
SAT	SURG	CLINICS				

MEDICINE:

LECTURE: 7/2Weeks; 14/Months; 14X10=**140 Hours**

TUTORIALS ETC= 5/2Weeks; =10/Months; 10X10= **100 Hours**

CLINICS= 4 Months; 4X4=16Weeks; 16X6= 96 Days; 96X4**=384 Hours**

3Months; 4X3=12Weeks; 12X6=72 Days;72X3**= 216 Hours**

SURGERY:

LECTURE: 7/2 Weeks; 14/Months; 14X10= **140 Hours;**

TUTORIALS ETC= 5/2Weeks; =10/Months; 10X10= **100 Hours;**

CLINICS= 2.5 Months; 2.5X4=10Weeks; 10X6= 60 Days; 60X3= **180 Hours**

3.5 Months; 3.5X4=14Weeks; 14X6= 84 Days; 84X4= **336 Hours**

SURGERY ALLIED:

LECTURE: 1/Weeks; 4/Months; 4X5= **20 Hours**

MEDICINE ALLIED:

LECTURE: 1/Weeks; 4/Months; 4X10= **40 Hours,**

1/Weeks; 4/Months; 4X5**= 20 Hours**

OBSTETRICS & GYNAECOLOGY:

LECTURE: 2/Weeks; 8/Months; 8X10= **80 Hours**

TUTORIALS ETC= 3/2Weeks; =6/Months; 8X10X2= **120 Hours**

CLINICS= 1 Months; 1X4=4 Weeks; 4X6= 24 Days; 24X3= 72 Hours

3Months; 3X4=12 Weeks; 12X6=72 Days; 72X4= 288 Hours

PAEDIATRICS:

LECTURE: 1/Weeks; 4/Months; 4X10= **40 Hours**

TUTORIALS ETC= 1/2Weeks; 2/Months; 2X10X2= **40 Hours**

CLINICS=0.5Months; 0.5X4=2 Weeks;2X6=12 Days; 12X3**= 36 Hours**

1.5 Months; 1.5X4= 6 Weeks; 6X6=36 Days; 36X4= 144 Hours

MEDICINE:

Clock Hours: (3rd, 4th & 5th SEMESTER) LECTURES= 58 Hours

(6th & 7th SEMESTER) LECTURES= 140 Hours

TUTORIALS=100 Hours

CLINICS = 600 Hours

TOTAL Hours = 944 Hours

MEDICINE ALLIED:

(8th & 9th SEMESTER) LECTURE= 60 Hours

PSYCHIATRY:

LECTURE – 30Hours;

CLINICS – 1.5 Months; 1.5X4= 6Weeks; 6X6=36Days; 36X3= **108 Hours**

1.5 Months; 1.5X4= 6Weeks; 6X6=36Days; 36X4= **144 Hours**

TOTAL CLOCK Hours= 252+30= 282 Hours

DERMATOLOGY & VENEROLOGY :

LECTURE – 30 Hours;

CLINICS- 1.5 Months; 1.5X4=6Weeks; 6X6=36 Days; 36X3= **108 Hours**

0.5 Months; 0.5X4=2Weeks; 2X6=12 Days; 12X4= **48 Hours**

TOTAL CLOCK Hours= 108+48+30= 186 Hours

SURGERY:

Clock hours: (3rd, 4th & 5th SEMESTER) LECTURES= 56 Hours

(6th & 7th SEMESTER) LECTURES= 64 Hours

(8th & 9th SEMESTER) LECTURES= 140 Hours

TUTORIALS= 100 Hours

CLINICS= 516 Hours

TOTAL CLOCK Hours= 876 Hours

SURGERY ALLIED:

(8th & 9th SEMESTER) LECTURE= 20 Hours

ORTHOPAEDICS:

LECTURE = 15 Hours

CLINICS = 1Months= 4Weeks; 4X6=24Days; 24X3= **72 Hours**

1Months= 4Weeks; 4X6=24Days; 24X4= 96 Hours

TOTAL CLOCK Hours= 183 Hours

ANAESTHESIOLOGY:

LECTURE = 5 Hours

CLINICS = 1MONTH = 4Weeks; 4X6=24Days; 24X4=**96 Hours**

TOTAL CLOCK Hours= 101 Hours

OBSTETRICS & GYNAECOLOGY:

Clock Hours:

(3rd, 4th & 5th SEMESTER) LECTURES= 58 Hours

(6th & 7th SEMESTER) LECTURES= 44 Hours

(8th & 9th SEMESTER) LECTURES= 80 Hours

TUTORIALS= 120 Hours

CLINICS= 1 Month; 1X4=4Weeks; 4X6= 24Days; 24X3= **72 Hours**

3Months; 3X4=12Weeks; 12X6=72Days; 72X4= 288 Hours

TOTAL CLOCK Hours= 662 Hours

PAEDIATRICS:

Clock Hours: (3rd, 4th & 5th SEMESTER) LECTURES= 10 Hours

(6th, 7th SEMESTER) LECTURES= 22 Hours

(8th & 9th SEMESTER) LECTURES= 40 Hours

TUTORIALS= 40 Hours

CLINICS= 180 Hours

TOTAL CLOCK Hours = 292 Hours

ELECTIVES - 66 CLOCK HOURS

PULMONARY MEDICINE

GASTROENTEROLOGY

CARDIOLOGY

MEDICAL ONCOLOGY

SURGICAL ONCOLOGY

RADIODIAGNOSIS

RADIOTHERAPY

BLOOD BANK & TRANSFUSION MEDICINE

PLASTIC SURGERY

NEUROSURGERY

UROLOGY

DENTAL SURGERY

AND ALL OTHER SUBJECTS IN UNDERGRADUATE STUDIES A STUDENT WANTS TO OPT FOR

- **MAXIMUM OF 5 STUDENTS WOULD BE ALLOWED IN A SUBJECT AT A TIME IN ANY PARTICULAR DEPARTMENT**

CLINICS:

MEDICINE – 7 Months

SURGERY – 6 Months

O&G – 4 Months

PAEDIATRICS – 2 Months

CM&FM – 3 Months

OPHTHALMOLOGY - 2 Months

ENT – 2 Months

ANAESTHESIOLOGY – 1 Month

ORTHOPAEDICS – 2 Months

DERMATOLOGY – 2 Months

PSYCHIATRY - 3 Months

TRAUMA & EMERGENCY MEDICINE – 15 Days

DENTAL – 10 Days

RADIOTHERAPY – 8 Days

RADIODIAGNOSIS – 7 Days

	3rd Sem & 4th Sem 5th Sem (14 & 1/2)	6th Sem & 7th Sem (11 & 1/2)	8th Sem & 9th Sem (11)	Total days
Medicine	3	1	3	7 months
Surgery	2 & 1/2	1	2 & 1/2	6 months
O&G	1	1	2	4 months
Paeds	15 days	15 days	1	2 months
CM&FM		3		3 months
TEM	15 days		5 days	20
Psychiatry	1 & 1/2	1	15 days	3 months
Derma	1 & 1/2		15 days	2 months
Ophthal	15 days	1 & 1/2		2 months
ENT	15 days	1 & 1/2		2 months
Ortho	1	15 days	15 days	2 months
Dental	10 days			10 days
Anaesthesia		15 days	15 days	1 month
RT	3 days		5 days	8
RD	2 days		5 days	7
	13	11 & 1/2 months	11 months	35.5 37

CURRICULUM FOR PATIENT SAFETY

Background and Introduction

Patient safety is an essential part of patient care that is not addressed during medical undergraduate and postgraduate training in India. Though awareness of patient safety issues has come into the limelight in the recent past, this has to be consolidated by way of introducing a formal curriculum in patient safety for medical undergraduates. which will be broadly based on the WHO curriculum on patient safety, using the principles, tactics and major thrust areas identified in it using a combination of case-based learning (with de-identified examples from AIIMS Bhubaneswar), active learning methods and interactive lectures for delivering the content. Specific outcomes expected under each broad heading, the time needed for delivery of content and training will be proportioned under each department. As assessment drives learning, it is expected that what is taught will be tested during the formative exams and when possible in the summative exams as well.

The onus of implementing the curriculum will be with individual departments under the leadership of the respective heads of individual departments. However, in each department, a single junior or mid-level faculty member will be nominated to coordinate the implementation of the curriculum at the departmental level. This faculty member may or may not belong to Medical Education Unit (MEU) of AIIMS Bhubaneswar. MEU will advise, inform and provide assistance to these faculty members for planning, conduct and assessment. It is hoped that the patient safety curriculum will evolve and continue to do so incorporating new information, methods and systems and prepare undergraduates of AIIMS Bhubaneswar to become champions of patient safety once they graduate.

Overall Objectives of the Curriculum

At the end of the medical undergraduate course in AIIMS Bhubaneswar the graduate should be able to:

1. Appreciate the concept of patient safety and understand its importance in terms of avoidable suffering and cost
2. Follow safety practices and comply with institutional procedural guidelines when providing healthcare
3. Develop a culture of reporting medical errors
4. Assist in improving patient safety in all healthcare situations throughout his/her professional life.

Flexibility in the implementation of the curriculum

As the present medical curriculum is already being overloaded with newer “must know” areas, individual departments will be encouraged to include these topics into what is already being taught. For example, adverse drug reactions (ADR) and monitoring of ADRs are already in the curriculum of pharmacology; medication safety may be added when this is being taught. Hand

washing and hospital infection control can easily be added into the curriculum of microbiology as elements are already being taught. In case departments do not want to use the normal working hours, as the schedule is already packed, they may also look at engaging students on Saturday afternoons (2-4 p.m.) or after normal working hours (4.30-5.30 p.m.). The arrangement will be left to the individual departments to work out.

For each broad topic - the coordinator from the pre and para clinical departments will prepare a lesson plan, in consultation with other faculty members and the MEU, if necessary. Help in preparing lesson plans will be provided by the MEU and templates will be provided. The respective department can provide the reading material, background information, anonymised case studies as required. Preparation of lesson plans will permit the programme to continue even if the main persons coordinating it initially are not able to do so at a later stage. It is hoped that there will be adequate discussions at the department at level before the programme is started so that there will be consensus and ownership at all levels. The final lesson plan may be submitted to the MEU which will be coordinating the implementation of the curriculum on patient safety.

Note: Clinical departments will not need to submit lesson plans as all aspects of patient safety can be discussed during clinics, using opportunities provided by individual cases that are being discussed. However, it must be reiterated that discussing aspects of patient safety whenever the clinics are being taken will necessitate a change in mind-set of teachers which must be encouraged by departmental heads. Residents taking clinics should also be asked specifically to discuss issues. Feedback from residents and students will also be useful to gauge whether this method is effective. During ward-leaving tests, OSCEs and other types of assessment, any one question pertaining to an aspect of patient safety may be included. The coordinator from the clinical departments will observe, facilitate and take feedback from faculty and students which will be used for further fine-tuning the training.

Date of starting: This curriculum will be implemented from this year onwards (2017).

Evaluation of the curriculum

Evaluation will be done by obtaining a formal written feedback from faculty and students. A long-term follow-up will be planned after the first year, as changes will have to be made to accommodate logistic issues. Topics in patient safety allocated to various departments, time allocation and broad methods of teaching-learning are given in the following table.

Table 1. Topics or patient safety with the departments responsible for training, time allocated for the topics and suggested methods of teaching-learning process

Broad Topic	Time Allotted	Dept. responsible	T-L method
Pre-clinical (semester 1-2)			
Basics of patient safety **Working as a team** **Communicating effectively**	2 hours 2 hours 2 hours	Anatomy	Interactive lecture Case based learning Game, group discussion Game, group discussion
Workplace and workforce safety	3 hours	Physiology	Survey and report writing/ presentation
Safe & Cleanenvironment	3 hours	Biochemistry	Visit to incinerator, STP Survey and report/ presentation
Fire-safety	6 hours	Community Med	Demonstration, Drill - hands on
Para-clinical (semester 3-5)			
Hand-washing **Infection control**	1 hour 4 hours	Microbiology Microbiology	Practical - demo and practice Survey and report writing/ presentation Talk - field visit
Transfusion safety **Communicating effectively (Transcribing errors; Laboratory practices to prevent errors)**	2 hours 2 hours	Pathology Pathology	Visit to me blood bank Observation of blood transfusion Case-based learning Role-play Case-based learning
Medication safety **Injection safety**	5 hours 1 hour	Pharmacology	Practical exercise Reporting of observed medication errors Practical exercise
Medico-legal Issues arising from communication and medical errors	4 hours	Forensic Medicine	Case Based Learning - Group discussion using examples from AIIMS Bhubaneswar

Broad Topic	Time Allotted	Dept. responsible	T-L method
Clinical (semesters 6-9)	There will be no specific time allotted as the depts. will be expected to incorporate any one aspect of patient safety as a routine into their clinical teaching in addition to the topics assigned to them.		
Workplace safety		ENT	*Healthcare worker safety;* demonstration, clinics
Infection control		Ophthalmology	*Hand-washing;* demonstration, clinics
Site-marking, OT check-list		Orthopaedics	Demonstration in wards, OT
Medication safety		Paediatrics	Clinics
Injection Safety **Medication safety**		Medicine	Clinics
Infection control		Surgery	Clinics - during evening rounds reinforcement on proper techniques for dressings
Communicating effectively		Obs & Gyn	Clinics
Workplace safety		Dermatology	Clinics
Workplace safety		Pulmonary Medicine	Clinics
Workplace safety		Anaesthesiology	*Equipment check, medications* check - in OTs - demonstration
Radiation safety		Radiodiagnosis	Clinics
Fire safety	2	EMSD	Reinforcement of fire safety - mock drill during posting in EMSD
Patient safety module	10 hours (5 day module)	Will be coordinated by MEU	Modular teaching - with inputs from all departments (module will be planned by MEU)

Broad Topic	Time Allotted	Dept. responsible	T-L method
Internship			To be included in the intern's diary for certification by unit chief
Medication safety		Medicine	Prescription audit of ten prescriptions written by them; (self audit) discuss with unit chief Reporting medication/medical errors observed during posting
		Paediatrics	Prescription audit of ten prescriptions written by them; (self audit) discuss with unit chief Reporting medication/medical errors observed during posting
Transfusion safety		Obs & Gyn	Demonstration following guidelines for blood transfusion Reporting medical errors observed during posting
Hospital infection **Working as a team** **Communicating effectively**		Surgery Community medicine	Demonstration of safe injection practices, safe practices during minor procedures Reporting medical errors observed during posting Demonstrate qualities of working as a team, leadership during activities Patient education initiatives; provide information to patients on contraception, diet, antenatal care, immunization etc.,

Medical Humanities Course AIIMS Bhubaneswar

Introduction to Course:

Medicine though being a technical and scientific field, has also long been known as the art of medicine. But the art of medicine, though essential for good medicine, has been ignored by both medical technology and medical science. Healthcare practitioners can be educated to be more receptive to creative input and innovative thinking in order to retain originality and prevent stifling by repetition.

The Medical Humanities course of AIIMS Bhubaneswar aims to promote creative thinking and develop new perspectives on patient experience and medical practice among medical students. It will serve 3 main goals :

1. To understand the humane aspects of medicine through the study of history, philosophy and sociology.
2. To develop understanding of the connection between medicine and the creative arts.
3. To inculcate insightfulness and compassion in future healthcare professionals.

MEDICAL HUMANITITES (110 hrs)

Sr. No.	Topic	Hours
1.	History of Medicine and key issues in history of medicine	04
2.	Introduction of portfolio and its management	04
3.	Introduction to history of technological devices and their influence in medicne	10
4.	Introduction to disciplines contributing to medical humanities with case studies as examples of interdisciplinary nature of medicine	04
5.	Themes and issues relevant to medicine and humanities	10
6.	Development of writing and oral presentation skills for different audiences and formats	10
7.	Computer	20
8.	English	18
9.	Local language	30

ANATOMY

ANATOMY

GOALS AND OBJECTIVES

- Comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures and organs in the body.
- Comprehend the basic structure and connections between various parts of the central nervous system so as to analyse the integrative and regulative functions and should be able to locate the site of lesions according to the deficits encountered.
- Recognize and state the micro-anatomical features of various tissues and organs of the human body with functional correlation as a prerequisite to understanding the altered state in disease processes.
- State the development of various organs of the human body, differentiate abnormal development and interpret the formation of various congenital anomalies.
- State the features of normal postnatal growth and development and recognize any variation
- State the basic principles of medical genetics and understand the basis of genetic disorders.
- Identify the radiological features of normal human body structures in routine radiological investigations.
- Project the outline of the internal structures on the surface of the body.

Activities:

- Large and Small Group Teaching, Integrated teaching, Problem-Based learning
- Practical classes on surface anatomy, dissection and histology,
- Demonstration of bones, charts, embryology models, radiology plates and museum specimens
- Use of multimedia for teaching
- Student participation in the form of seminar presentation, giving assignments and maintaining practical records
- Formative and Summative assessments in the form of MCQs, Short Answer types, Structured and Modified Essay Questions, Practical and Viva voce.

GUIDELINES FOR INTRODUCTION OF UNIFORM EXAMINATION/EVALUATION PATTERN

THEORY:

1. Attempts should be made to examine/ evaluate the different branches of Anatomy.
   - 70% of the total marks to be allotted to level 1 (Must know) of the course content.

- 20% of the total marks to be allotted to level 2 (Desirable to know) of the course content.
- 10 % of the total marks to be allotted to level 3 (Nice to know) of the course content

2. **Long answer question (LAQ) to be chosen from among the lecture topics outlined.**
3. Questions may be prepared from all the three levels keeping in mind guideline- 1.

PRACTICALS:

1. Gross Anatomy, Surface Anatomy and Histology will be evaluated by practical examination.
2. Attempts should be made to include all regions of the body, for evaluation purposes.
3. Should be designed to examine the skills of the student to identify the structures in the body, and to test his/her competence in correlating with the applications.

VIVA VOICE/ ORALS:

The following subdivisions of Anatomy will be included to evaluate the knowledge as well as the communication skill of the student:

1. Osteology
2. Radiology
3. Embryology
4. Neuroanatomy

INTERNAL ASSESSMENT

- Internal Assessment: It is a sort of training towards professional examination. It includes periodic test conducted by department and end semester examination notified through Dean's Office. These assessments in theory and practical will be held as given below.
- Monthly internal Assessments will be done at Department level, 100 marks each (Pattern of examination will be decided at the department level).
- End-Semester Examinations (3) will be notified by Dean's Office, 100 marks for theory and 100 marks for practical and viva.
- Evaluation of Practical records will be done during internal assessment only.
- Syllabus for exam will be topics covered during that period only. The pre-Professional Internal Assessment notified by Dean's Office will include the entire syllabus.

Professional Examination (Distribution of Marks)

• Theory: (Two papers of 100 Marks each)	200 Marks
• Practical & Viva: (Practical:70 Marks and Viva :30 Marks)	100 Marks
Total:	**300 Marks**

ANATOMY THEORY PAPER (2 Papers, 100 Marks each, Total 200 Marks)

Paper I – 100 marks **Time: 3 Hours**

Section-A: 50 Marks

General Anatomy -	5-8 Marks
General Histology-	5-8Marks
General Embryology-	8 Marks
Genetics-	5 Marks
Upper Extremity-	10-12 Marks
Lower Extremity-	10-12 Marks

Section-B: (50 Marks)

Abdomen, Pelvis & Perineum
(With related histology and embryology)

Paper II – 100 marks **Time: 3 Hours**

Section A: 50 Marks

Head & Neck and Face-	40 Marks
Special senses-	10 Marks

(With related histology and embryology)

Section B: (50 Marks)

Thorax-	25 Marks
Neuroanatomy-	25 Marks

(With related histology and embryology)

- **Long Answer Type can be Structured or Modified type. (One question of 10 Marks in each section)**
- **Short Note (Five Questions of 5 Marks each in each section)**
- **Short Answer can be Compare and Contrast, Enumerate, Explain with reason, Mechanism etc. type. (Five Questions of 3 Marks each in each section)**
- **Questions may be framed from all levels assessing recall, understand and application abilities.**
- **Each Section will comprise of**
  one Long answer question (10 marks)
  Five Short notes (5x5=25 marks)
  Five Short answer/Brief answer type (5x3=15 marks)

ANATOMY PRACTICAL AND VIVA (100)

- **Practical - 80 marks**

  Histology- 30 Marks

Spotting-	20 marks
Commenting-	10 marks

  Genetic Charts- 5 Marks

  Gross Anatomy 45 marks

Limb-	15 marks
Viscera-	15 Marks
Sections-	10 marks
Surface Anatomy-	5 Marks

  Gross Anatomy spotting to be taken during internal assessment only

- **Viva -20 Marks**

Osteology-	8 Marks
Brain-	4 Marks
Embryology Models-	4 Marks
Radiology-	4 Marks

CONTENTS

General Anatomy				
Sl. No	**Topic**	**Must know**	**Desirable to know**	**Nice to know**
01.	**Introduction to Anatomy**	Subdivisions of anatomy, anatomical terminology, positions and planes		History of anatomy, Embalming techniques
02.	**Cartilage**	Definition, types, structure and function, distribution		
03.	**Bones**	Classification of bones, parts of bone, ossification, blood supply	Laws of ossification	Factors affecting growth of bone, Wolff's law, Bone graft
04.	**Joints**	Definition, classification, nerve supply of joints- Hilton's law, blood supply of joints, lubricating mechanism of joints	Close packed and loose packed position	
05.	**The Muscular System**	Structural classification of muscle, Parts of a skeletal muscle, Principles of sensory and motor innervation of muscles, Blood supply of muscle, Introduction to the terms, Muscle action		Shunt and spurt muscles
06.	**The Cardiovascular & lymphatic System**	Classification of vascular and lymphatic systems, Pulmonary, systemic and portal circulation, Layers of blood vessel, Types of blood vessels, Factors affecting venous return, End-arteries, Components and function of the lymphatic system, anastomosis	Concepts of thrombosis, infarction, aneurysm, embolism, Lymphoedema and lymphangitis, spread of tumours via lymphatics	
07.	**The Nervous System**	Classification of nervous systems (CNS,ANS,PNS).Components and classification of nervous tissue with their functions, Autonomic Nervous system, Peripheral Nervous system	Types of synapses	Neurotransmitters Nerve injuries and regeneration of nerve, Nerve grafting
08.	**Skin and Fascia**	Types, Structure in brief with pilo-sebaceous unit, Functions, Appendages, superficial fascia- definition, layers, distribution of fat , function, panniculus carnosus, Deep fascia- Definition, distribution, features, modification, function and applied anatomy	Cleavage lines, Langer's lines, skin creases, flexure lines, Brown fat	Skin grafts

General Histology				
Sl. No	**Units**	**Must know**	**Desirable to know**	**Nice to know**
01.	**Introduction And Microscopy**	Relevance of histology to Medicine, Different types of microscopes, Light microscope, Magnification/ Resolution, Microtome and H&E staining	Principles of light and electron microscopy, Special stains	Golgi staining, Cryostat
02.	**Cell**	Definition and Classification of cell organelles, Classification of Primary Tissues	Diseases of cell organelles	
03.	**Epithelial Tissues I**	Characteristics of different types of Epithelium, Basement Membrane, Surface modifications of cell membrane	Cell Junctions	Ultrastructure, Metaplasia, Hyperplasia
04.	**Epithelial Tissues II**	Glandular Epithelium-Types of Glands, classification with examples		
05.	**Connective Tissue I**	Connective tissue-Types and Composition	Nutrition of Generalized Connective Tissue	
06.	**Connective Tissue II**	Structure and classification with examples of Cartilage and Bone	Ossification of Bone	
07.	**Lymphoid/ Immune System**	Distribution, Lymph Node, Spleen, Thymus, Tonsils	Splenic Circulation, Blood Thymic Barrier	Types of Immunity
08.	**Muscle Tissue**	Types of Muscles, Structural Organization	Red and White Muscle fibres, Nutrition, Myoneural Junction	Hyperplasia and Hypertrophy
09.	**Nervous Tissue**	Structure and Classification of Neurons and Neuroglia Cells, Peripheral nerves, Ganglia and nuclei	Structure of Myelin, Types and structure of Synapses, Blood Brain Barrier	
10.	**Blood Vessels**	Basic structure of blood vessels, Type of Vessels		Atherosclerosis

Systemic Histology				
11.	**Skin**	Skin Layers and Appendages	Renewal of Epidermis, Keratinisation, Cutaneous receptors	Vitiligo, Acne
12.	**Oral Cavity**	Tongue, Taste buds, salivary glands and lips		
13.	**Digestive System**	Oesophagus. Stomach, small Intestine, large intestine, Appendix, Liver, Pancreas and Gall Bladder		
14.	**Respiratory System**	Epiglottis, Trachea, Bronchus and Lung parenchyma	Blood-Air Barrier, Hyaline Membrane disease	
15.	**Male Reproductive System**	Testis, Epididymis, Vas Deferens, Prostate, Seminal Vesicle	Blood testis barrier Male infertility	
16.	**Female Reproductive System**	Ovary, Uterus, vagina, Mammary gland, placenta, umbilical cord	Female infertility	
17.	**Urinary System**	Kidney, Ureter, Urinary Bladder and urethra		
18.	**Special Sense Organs**	Eyelid, cornea, retina		
19	**Endocrine System**	Pituitary, Thyroid, parathyroid and adrenal gland	Related Applied anatomy	
General Embryology				
Sl. No	**Units**	**Must know**	**Desirable to know**	**Nice to know**
01.	**Introduction**	Relevance of Embryology to medicine; Male and female reproductive system; Stages of pregnancy and its outcome, Critical periods of development, Terminlogy- Cranial, Rostral, Caudal, Dorsal, Ventral, Medial, Lateral		Ontogeny in relation to Phylogeny
02.	**Gametogenesis**	Spermatogenesis and Oogenesis, Menstrual cycle & Ovulation, Spermiogenesis, Sex determination	Seminal fluid analysis, Pregnancy test	Infertility

03.	**First and Second Week**	Fertilization, Cleavage, Blastocyst, Inner & outer cell mass, Implantation and its abnormal sites, Formation of Germ Disc	Spontaneous abortion, Ectopic pregnancy	Mosaicism, Chimera
04.	**Third Week**	Gastrulation, Formation of Notochord, Neurulation, Development of Somites & Intraembryonic coelom, Foetal membranes, Differentiation and Derivatives of germ layers, Folding of embryo		SacrococcygealTer-atomas
05.	**Placenta and Umbilical Cord**	Formation, Types, Functions and Fate of foetal membranes, Placenta and Umbilical cord, Foetal circulation	Twinning	Placental (Graft Versus Host Reaction)
06.	**The Foetal Period**	Growth of the foetus in general with reference to weight & major features, Parturition	Estimation of foetal age	Prenatal diagnostic techniques
07.	**Birth defects**	Causative factors & Mechanisms, Critical period of development, Teratogens, Multifactorial inheritance	Preventive measures and genetic counselling	
08.	**Body Cavities and Diaphragm**	Subdivisions of Intra Embryonic Coelom, Serous Membrane, Cardiogenic Area, Development of Diaphragm	Diaphragmatic Hernias and Eventration	
Systemic Embryology				
09.	**Musculoskeletal System**	Limb buds development, development of muscles	Amelia, Phocomelia	
10.	**Cardiovascular System**	Angiogenesis and establishment of cardiogenic area, Heart loop formation, position and differentiation. Formation of major blood vessels, Foetal circulation & changes at birth, Congenital anomalies of CVS		
11.	**Respiratory System**	Tracheo-bronchial Diverticulum, Development of larynx, trachea, bronchi & lungs, Lung maturation Tracheo esophageal fistulas		Respiratory distress syndrome

12.	**Digestive (Alimentary) System**	Body cavities & serous membranes, Division of primitive gut (Foregut, Midgut & Hindgut) and its derivatives, rotation of the gut, Meckel's diverticulum, Development of Liver & Extrahepatic Biliary System, Pancreas, Spleen	Congenital Hypertrophic Pyloric Stenosis. Atresia of gut tube, Omphalocoele, Hernia, Situs inversus, rotational abnormalities, Developmental anomalies of Hepatobiliary System and Pancreas	Clinical presentation in premature births and neonatal period
13.	**Urogenital System**	Differentiation of intra-embryonic mesoderm, development of Kidneys, Ureter, Urinary Bladder And Urethra, Suprarenal gland, Cloaca and its derivatives, Gonads: Testis & Ovary & associated glands, Descent of Gonads, Derivatives of Mesonephric and Paramesonephric Ducts, External genitalia.	Congenital anomalies of Urogenital System	Ambiguous genitalia & hermaphroditism
14.	**Face & Pharyngeal Apparatus**	Pharyngeal Arches, Development of Face, Oral Cavity, Palate & associated anomalies.	Related congenital anomalies	
15.	**Nervous System**	Neural tube and brain vesicles, Ventricular system, Neural crest, Hypophysis cerebri, Development of cerebellum, Peripheral nervous system: somatic and autonomic, Principles of neurobiotaxis, Functional components of cranial nerves, Neural Tube defects	Congenital malformation of CNS	Sequence of Myelination
16.	**Organs Of Special Senses**	Eye: Embryologic source of each component and their fate, Development of Ear	Common anomalies of the eye and ear	"TORCH" group of infection and its complication
17.	**Integumentary System**	Skin and its appendages, Development and anomalies of Mammary Gland		Pigmentary disorders and dermatoglyphics, Icthyosis

Genetics				
Sl. No	**Units**	**Must know**	**Desirable to know**	**Nice to know**
01.	**Introduction**	History: Medical and Clinical genetics, Pattern of inheritance, Pedigree charts /symbols		
02.	**Chromosomes and Genes**	Structure and Classification of Human Chromosomes, Sex Chromatin and Lyon Hypothesis, Karyotyping, Structure of DNA, RNA, Genetic Code, Gene Mutation, Cell division.	Mutagens	
03.	**Genetic Diseases**	Single Gene Disorders, Chromosomal Disorders and Multifactorial Disorders		
04.	**Diagnosis Of Genetic Diseases**	Indications and Investigations of Prenatal diagnosis	Genetic Screening	
05.	**Genetic Counseling**	Definition, Indications and Human genome project	Gene Therapy, Cloning	

Upper Limb				
Sl. No	**Units**	**Must know**	**Desirable to know**	**Nice to know**
01.	**Pectoral Region And Axilla**	Surface identification of relevant skeletal features, Pectoral, Clavipectoral and Axillary fascia, Muscles of Pectoral Region, Mammary Gland, Boundaries and Contents of Axilla, Brachial plexus	Brachial plexus Injuries	Features of Breast Cancer with anatomic correlations
02.	**Front Of Arm And Cubital Fossa**	Identification of relevant skeletal features, Subcutaneous structures, Deep fascia, Muscles, Nerves and Arteries of front of arm, Cubital Fossa, Anastomosis around the elbow joint	Epitrochlear lymph nodes, Nerve injuries	Fracture of the Humerus
03.	**Scapular Region And Back of The Arm.**	Identification of relevant skeletal features, Deep fascia, Ligaments, Muscles, Nerves and blood vessels of back of arm and scapular region, Quadrangular and triangular spaces	Nerve injuries, Scapular Anastomosis	

04.	**Front Of Forearm And Palm**	Identification of relevant skeletal features, Subcutaneous structures, Deep fascia and its modifications Muscles, Synovial sheaths of long flexor tendons, Nerves and blood vessels, Palmar spaces of hand, Vinculae, Flexor retinaculum of wrist, Carpal Tunnel Syndrome, Claw Hand	Volkman's Ischaemic Contracture, Dupuytren's Contracture	Pulp space infection
05.	**Back Of Forearm And Dorsum of Hand**	Identification of relevant Skeletal features, Subcutaneous structures, Deep fascia and its modifications, Muscles, Fascial compartments and structures passing through them, Nerves and Blood vessels	Wrist Drop, Pseudo-ganglion	
06.	**Joints of The Shoulder Girdle and Shoulder Joint**	**Sternoclavicular And Acromioclavicular Joints**: Identification of relevant skeletal features, Ligaments, Intraarticular structures, Movements, Nerve supply **Shoulder Joint**: Identification of relevant skeletal features, relation Ligaments, Intracapsular structures, Movements, Nerve and arterial supply, Bursae related to the joint	Joint dislocation, Adhesive capsulitis, Rotator cuff Tear	Subacromial Bursitis
07.	**Elbow, Radio-ulnar, Wrist And Joints Of The Hand**	**Elbow Joint-**Identification of relevant skeletal features, Articular surfaces, relation, Ligaments, Nerve and blood supply and Movements **Proximal and Distal RadioUlnar Joints**-Identification of relevant skeletal features, Capsule, Ligaments, Intra-articular structures, Movements **Middle RadioUlnar Joint** **Wrist Joints**: Identification of relevant skeletal features, Ligaments, Movements **First Carpometacarpal Joint :**Type and movements	Pulled elbow, Tennis Elbow and Golfer's elbow, Weight transmission to upper limb, Colles fracture, Carrying angle	

Lower Limb				
Sl. No	**Units**	**Must know**	**Desirable to know**	**Nice to know**
01.	**Anterior and Medial Compartment of Thigh**	Dermatomes, Subcutaneous structures, Great Saphenous Vein-course & tributaries, Deep Fascia, Muscles, Blood vessels, Lymph Nodes and Lymphatics, Femoral Triangle & Adductor Canal, Inguinal Ligament.	Femoral hernia, Referred pain around Hip and Knee Joint and Accessory Obturator Nerve	Abnormal Obturator artery, Meralgia Paresthetica, Femoral Artery Catheterization,
02.	**Gluteal Region**	Cutaneous innervations and muscles in Gluteal region, blood vessels, IM injections, Sciatica	Sacral Plexus and its branches, Pudendal block, Trendelenburg's Sign	
03.	**Back of Thigh**	Dermatomes, Subcutaneous structures, Hamstring Muscles Sciatic Nerve and its branches Blood Vessels	Anastomosis around Hip Joint	
04.	**Popliteal Fossa**	Superficial structures, Boundaries and contents, Anastomosis around knee joint	Popliteal Pulse and Aneurysm	Sural Nerve Grafts.
05.	**Leg (Anterior, lateral and Posterior compartment of Leg) and Dorsum of Foot**	Dermatomes, Subcutaneous structures, Great and Small Saphenous Vein, Deep Fascia and its modification, Muscles, Blood vessels, Nerves	Foot drop, Compartment syndrome	Fibular Graft Ossification of Fibula
06.	**Sole**	Plantar aponeurosis, layers of Sole, Plantar arterial arch, Cutaneous innervation	Calcaneal spur Plantar Fasciitis	
07.	**Hip Joint**	Type, Articulating bones, Ligaments, Movements & Muscles involved, Relations, Nerve and Blood supply, Bursae related to the joint	Femoral neck Fracture, Dislocation of Hip Joint	Congenital dislocation of hip, Perthe's test, Nelaton's Line, Bryant's Triangle
08.	**Knee Joint**	Type, ligaments, muscles, Movement, Locking & Unlocking, Relations, Factors for stability of joint, Nerve and Blood supply, Bursae related to the joint	Meniscus tear, Cruciate ligament tear, Housemaid's knee, Baker's cyst	Patellar dislocations, Knee Joint replacement

09.	**Ankle Joint**	Type, Articulating bones, ligaments, Relations, Movements & Muscles, Nerve and Blood supply	Pott's Fracture, Ligament Tear	Dislocation of Ankle Joint
10.	**Joints of Foot**	Subtalar, Midtarsal and Tarso-metatarsal joints : Types, Articulating bones and movements	Ligaments around the joint	
11.	**Arches of Foot**	Skeletal frame work of foot, Classification & Components of arches, Factors for maintenance of Arches	Flat foot, Morton's Metatarsalgia, CTEV,	Weight Transmission
12.	**Venous and lymphatic Drainage of lower Limb**	Major Veins and Perforators, Varicose veins, Inguinal and Popliteal group of lymph nodes	Venesection, Trendelenburg test	Deep Vein Thrombosis
		Thorax		
Sl. No	**Units**	**Must know**	**Desirable to know**	**Nice to know**
01.	**Thoracic Wall**	Skeletal features, Intercostal Spaces including muscles, nerves, arteries and veins. Joints of the thorax, Intercostal nerve block, Mechanism of respiration	Pleural tapping	Skeletal deformity of chest
02.	**Mediastinum**	Definition, divisions, boundaries and contents of each Mediastinum **Detail about the following structures** : Trachea, Oesophagus, Thoracic Duct, Thymus, Vena Cava, Azygos Venous System, Arch of Aorta, And Descending Thoracic Aorta, Sympathetic chain	Mediastinal Syndrome, Mediastinitis, Aortic Aneurysm, Tracheostomy, Venacaval obstruction and collateral circulation	Oesophagoscopy
03.	**Pleura and Lungs**	Parts of pleura, Lines of pleural reflection, Pleural recesses, Paracentesis Thoracis, surfaces and borders of lungs, lobes of lungs, root, fissures and Relations, Blood supply, Nerve supply, lymphatic drainage of pleura and lungs, Bronchopulmonary segments	Pleurisy, Haemothorax, Chylothorax, Empyema, Pneumothorax, Foreign Body Aspiration, Bronchoscopy, Surgical significance of lung abscess	Mendelson's syndrome, Pan Coast Tumour, Segment pulmonary resection

04.	**Pericardium and Heart**	Parts of pericardium, Pericardial sinuses, External & Internal features of heart, Fibrous skeleton of Heart , coronary circulation, Nerve supply of pericardium and heart	Referred pain in ischemic heart diseases	Pericardial effusion, Aortic Window, Coronary angiography
		Abdomen		
Sl. No	**Units**	**Must know**	**Desirable to know**	**Nice to know**
01.	**Ant. Abdominal Wall & Ext. Genitalia**	Relevant Surface anatomy and Osteology, Abdominal planes and quadrants , Dermatomes, Layers of anterior abdominal wall, Flat muscles , Rectus sheath and contents, Inguinal canal and hernias, spermatic cord, testis, layers of scrotum, Cremasteric reflex, Porto-Caval Anastomosis, Lymphatic Drainage	Holden's line, Extravasation of urine, Caput Medusae	Langer's lines, Incisions of abdomen and Incisional Hernia, Torsion of testis, Umbilical hernia
02.	**Abdominal Cavity and Peritoneum**	Orientation of abdominal viscera, Disposition of peritoneum with peritoneal folds including greater and lesser omentum, greater and lesser sac, Nerve supply of the peritoneum and Referred pain, Functions of peritoneum	Peritoneal recesses (fossae), Ascites	
03.	**Stomach**	External features and Relations & Stomach bed, Blood supply, Lymphatic drainage, Nerve supply	Gastric ulcer and Vagotomy	Traube's space
04.	**Duodenum, Jejunum, Ileum**	External features, relations, Internal features, Blood supply, Nerve supply and lymphatic drainage	Paraduodenal fossa,Ligament of Treitz, Duodenal ulcer & cap	
05.	**Caecum, Vermiform Appendix and Colon**	External features, including relations, position, Internal features, Blood supply, nerve supply and lymphatic drainage	Appendicitis	

06.	**Liver**	External features, relations, Blood supply, Nerve supply, Lymphatic drainage, Segments, Peritoneal ligaments and Bare areas	Liver Biopsy	
07.	**Extrahepatic Biliary Apparatus**	Components, External and internal features, Relations, Blood supply, Nerve supply, Lymphatic drainage. Gall Bladder and Common Bile Duct	Callot's triangle, Murphy's sign	
08.	**Pancreas**	Parts ,External features and relations, Blood supply, Nerve supply and Lymphatic drainage, Duct system of pancreas	Anatomical basis of Obstructive jaundice.	
09.	**Spleen**	Gross features with relations and peritoneal supports, blood supply, lymphatic drainage, Functions	Splenomegaly, Splenectomy	
10.	**Kidney and Ureters**	**Kidney**: External features including relations, Coverings, internal features, Blood supply, Nerve supply and lymphatic drainage, **Ureter:** Extent, course & terminations, Parts and Relations, Blood supply and Lymphatic drainage	Morrison's parallelogram, Ureteric colic	
11.	**Supra Renal Gland**	External features, relations; Blood supply		
12.	**Diaphragm**	Attachment, Openings, Nerve supply, Functions	Subphrenic spaces	Phrenic nerve injury, Hiccup
13.	**Portal Vein**	Formation &Tributaries, Parts & Relations, PortoCaval Anastomosis	Portal Hypertension	
14.	**Aorta, Inferior Vena cava**	Extent, Course & Termination, Relations, Branches and Tributaries	IVC obstruction, Aortic aneurysm	
15.	**Posterior Abdominal Wall**	Muscles, Fascia, lumbar plexus, Sympathetic trunk and pelvic splanchnic nerves.		External Vertebral Venous Plexus

Pelvis				
Sl. No	**Units**	**Must know**	**Desirable to know**	**Nice to know**
01.	**Perineum**	Boundaries, Subdivisions, Colle's fascia & Perineal membrane Urogenital diaphragm, Perineal body, Pelvic diaphragm, Perineal pouches: Boundaries, contents, Nerve supply of the perineum, Boundaries & contents of Ischiorectal Fossa	Rupture of urethra & extravasation of urine, Ischiorectal Abscess	Perineal tear, Episiotomy, Prolapse of pelvic organs
02.	**Pelvis**	Types of Bony pelvis, Pelvic Fascia, Pelvic diaphragm, Nerves & sacral plexus, Vessels, Sacroiliac joints	Urinary stress incontinence	Dimensions of female pelvis
03.	**Urinary Bladder**	External features & relations (in male and female), Internal features, support, Nerve supply, Blood supply and Lymphatic drainage	Neurogenic bladder	Suprapubic cystostomy
04.	**Prostate, Male Urethra and Seminal Vesicle**	External features, relations, Internal structure, Blood supply, Lymphatic drainage, Age changes of prostate gland	Benign prostatic hypertrophy, Carcinoma prostate	Per rectal examination, Urethral Catheterization
05.	**Ovary, Uterus and Fallopian Tube**	External features, relations, Position, ligaments, Blood supply, Nerve supply and Lymph drainage of ovary, uterus and Fallopian Tube, Supports of uterus	Upper and lower uterine segments Prolapse of uterus, Hysterectomy, Tubectomy	Hysterosalpingography
06.	**Sigmoid Colon, Rectum and Anal Canal**	Goss anatomy including relations and External and internal features, Blood supply, Nerve supply and Lymphatic drainage	Per rectal examination, Haemorrhoids, Anal Fissure and Fistula in ano, Perianal abscesses	Hirschsprung's Disease

Head & Neck				
Sl. No	**Units**	**Must know**	**Desirable to know**	**Nice to know**
01.	**Scalp**	Layers, Vessels, nerves and lymphatic drainage, applied anatomy of each layer		
02.	**Face and Parotid Region**	Cutaneous Innervation, Muscles of Facial Expression, Vascular supply and lymphatic drainage, Parotid Gland, Extra-cranial Part of Facial nerve, Lacrimal Apparatus, Eyelid	Bell's Palsy, Frey's Syndrome	Plane for Superficial Parotidectomy
03.	**Cervical Fascia**	Components with their tracings, attachments and modifications, Fascial planes, Spaces in neck and their contents.		Cold Abscess
04.	**Posterior Triangle**	Boundaries, Subdivisions, Contents	Subclavian Steal syndrome, Wry neck	Accessory phrenic nerve
05.	**Anterior Triangle of Neck**	Boundaries, Subdivisions, Contents Thymus and Thyroid Gland		
06.	**Deep Dissection of Neck**	Sympathetic Trunk, IX, X and XI Nerves, Muscles, Blood vessels, Lymph nodes		
07.	**Suboccipital Triangle and Back of Neck**	Boundaries and Contents of Triangle, Deep Muscles of Back of Neck		Cisternal Puncture
08.	**Cranial Cavity**	Cranial fossae, Meninges and Dural Folds, Dural Venous Sinuses, Pituitary Gland, Cavernous Sinus Thrombosis,	Pituitary Tumour	
09.	**Orbit and Its Contents**	Bony Orbit-Boundary, fascia bulbi, ligaments, Extra-ocular muscles and LPS, Nerves (III, IV and VI Cranial Nerves and ophthalmic nerve) and Vessels of Orbit, movements of eyeball	Applied anatomy of III,IV and VI Cranial Nerves Visual axis Orbital axis	

10.	**Eyeball**	Layers and Chambers of Eyeball, Optic Nerves and pathway, Intrinsic muscles of Eyeball, Ciliary Nerves and Vessels	Reflexes Lesions of Optic pathway	Argyll-Robertson Pupil
11.	**Nose and Paranasal Sinuses**	Structure and features, Nerve supply, Blood supply of different areas of Nose, Olfactory Nerve, Paranasal Sinuses with their functions	Little's Area and Kiesselbach's Plexus	
12.	**Temporal and Infratemporal Region**	Boundaries and Communication, Contents, Muscles of Mastication, Temporo-mandibular Joint, Boundaries and Contents of Pterygo-palatine Fossa	Fracture of spine of sphenoid, Ankylosis of Temporo-mandibular Joint	
13.	**Submandibular Region**	Boundaries and Contents, Submaxillary and Sublingual salivary glands, submandibular ganglion, Ganglions-Locations and Connections, Hypoglossal Nerve	Sialolithiasis	
14.	**Oral Cavity**	Tongue, Lips, Palate, Teeth,	Lesion of XII nerve	Alternate taste pathway
15.	**Pharynx**	Introduction, Parts/Divisions, Relations, internal features, Muscles, Blood supply, Nerve supply, Lymph nodes and Lymphatics, Killian's Dehiscence	Mechanism of Deglutition	
16.	**Larynx**	Components Cartilages, Ligaments, internal features, Muscles , Blood supply, Lymphatic drainage, Nerve supply	Hoarseness of Voice, Laryngotomy	Laryngoscopy
17.	**Ear**	Parts and features of External, Middle and Internal Ear, Blood and Nerve supply, Lymphatic drainage, VII and VIII Nerve (Course, Branches and Applied anatomy)	Otitis Externa, Otitis Media, Otosclerosis	Tests for Deafness
18.	**Joints of The Head and Neck**	Craniovertebral joints		

Neuroanatomy				
Sl. No	**Units**	**Must know**	**Desirable to know**	**Nice to know**
01.	**Introduction**	Development of neural tube and its derivatives, Subdivisions: CNS, PNS and AN,; Neurons and Neuroglia types and functions		
02.	**Peripheral Nervous System**	Cranial and Spinal nerves, Nerve endings: receptors, effectors		
03.	**CNS: Spinal Cord**	External features and Coverings, Internal features, Sections of spinal cord at: cervical, thoracic, lumbar & sacral regions, Blood supply;	Lumbar puncture; Lesions at various levels and their effects.	
04.	**Medulla Oblongata**	External and internal features, Cranial nerve nuclei, Sections at the motor decussation, sensory decussation and at the level of Olive, Floor of the fourth ventricle, Inferior cerebellar peduncle, Blood supply	Medullary syndromes	
05.	**Pons**	External and internal features, Floor of fourth ventricle, Sections through upper and lower pons, Cranial nerve nuclei, Middle cerebellar peduncle, Blood supply	Pontine haemorrhage, Millard-Gubler syndrome and Foville's Syndrome	
06.	**Midbrain**	External features, internal features, Cerebral aqueduct, Sections at the level of superior and inferior colliculi, Nuclei of cranial nerves, Blood supply	Weber's syndrome and Benedict's syndrome	

07.	**Cerebellum**	External Features and Morphological classification of Cerebellum with connections, Internal features i.e. cellular organisation and nuclei. Blood supply, Afferents and efferents of all the cerebellar peduncles, Functions of Cerebellum	Cerebellar lesions, signs and symptoms Anatomical correlations	
08.	**Diencephalon**	Thalamus, Hypothalamus, Metathalamus, Epithalamus, Subthalamus, Morphology and Relations of thalamus, Classification and, Blood supply Hypothalamic nuclei, and functions	Connections of Thalamus and hypothalamus. Lesions of the thalamus and hypothalamus and their effects	
09.	**Cerebral Hemispheres**	Lobes, Poles, Borders, Surfaces, Sulci and Gyri, Major Brodmann's Areas, Blood supply of brain- Circle of Willis: Central and cortical branches, Venous drainage		
10.	**White Matter of Cerebral Hemispheres**	White matter: Types of fibres, Internal capsule and Corpus Callosum in Detail	Lesions of Internal Capsule, Agenesis of Corpus Callosum	• Upper and Lower Motor Neuron Paralysis
11.	**Basal Ganglia**	Morphology and Relations, Connections of basal ganglia Extrapyramidal system: Components and functions	Basal ganglia lesion	
12.	**Limbic System**	Parts, Connections and Functions	Lesions of Limbic system	• Circuit of Papez, Wernicke–Korsakoff syndrome
13.	**Reticular Activating System**	Definition, Components and Functions	Lesions of Reticular Activating System	
14.	**Meninges And Blood Supply**	Dura mater: Cranial and spinal differences, Arachnoid mater, Pia mater, Spaces in between them, Meningeal vessels	Applied anatomy of the Meningeal vessels	

15.	**Cerebrospinal Fluid:**	Choroid plexus, Production, Circulation and Absorption of the CSF	Hydrocephalus, Arnold-Chiari Malformations	Ventriculo-Peritoneal and Ventriculo-Atrial Shunts
16.	**Fourth Ventricle**	Extent, Boundaries, Features of Floor, Communications, Relations	Cerebello-Pontine Angle	• Cisternal puncture • Queckenstedt's test
17.	**Lateral and Third Ventricle**	Extent and Parts, Relations, Communications	• Choroid fissure • Tel choroidae	
18.	**Cranial Nerves**	General Concepts, Cranial nerve nuclei, Functional components, Course and distribution	Effect of lesions of Cranial Nerves	
19.	**Autonomic Nervous System**	Sympathetic and Parasympathetic:– Components, Functions and Regulation	Horner's syndrome	

Relevant skeletal features and Surface Anatomy and radiology to be included in discussion of Corresponding Sections.

MODEL QUESTION PAPER
ANATOMY
PAPER-I

Total Marks- 100 **Time: 3 hours**

- Answer all questions.
- Answer the questions in the same serial order strictly.
- Illustrate your answers with well labelled diagram wherever necessary.
- Answer each section in a separate answer book.

SECTION A

General Anatomy, General Histology, General Embryology, Genetics, Upper Extremity and Lower Extremity

1. Describe in detail the mammary bed, structure, blood supply and lymphatic drainage of mammary gland. [2+3+2+3=10]
2. Write short notes on: [5×5 marks=25]
   a. Blood supply of long bone.
   b. Medial longitudinal arch of foot.
   c. Features of Down's syndrome.
   d. Derivatives of neural crest cells.
   e. Transitional epithelium.
3. Answer in brief: [5×3 marks=15]
   a. Explain the embryological basis of non-rejection of placenta during pregnancy
   b. Explain the anatomical basis of foot drop.
   c. List the features of Erb's palsy.
   d. Clinical significance of End-arteries.
   e. Compare and contrast anterior and posterior cruciate ligaments.

SECTION-B

Abdomen, Pelvis & Perineum (with related histology and embryology)

1. Describe in detail the Uterus under following headings. [3+3+2+2=10]
   - Parts and relations
   - Supports
   - Blood supply and lymphatic drainage.
   - Developmental anomalies.

2. Write short notes on: [5×5 marks=25]
   a. Formation and contents of Rectus sheath
   b. Relations of Second part of Duodenum
   c. Microscopic structure of adrenal gland
   d. Rotation of mid-gut
   e. Hepato-renal pouch

3. Answer in brief: [5×3 marks=15]
   a. Explain the anatomical basis of vertebral metastasis in carcinoma of prostate.
   b. Compare and contrast superficial and deep perineal pouch
   c. Explain the anatomical basis of referred pain in ureteric colic.
   d. Enumerate the contents of pudendal canal.
   e. List the functions of Sertoli cells

Model Question Paper

ANATOMY

PAPER-II

Total Marks- 100 **Time: 3 hours**

- Answer all questions.
- Answer the questions in the same serial order strictly.
- Illustrate your answers with well labelled diagram wherever necessary.
- Answer each section in a separate answer book.

SECTION A

Head& Neck, Face and Special senses (with related histology and embryology)

1. Describe in detail the Thyroid gland under following headings. [3+2+2+3=10]
   - Parts and Relations
   - Blood supply
   - Microscopic structure
   - Developmental anomalies

2. Write short notes on: [5×5 marks=25]
   a. Lymphatic drainage of tongue
   b. Relations of cavernous sinus
   c. Functional component and nuclei of facial nerve
   d. Microscopic structure of Layers of Retina
   e. Cleft lip and palate

3. Answer in brief: [5x3 marks=15]
   a. Which layer is known as dangerous layer of Scalp and why?
   b. Explain with reason the safety muscle of larynx.
   c. Enumerate the derivatives of second pharyngeal arch.
   d. Mechanism of Ludwig angina.
   e. List the features of Horner's Syndrome

SECTION B

(Thorax and Neuroanatomy (with related histology and embryology)

1. Describe in detail the parts, relations, and blood supply of internal capsule. Add a note on vascular lesions of internal capsule. [3+2+2+3=10]

2. Write short notes on: [5×5 marks=25]

   a. Branches and distribution of left coronary artery
   b. Microscopic structure of cerebellum
   c. Structures in floor of fourth ventricle
   d. Boundaries and contents of Superior Mediastinum.
   e. Bronchopulmonary segments

3. Answer in brief: [5×3marks=15]

   a. Compare and contrast media and lateral medullary syndrome.
   b. Rational of preconception supplementation of folic acid.
   c. Clinical Basis of motor aphasia.
   d. List the features of Tetralogy of Fallot.
   e. Source of development of arch of aorta

Recommended Books:

Gross Anatomy

1. Susan Strandring: Gray's Anatomy: The anatomical basis of clinical practice, Churchill Livingstone Elsevier.
2. Dutta A.K. Human Anatomy vol. I-III Current Publisher.
3. Romanes. Cunningham's Manual of Practical Anatomy vol. I-III, Oxford.
4. R.S Snell. Clinical Anatomy by regions.Lippincot Williams and Wilkins.

Histology

1. Young B. and Heath J. Wheater's Functional Histology.Churchill Livingstone.
2. Difiore's. Atlas of histology with functional co-relation.

Genetics

1. J. S Thompson and Thompson. Genetics in medicine. W.B. Saunders and Co.Philadelphia, London.

Embryology

1. TW Sadler. Langman's Medical Embryology. Lippincotts, Williams and Wilikins.
2. Keith L Moore and T.V.N. Persaud. The Developing Human. Saunders.

Neuroanatomy

1. Richard S. Snell. Clinical Neuroanatomy for Medical Students. Williams and Wilkins.
2. Vishram Singh. Clinical Neuroanatomy.Elsevier.

Surface anatomy

Halim. and A.C. Das. Surface Anatomy Lucknow. ASI, KGMC.

General Anatomy

A.K.Datta

Reference book for all- Gray's Anatomy (41st Edition)

PHYSIOLOGY

PHYSIOLOGY

GOAL

Imparting a comprehensive knowledge of functioning of cells, organs and organ systems of human body to understand physiological basis of health and disease.

COURSE OBJECTIVES :

Knowledge:

1. Explain the normal functioning of all the organ systems of the body.
2. Describe the contribution of each organ system to the maintenance of homeostasis
3. Elucidate the physiological aspects of normal growth and development
4. Describe the physiological response and adaptations to environmental stresses
5. Explain the physiological principles underlying pathogenesis and treatment of disease.

Psychomotor and clinical Skills:

1. Perform experiments designed for study of physiological phenomena and for assessment of function
2. Analyse and interpret experimental/investigative data critically
3. Distinguish between normal and abnormal data derived as a result of test which student has performed and observed in the laboratory
4. Acquire a list of clinical skills at the introductory level

Integration:

1. Acquire an integrated knowledge of organ structure and function.
2. Understand the regulatory mechanisms and pathophysiology of diseases.

COURSE CONTENT	MUST KNOW (70%)	GOOD TO KNOW (20%)	NICE TO KNOW (10%)
GENERAL PHYSIOLOGY	Introduction to Physiology and functional organization of human body. Concept of Homeostasis and characteristics of control systems	Features, process and importance of feedback mechanisms	Consequences of failure of homeostatic mechanisms with examples
	CELL PHYSIOLOGY: Physiology of the cell and cell organelles Physicochemical properties of cell membrane Transport across cell membrane Intercellular communication	Cytoskeleton and molecular motors G-proteins, second messengers Cell cycle and its regulation. Apoptosissites and its role in physiology. Role of diffusion in dialysis Drugs that block various transport mechanisms and their clinical use.	Clinical application of fluid-mosaic model of cell membrane structure (especially of in vitro fertilization). Role of Patch clamp technique in study of membrane transport proteins Failure of apoptosis and its role in the development of cancer, neurodegenerative and autoimmune diseases Lysosomal storage diseases
	Body fluid compartments - Classification, normal values, composition and their important functions.	Measurement of body fluid compartments Indications and physiological basis of oral rehydration therapy.	Intravenous fluids and their therapeutic uses in fluid and electrolyte disorders
NERVE MUSCLE PHYSIOLOGY	Principles of bioelectricity Genesis of RMP Action potential, compound action potentials. NEURON- Structure, types and properties. Classification of nerve fibers, Saltatory conduction.	Electrotonic potentials Propagation of action potential Strength-duration curve Axoplasmic flow Effect of hypoxia, pressure and local anesthetics on different nerve fibres Nerve growth factors	Demyelinating diseases Drugs that block action potentials and their clinical use

COURSE CONTENT	MUST KNOW (70%)	GOOD TO KNOW (20%)	NICE TO KNOW (10%)
NERVE-MUSCLE PHYSIOLOGY	Neuromuscular Junction of skeletal muscle, neuromuscular transmission	Myasthenia gravis, Lambert-Eaton syndrome Neuro-muscular blockers	
	NERVE INJURIES Chromatolysis, Wallerian degeneration		Transneuronal degeneration
NERVE-MUSCLE PHYSIOLOGY	SKELETAL, CARDIAC & SMOOTH MUSCLES- Types and subtypes, structure, properties, features of each muscle Excitation contraction coupling in skeletal muscle and relaxation Rigor Mortis Isotonic versus isometric contractions Factors affecting force of skeletal muscle contraction, skeletal muscle fibre types, Motor unit Smooth muscle: Structure, distribution, types, molecular mechanism of contraction, properties, regulation, and disorders.	Dystrophin-glycoprotein complex, Size principle, Oxygen Debt, Heat liberated during various phases of contraction, Fenn effect Body mechanics	Duchenne's and Becker's Muscular dystrophies
BLOOD	PLASMA-normal volume, composition, plasma protein concentration and their functions. RBC- normal count, physiological variations, morphology, Principles of hemopoiesis , erythropoiesis and its regulation,	Diseases affecting plasma protein concentration Bone marrow structure and cellular elements. Method of determination of life span of R.B.Cs. Erythropoietin-source, stimuli, functions and regulation	Plasmapharesis and its clinical relevance Consequences of hypoprotenemia Gower-I & II hemoglobins Hemoglobinopathies

COURSE CONTENT	MUST KNOW (70%)	GOOD TO KNOW (20%)	NICE TO KNOW (10%)
BLOOD	Hemoglobin-physiological types, functions, fate of hemoglobin Anemia: classification, causes, physiological basis of symptoms and principles of management Blood indices, PCV & ESR	HbA1C Polycythemia: Primary & secondary.	
BLOOD	WBC- Normal count, classification, features, functions, physiological and pathological variations (in brief), Granulopoiesis staes and regulation Immunity: definition, types of immunityInnate & Acquired & their mechanism, B lymphocytes, Tlymphocytes & their types, concept of antigen & antibody, cell mediated & humoral immunity, Primary & secondary response,	Physiological basis of vaccination, complement system, components and functions of reticuloendothelial system	Consequences of failure of cell mediated and humoral immunity Lymphokines Endogenous pyrogens AIDS Organ transplantation Graft rejection
BLOOD	PLATELETS: structure, functions Hemostasis Tests for hemostasis Haemophilia. BLOOD GROUPS-Basis, inheritance and importance of the blood groups.	Thrombocytopenia purpura. Thrombosis and thrombolysis Anticoagulants commonly used & their mechanism of actions	Disseminated intravascular coagulation Blood component therapy. Effects of splenectomy.

COURSE CONTENT	MUST KNOW (70%)	GOOD TO KNOW (20%)	NICE TO KNOW (10%)
	Landsteiner's law, ABO System – type A & B antigen, ABO system & inheritance, relation to transfusion, cross matching major & minor. Rh System – inheritance, Rh incompatibility & Erythroblastosis foetalis. Blood transfusion: indications, storage of blood & changes during storage, transfusion reactions.	Bombay blood group, MN blood group system, kernicterus and exchange transfusion	Autologous transfusion Other important blood groups Cold antibodies
CARDIOVASCULAR SYSTEM	Functional anatomy of cardiac muscle, properties of cardiac muscle, cardiac innervation CONDUCTING SYSTEM-Components of conducting system, origin and spread of cardiac impulse, pacemaker potential	Excitation-contraction coupling in myocardium	Stokes-Adams Syndrome Sick-sinus syndrome
	ECG: Physiologic basis of ECG, method of recording, characteristics of normal ECG	Cardiac arrhythmias ECG changes in myocardial infarction and alterations in the ionic composition of the body fluids	Long QT syndrome Holter monitoring
CARDIOVASCULAR SYSTEM	CARDIAC CYCLE-pressure – volume changes in different phases, Functional basis of heart sounds Heart rate & its regulation	Jugular venous pulse, arterial pulse Murmurs	Abnormal pulse types
	Cardiac output: normal values, physiological variations, factors affecting cardiac output, regulation	Measurement of cardiac output – principles	

COURSE CONTENT	MUST KNOW (70%)	GOOD TO KNOW (20%)	NICE TO KNOW (10%)
CARDIOVASCULAR SYSTEM	Cardiovascular regulatory mechanisms		
	Nutrition and metabolism of the heart		
CIRCULATION	Hemodynamics of circulation Neural and local control of circulation	Mayer's waves and Traube -Hering wave Sympathetic vasodilator system	
	Blood pressure: Normal levels, measurement, determinants, short term & long-term regulation	Hypertension, Hypotension	Physiological basis of treatment
	Capillary circulation, tissue fluid formation.	Lymphatic system: Anatomy & structure, formation of lymph, composition of lymph, functions of lymphatic system, lymph flow & factors affecting it. Pathophysiological basis of edema	
	Regional circulation: Physiologic anatomy, factors affecting, special features: coronary and cerebral circulation	Cutaneous, visceral, muscle and fetal and neonatal circulation	Methods of measurement of regional circulation
	Shock – classification, pathophysiologic basis, Compensatory mechanisms, Uncompensated shock	Physiological basis of treatment of shock	
RESPIRATORY SYSTEM	Physiologic anatomy - Functions of respiratory system	Non-respiratory functions of lung	Cystic fibrosis
	Mechanics of breathing: Ventilation : Inspiratory & expiratory muscles, intrapleural pressure Lung volumes and capacities. Pulmonary ventilation, alveolar ventilation, alveolar dead space	Asthma, COPD and difference between obstructive and restrictive lung diseases	

COURSE CONTENT	MUST KNOW (70%)	GOOD TO KNOW (20%)	NICE TO KNOW (10%)
RESPIRATORY SYSTEM	Pulmonary Circulation Ventilation perfusion ratio (V/Q)	V/Q abnormalities, clinical conditions associated with abnormal dead space volumes	Pulmonary wedge pressure and its clinical implications
	Diffusion of Gases Exchange of respiratory gases at alveolar-capillary membrane, factors affecting diffusion.	Atelectasis, Adult respiratory distress syndrome	
	Carriage of oxygen, role of Hemoglobin, oxygen dissociation curve & factors affecting it.	Carbon monoxide poisoning	
RESPIRATORY SYSTEM	Carriage of carbon dioxide	Carbon-dioxide dissociation curve	CO2 narcosis
	Control of Breathing : Neural control – higher centers, reflexes. Chemical control – central & peripheral chemoreceptors, role of CO2, O2, H+	Abnormal breathing patterns Respiratory adjustments in exercise. Hypoxia, cyanosis and dyspnea Pulmonary function tests	Oxygen therapy O2 toxicity, hyperbaric O2 therapy Artificial respiration
ENVIRONMENTAL PHYSIOLOGY	Body temperature regulation : in cold and hot environment	Heat cramps Heat exhaustion Heat stroke	Hypothermia and its clinical applications
	Physiological responses to high altitude	High altitude pulmonary and cerebral edema	
	Physiological responses to high atmospheric pressure	Graded decompression	
	Space physiology		
EXERCISE PHYSIOLOGY	Energy dynamics in exercise Cardiorespiratory changes in exercise	Classification of physical activity based on energy expenditure Effect of training	
EXCRETORY SYSTEM	KIDNEY- renal capsule, nephron segments and their functions, difference between cortical and juxtamedullary nephrons, peculiarities of renal circulation, Juxta glomerular apparatus	Reno-renal reflex Renal hypertension	

COURSE CONTENT	MUST KNOW (70%)	GOOD TO KNOW (20%)	NICE TO KNOW (10%)
	Glomerular filtration rate and its regulation	Concept of clearance	
	Renal tubular reabsorption and secretion	Regulation of fluid electrolyte balance Regulation of acid-base balance	Diuretics – physiological basis of action
	URINARY BLADDER- Nerve supply, Micturition reflex.	Cystometrogram, disorders of micturition	Pathophysiology of renal failure Hemodialysis & Peritoneal dialysis
GASTRO-INTESTINAL SYSTEM	Functional anatomy of gastrointestinal tract and innervation of G.I.T. Basic electric rhythm, migrating motor complex;	Enteric nervous system-components, functions and regulation;	APUD Cells
	Movements of the GIT-Mastication, deglutition, peristalsis, receptive relaxations, antral contractions, segmentations, pendular, villi movements; haustrations, defecation.		Barium meal studies, endoscopy
	GI HORMONES- Gastrin, secretin, CCK-PZ, (source, stimuli, inhibition, actions)	Motilin , VIP, GIP and Ghrelin	
	SALIVARY GLANDS- innervation, salivary composition, functions and regulation	Xerostomia, Sialorrhoea	
GASTRO-INTESTINAL SYSTEM	Phases of deglutition (swallowing), mechanism.	Dysphagia	
	ESOPHAGUS- functions of lower esophageal sphincter	Achalasia cardia,	Gastroesophageal reflux disease.

COURSE CONTENT	MUST KNOW (70%)	GOOD TO KNOW (20%)	NICE TO KNOW (10%)
	STOMACH-Gastric glands, gastric juice- volume, pH, composition, functions and regulation.	Vomiting, pernicious anemia, peptic ulcer	Zollinger-Ellison Syndrome, NSAIDS
	SMALL INTESTINE- Intestinal glands, composition, functions and regulation of intestinal juice, movements of small intestine	Peyer's patches ('M' or microfold cells), adynamic ileus, Ileocecal valve	Malabsorption syndrome
	PANCREAS- composition, functions and regulation of pancreatic juice.		Steatorrhea
GASTRO-INTESTINAL SYSTEM	LIVER- Microscopic structure, functions of liver, composition of bile, cellular mechanism of bile formation, enterohepatic circulation of bile salts, control of secretion, concentration & storage of bile in gall bladder. Filling & evacuation of gall bladder,functions of gall bladder	Pre-hepatic, hepatic and post hepatic jaundice and their features	Liver function tests Cholecystectomy, Cholelithiasis or gallstones
	LARGE INTESTINE- Functions of large intestine, defecation reflex, dietary fiber	peristaltic rush, mass peristalsis, Gastrocolic and ileoileal reflexes, constipation and diarrhea	Aganglionic megacolon or Hirschpung's disease
NUTRITION	Concept of balanced diet - factors affecting caloric requirements - requirements of various nutrients, sources, daily needs.	Recommended dietary allowances Nutrition under special conditions – pregnancy, lactation, growing child.	Pre-biotics and Pro-biotics Glycemic index

COURSE CONTENT	MUST KNOW (70%)	GOOD TO KNOW (20%)	NICE TO KNOW (10%)
NERVOUS SYSTEM	Introduction to neurophysiology Cerebrospinal fluid Neuroglial cells Neurotransmitters and neuromodulators	Transport across Blood Brain barrier Lumbar puncture	Hydrocephalus
	Sensory Receptors- Clasification and properties Synapse- types, synaptic transmission and properties	Signal detection, transmission and interpretation of stimulus intensity and processing of information	
	Ascending sensory pathways		
	Thalamus	Thalamic syndrome	
	Somatosensory cortex and association areas	Cortical plasticity	Effect of cortical lesions
NERVOUS SYSTEM	Physiology of pain sensation Endogenous pain regulatory mechanisms Organization of motor system and Motor cortex Reflexes- classification, characteristics and properties	Central inhibition and counter-irritants Physiological basis of use of Analgesics Spinal processing of information Physiology of locomotion	Headache Herpes zoster Tic Douloureux
	Descending pathways	Physiological basis of neural deficits caused by lesions at various levels of the neuraxis	
	Basal ganglia	Parkinson's disease	Chorea and Athetosis
	Cerebellum	Cerebellar disorders	
	Posture and equilibrium	Disorders of gait	

COURSE CONTENT	MUST KNOW (70%)	GOOD TO KNOW (20%)	NICE TO KNOW (10%)
NERVOUS SYSTEM	Functions of Hypothalamus	Obesity	
	Limbic system- components and functions	Kluver-Bucy syndrome Addiction	Effect of Sex hormones on behaviour
	Ascending reticular activating system- components & function		
	Electroencephalography (EEG)	Clinical uses of EEG (Brief)	
	Neurophysiology of sleep	Genesis of slow wave sleep and REM sleep	Sleep disorders
	Cerebral cortex-Lobes, functional areas and their functions		
	Learning and memory	Long-term potentiation Long-term depression	Alzheimer's disease and senile dementia
	Neurophysiology of speech	Language disorders	
ANS	ANS-Functions of sympathetic and parasympathetic divisions.	Horner's syndrome	
SPECIAL SENSES	Functional anatomy of the eye and optics Retina: Photoreceptors, signal transduction and perception, color vision visual field defects Central visual pathway and visual cortex	Processing of colour vision Colour blindness Nystagmus	Glaucoma and physiological basis of treatment
	Physiology of hearing, external ear and middle ear Cochlea: Structure and signal transduction Auditory pathways and auditory cortex Vestibular apparatus: Structure & Function	Tests of hearing Audiometry	Meniere's disease

COURSE CONTENT	MUST KNOW (70%)	GOOD TO KNOW (20%)	NICE TO KNOW (10%)
	Physiology of olfaction	Disorders of the taste	
	Physiology of gustation	Disorders of the smell	
ENDOCRINE SYSTEM	Mechanism of hormone action		
	Hypothalamo-pituitary axis		
ENDOCRINE SYSTEM	Anterior Pituitary-Hormones secreted from it their regulation and actions	Gigantism Acromegaly Dwarfism	
	Posterior Pituitary-Hormones and their actions and regulation	Diabetes insipidus Syndrome of inappropriate secretion of ADH (SIADH)	
	Thyroid Gland-Biosynthesis, actions and regulation of thyroid hormones	Hyper and hypo-thyroidism	
	Parathyroid Glands-Plasma calcium and phosphorus regulation by PTH, Vit.D3 and Calcitonin	Imbalance of calcium homeostasis	
	Adrenal Cortex-Biosynthesis, actions and regulation secretion of hormones secreted from adrenal cortex	Cushing's disease Addison's disease Conn's syndrome	Basis and features of Adrenogenital syndrome
	Adrenal Medulla		
	Pancreas-cells of Islets and their secretions. Actions and regulation of insulin secretion, types of diabetes mellitus, basis and features of diabetes mellitus. Regulation of blood glucose	Physiological basis of complications of diabetes mellitus	Oral hypoglycemic agents

COURSE CONTENT	MUST KNOW (70%)	GOOD TO KNOW (20%)	NICE TO KNOW (10%)
REPRODUCTIVE SYSTEM	Biological rhythms		
	Growth, development and aging	Theories of aging	
	Sex determination and differentiation, MALE-endocrine functions of testes and regulation of testosterone, male pubertal changes. Functions of sertoli cells Composition and functions of semen	Factors affecting spermatogenesis Blood-testis barrier	Male infertility
	FEMALE-oogenesis, actions of estrogen and progesterone, phases and hormonal regulation of menstrual cycle, indicators for ovulation	Menstrual disorders, Menopause	
	Maternal changes during pregnancy, functions of placenta, parturition reflex, lactation Contraception	Pregnancy tests	IVF methods
YOGA	Physiology of yoga	Yoga in health & disease	

Suggested Topics for Integration:

- Diabetes mellitus
- Anaemia
- Thyroid
- Coronary circulation and myocardial infarction
- Jaundice
- Cerebellar disease
- Dialysis
- Acid-base balance

Practicals:

Haematology:

- Preparation and examination of peripheral blood smear and identification of cells
- Determination of differential leucocyte count
- Determination of total red blood cell count
- Determination of total leucocyte count
- Determination of reticulocyte count
- Determination of osmotic fragility of erythrocytes
- Determination of platelet count
- Determination of eosinophil count
- Determination of haemoglobin concentration of blood
- Determination of erythrocyte sedimentation rate and packed cell volume and calculation of the absolute values
- Determination of ABO and Rh blood groups
- Determination of bleeding time, clotting time
- Determination of Prothrombin time, activated partial thromboplastin time and fibrinogen time
- Examination of bone marrow smear

Nerve and Muscle:

- Study of salient features of electromyography
- Study of phenomenon of human fatigue
- Mosso's ergograph,
- Handgrip dynamometer / ergograph for isometric work
- Estimation of conduction velocity of sensory and motor nerves
- Measurement of mechanical efficiency at different grades of exercise
- Study of excitable and contractile properties of a nerve muscle preparation
- Demonstration of work performed by skeletal muscle in vitro under (i) After loaded conditions, and (ii) Free loaded conditions
- Demonstration of muscle fatigue and neuromuscular transmission in an amphibian model
- Demonstration of compound action potential in a frog's sciatic nerve
- Determination of strength duration curve in frog's nerve muscle

Cardiovascular system

- Recording and analysis of 12 lead electrocardiogram
- Measurement of blood pressure
- Determination of the effect of posture on blood pressure
- Determination of the effect of exercise on blood pressure
- Determination of physical fitness of a subject using screening tests
- Measurement of blood flow in the forearm by venous occlusion plethysmography and to demonstrate the effect of (a) Exercise, (b) Arterial occlusion, and (c) Temperature
- Clinical examination of the human cardiovascular system (CVS)
- Demonstration of the properties of cardiac muscle in the frog
- Study of the factors controlling inotropic and chronotropic functions in isolated perfused frog's heart
- Demonstration of exercise stress test

Respiratory system:

- Recording of chest movements by a stethograph and to study the effects of speech, swallowing, coughing, breath-holding and hyperventilation
- Determination of various lung volumes and lung capacities
- Determination of maximum voluntary ventilation (MVV) and forced expiratory volume (FEV) by spirometry
- Examination of human respiratory system
- Predicting VO2 max using the Harvard Step test
- Effects of hypoxia on various systems in the human body

G.I.T & Metabolism:

- Determination of resting metabolic rate in human
- Clinical examination of the abdomen
- Study of the movements of isolated segment of mammalian small intestine and the effects of: (i) Ions, (ii) Neurotransmitters, and (iii) Cold in vitro

Reproductive system :

- Changes in vaginal exfoliation cytology and cervical secretion during different phases of reproductive cycles in human and in rat Pregnancy tests
- Pregnancy tests
- Determination of sperm count, motility and morphology in a human sample

Neurophysiology:

- Examination of nervous system
- Examination of cranial nerves
- Human electroencephalography: Method of recording and identification of different types of EEG waves
- Assessment of autonomic function
- Determination of reaction time in a human subject

Special senses:

- Determination of visual acuity and astigmatism
- Blind spot in the field of vision
- Clinical assessment of colour vision
- Perimetry
- Audiometry
- Demonstration of visual and auditory evoked potentials

Teaching learning methodology:

Large group teaching:

- Didactic lectures
- Student's seminars

Small group teaching:

- Structured Interactive Tutorials
- Practical demonstrations
- Case based discussions

Learning Resource Materials:

Textbooks, Reference books, Practical Record

Recommended textbooks:

Textbook of Medical Physiology by A.C.Guyton & Hall

Understanding medical Physiology by R.L.Bijlani

Reference books:

Review of Medical Physiology by W.F.Ganong

Physiology by Berne and Levy

ASSESSMENT:

The 3rd Friday of every month is designated for internal assessment of Physiology

The Pre-Professional examination will have 2 theory papers of 100 marks each and Practical examination of 100 marks.

The professional examination will have 2 theory papers of 100 marks each and practical and viva of 100 marks. In each paper 10 marks questions will be from the topics of integrated teaching.

Theory paper I topics:

General Physiology, Nerve-Muscle physiology, Blood, Respiratory physiology, Cardiovascular physiology, Gastrointestinal physiology, Nutrition

Theory paper II topics:

Renal physiology, Environmental physiology, Endocrinology, Reproductive physiology, Neurophysiology, Special senses, Yoga and exercise physiology

Paper I distribution of marks:

Section A – (50 marks)

(General Physiology, Nerve-Muscle physiology, Blood, Gastrointestinal physiology and nutrition)

1 Structured Long answer Question 10 marks

8 Short Answer questions 5 marks each

Section B (50 marks)

(Respiratory physiology, cardiovascular physiology, Environmental physiology,)

1 Structured Long answer Question 10 marks

8 Short Answer questions 5 marks each

Paper II distribution of marks:

Section A (50 marks)

(Renal physiology, Endocrinology, Reproductive physiology)

1 Structured Long answer Question 10 marks

8 Short Answer questions 5 marks each

Section B (50 marks)

(Neurophysiology, Special senses, Yoga and Exercise physiology)

1 Structured Long answer Question 10 marks

8 Short Answer questions 5 marks each

MODEL QUESTION PAPER

PHYSIOLOGY

PAPER I

Time: 3 hours **Max. Marks: 100**

ANSWER ALL QUESTIONS

Each Section to be answered in a separate answer book.
Illustrate your answers with suitable diagrams wherever appropriate.

SECTION A

(General Physiology, Blood, Nerve and Muscle, Gastrointestinal physiology and nutrition)

1. Draw a neat labelled diagram of neuromuscular junction. With the help of a flow chart, illustrate the steps of neuromuscular transmission. State the action of any 3 drugs acting at the neuromuscular junction. (3+4+3=10 marks)
2. Describe briefly the events that occur during Wallerian degeneration of the axon. (5 marks)
3. Describe the secretion of acid by the gastric mucosa. (5 marks)
4. Explain, why dehydration is common and usually fatal in children, if not treated immediately. (2½ marks)

   Explain why oral rehydration solution is administered in dehydration? (2½ marks)
5. Write the composition, physiological and clinical significance of dietary fibres. (2+1⅓+1⅓=5marks)
6. Explain the physiological basis of: (1+1+1+1+1+1=5 marks)
   a) Achalasia cardia
   b) Achlorhydria
   c) Steatorrhea
   d) Prolonged clotting time in obstructive jaundice
   e) Hirschsprung disease
7. With the help of a flow chart, explain the mechanism of cell mediated immunity (5 marks)

8. Explain the mechanism by which primary hemostatic plug is formed. (5 marks)
9. Explain the pathophysiological basis of erythroblastosis fetalis. How can it be prevented? (4+1=5marks)

SECTION B

(Respiratory physiology, cardiovascular physiology, environmental physiology)

1. Define cardiac cycle and give its normal value. With the help of diagram, describe the left ventricular pressure, volume and acoustic changes in a single cardiac cycle. Explain the physiological basis of split heart sound. (½+2+2+2+2+½ = 10marks)
2. With the help of flow chart explain how sino-aortic reflex regulates the blood pressure. (5marks)
3. Describe the transport of carbon dioxide by blood. (5marks)
4. Compare and contrast pacemaker potential and ventricular muscle action potential.(5marks)
5. Describe the chemical regulation of respiration. (5marks)
6. Classify hypoxia. Describe the features of different types of hypoxia with examples.(5 marks)
7. Describe the mechanisms of temperature regulation in a hot environment. (5 marks)
8. Explain the pathophysiology of pulmonary edema. (5 marks)
9. Draw a graph of changes in intrSapulmonary and intrapleural pressure occurring during inspiration and expiration. (5 marks)

MODEL QUESTION PAPER
PHYSIOLOGY
PAPER II

Time: 3 Hours **Max. Marks: 100**

ANSWER ALL QUESTIONS

Each Section to be answered in a separate answer book.
Illustrate your answers with suitable diagrams wherever appropriate.

SECTION A

(Renal physiology, Endocrinology, Reproductive physiology)

1. Explain the actions of insulin on muscle and liver. With the help of flow chartexplain the consequences of its deficiency. (3+3+4 = 10 marks)
2. Name the hormones involved in calcium homeostasis. Describe the action of anyone. (2+ 3= 5 marks)
3. Describe the actions of testosterone. (5 marks)
4. Briefly explain how the following conditions affect GFR: (1+1+1+1+1=5marks)
   a. Afferent arteriolar constriction
   b. Severe efferent arteriolar constriction
   c. Ureteral obstruction
   d. Hypo-proteinemia
   e. Pregnancy
5. Describe the innervation of urinary bladder and micturition reflex. (2½ + 2½=5marks)
6. Compare and contrast metabolic and respiratory acidosis. (5 marks)
7. Explain the physiological basis of (2½+2½=5marks)
   a. oral contraceptive pills
   b) immunological pregnancy tests
8. With the help of flow chart, describe the process of milk ejection reflex. (5 marks)
9. Describe the actions of thyroid hormone on cardiovascular system. (5 marks)

SECTION B

(Neurophysiology, Special senses and Yoga)

1. Name the deep nuclei, functional lobes and functions of cerebellum. Describe the afferent and efferent connections of intermediate zone of the cerebellum. Enumerate any four cerebellar disorders. (1+1+2+3+3)
2. Explain myotatic reflex with well labelled diagram. (5 marks)
3. Describe the origin, course and termination of dorsal column medial lemniscus pathway. (5 marks)
4. Compare and contrast between upper motor neuron paralysis and lower motor neuron paralysis. (5 marks)
5. Describe the features and suggest the corrections of refractory errors. (5 marks)
6. Explain how semi-circular canals and otolith organs are stimulated. (5 marks)
7. Draw a neat labelled diagram of Organ of Corti and explain the basis of travelling wave theory of sound transmission. (5 marks)
8. Trace the olfactory pathway. (5 marks)
9. Describe in brief the cardiorespiratory changes during exercise. (5 marks)

BIOCHEMISTRY

BIOCHEMISTRY

OBJECTIVES FOR UNDER GRADUATE MEDICAL EDUCATION

At the end of the 1st MBBS course, the student shall be able to have the following knowledge and skills.

Knowledge:

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

- Describe the molecular and functional organization of a cell and lists its sub cellular components.
- Delineate structure, function and inter-relationship of bio-molecules and consequences of deviation from normal.
- Summarize the basic and clinical aspects of Enzymology with emphasis on diagnostic enzymes.
- Describe digestion & assimilation of nutrients and consequences of malnutrition; integrate the various aspects of metabolism, their regulation and inborn errors of metabolism
- Describe mechanisms involved in maintenance of body fluid, electrolyte and pH homeostasis
- Outline the molecular mechanisms of gene expression and regulations, the principles of genetic engineering and their application in medicine.
- Summarize the molecular concept of defence and their application in medicine.
- Outline the biochemical basis detoxification, environmental health hazards, mutagens and carcinogenesis
- To familiarize themselves with the principles of various conventional and specialized laboratory investigations, instrumentation analysis and interpretation of a given data.
- Interpret normal and abnormal levels of common biochemical parameters.
- Outline the calorie intake, mention sources of micronutrients and vitamins, special dietary needs and restrictions.

Skills:

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

- Make use of glucometer, reagent kits and urine strips to perform biochemical analysis relevant to clinical screening and diagnosis
- Analyze and interpret investigative data
- Demonstrate the skills of solving scientific and clinical problems and decision making
- Prepare a diet plan and advice for normal individuals and certain disease conditions

Integration:

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

DURATION

Duration of the course: 2 semesters

Total number of hours: 240 (Lectures: 160 Hours & Practicals and Innovative sessions: 80Hours)

Innovative sessions include projects, seminars, structured discussion, integrated teaching, formative evaluation and revision.

BIOCHEMISTRY CURRICULUM CONTENT

S/N	TOPIC	MUST KNOW (A)	MUST KNOW (B)	NICE TO KNOW	T-L METHOD	DURATION
1.	CELL	1. Cell organelle, structure and fucntion. 2. Cell membrane, transport across the cell membrane	1. Diseases associated with organelle 2. Fractionation of organelles in brief and their marker enzymes	1. Unusual membrane structure and disorder associated with cell membrane.	1. Integration with Anatomy and Physiology	2 hrs
CHEMISTRY OF BIOMOLECULES:						
2.	PROTEIN	1. Classification of aminoacids based on structure, metabolic fate, nutritive value 2. Nutritional value, limiting amino acids and mutual supplementation. 3. Structural organization of proteins 4. Primary, Secondary, Tertiary and Quaternary structure 5. Structure of insulin, collagen Myoglobin and haemoglobin 6. Protein folding in brief, prion diseases 7. Plasma proteins	1. Properties of amino acids, ionic properties of amino acids, isoelectric pH and its importance; Buffering action of amino acids and proteins 2. Peptide bonds; Biologically important peptides, 3. Protein; classification based on composition and solubility, shape, function 4. Denaturation, coagulation; precipitation of protein 5. Haemoglobinopathies: Different types and HbS in detail (Hb electrophoresis sicking test) 6. Thalassemia **:** Alpha and beta thalassemia in brief	1. Isoelectric precipitation using salts, heavy metals and organic solvents. 2. Protein sequencing 3. Denaturation 4. Precipitation of proteins	1. Lectures 2. Practical on protein precipitation and colour reactions of Biuret and Ninhydrin tests 3. Plasma protein electrophorosis 4. Demonstration of Hb electrophoresis and different patterns obtained.	6 hrs (2 practical) 6hrs (2 practical) 3hrs (1 practical)

3.	CARBOHY-DRATES	1. Classification 2. Monosaccharides 3. Disaccharides 4. Oligosaccharides 5. Polysaccharides : Homopolysaccharides, Heteropolysaccharides Glycosaminoglycan-composition, distribution and function 6. Dietary fibre-Definition, types function and clinical significance	1. Properties and reactions of carbohydrates 2. Alcohol and acid derivatives of monosaccharaides and their uses 3. Artificial sweeteners 4. Sialic acid	1. Glycosidic bonds-N linked and O linked with examples 2. Amino sugars, deoxy sugars with examples 3. Blood group antigens-Basic composition and Types 4. Carbohydrates in cell membrane	Lectures Practical Monosaccharide and disaccharide polysaccharide	5 hrs 6hrs(2 practical)
CHEMISTRY OF BIOMOLECULES:						
4.	LIPIDS	1. Definition, classification of Lipids 2. Simple lipids-composition and function 3. Compound lipids-phospholipids, glycolipids and lipoproteins, their composition and functions 4. Fatty acids: Definition, Alpha, beta and omega numbering system, classification; clinical significance of MUFA & PUFA; Essential fatty acids, Trans fatty acids. Chemical reaction of fatty acids	1. Prostaglandins- derivatives, biological importance, uses.	1. Phospholipases-Clinical highlights: Viper venom, Respiratory distress syndrome	Lectures Integration with Physiology for Membrane transport Chemistry & Properties of Lipids	6 hrs 3hrs (1 practical)

		5. Cholesterol: Structure, biologically important compounds derived 6. Micelles and Liposomes,				
5.	ENZYMES	1. Definition , IUBMB Classification with examples, coenzymes and cofactors 2. Concept of active site, specificity of enzyme 3. Enzyme Kinetics 4. Factors affecting enzyme activity , km value and its significance 5. Enzyme inhibition : Competitive, non-competitive, and uncompetitive with examples, Suicidal inhibition, Allosteric inhibition and feedback inhibition with examples of drug action. 6. Enzyme regulation in biological systems-compartmentalization, allosteric regulation, covalent modification, zymogen activation, induction, repression & depression.	1. Iso-enzymes: Definition separation and examples – CPK & LDH. 2. Therapeutic enzymes 3. Enzymes used in laboratory techniques 4. Enzyme inhibitors of therapeutic importance		Lectures Practical on Serum Amylase estimation, LDH estimation	7 hrs 6 hrs (2 practical)

S/N	TOPIC	MUST KNOW (A)	MUST KNOW (B)	NICE TO KNOW	T-L METHOD	DURATION
CHEMISTRY OF BIOMOLECULES:						
6.	ENZYMES	1. Clinical enzymology: Diagnostic importance of enzymes: Functional & Non-functional enzymes. 2. Other enzymes of diagnostic importance: Transaminases(AST., ALT, ALP, GGT, NTP, ACP, Amylase, Lipase, Choline esterase, Enolase				
DIGESTION AND ABSORPTION						
7.	CARBOHY-DRATES	1. Digestion, Absorption, Glucose transporters and their applied aspects.	1. Significance of dietary fibre 2. Lactose intolerance-congenital and acquired		Lectures	1 hr
8.	LIPIDS	1. Digestion, Absorption 2. Role of bile salts and micelle	1. Malabsorption, steatorrhea	1. Diagnostic tests for malabsorpation	Lectures	1 hr
9.	PROTEIN	1. Digestion & Absorption, Meister cycle 2. Nitrogen balance			Lectures	1 hr
METABOLISM IN HEALTH AND DISEASE CONDITIONS						
10.	METABOLISM OF CARBO-HYDRATES	1. Overview of Glycolysis-aerobic and anaerobic, Regulation, Rappaport Leubering shunt and its applied aspect	1. Fate of pyruvate, PDH reaction, lactic acidosis with two examples 2. Fructose and galactose metabolism	1. Artificial sweeteners 2. Pentosuria, polyol pathway and its importance	Lectures Case studies, OSPE and spotters	10 hrs 3 hrs

		2. Gluconeogenesis: Definition, Substrates, reactions and key enzymes, regulation, significance, Glucose-alanine cycle, Cori cycle 3. Glycogen metabolism and Von Gierke's disease in detail.Regulation of glycogenesis and glycogenolysis	4. HMP shunt pathway: Tissues operating, oxidative phase in detail & mention the products of non oxzidative phase significance of HMP shunt pathway, G6PD, Transketolase, their applied aspect 5. Uronic acid pathway-products and their importance. 6. Insulin: Receptor, mechanism of action, insulin release, actions of insulin related to metabolism in brief	1. Types of bonds sugars participate in the cell	Principles and use of 1. Urine strips for glucose and 2. Glucometer	3 hrs (pratical)
S/N	**TOPIC**	**MUST KNOW**	**DESIRABLE TO KNOW**	**NICE TO KNOW**	**T-L METHOD**	**DURATION**
11.	METABOLISM OF CARBOHY-DRATES	1. TCA cycle- overviews, regulation, importance and applied aspects, Anaple-rotic reactions, Amphibolic role 2. Blood sugar regulation, Diabetes Mellitus-Diagnostic criteria and monitoring of glycaemic control and complications, Metabolic derangements, other causes of hyperglycaemia and hypoglycaemic, Glycemic index of food, Acute & Chronic complications of DM (Biochemical basis)	1. GTT : Indications, procedure, interpretation, Types a of GTT curves, Mini GTT, extended GTT, IV GTT & GCT in brief		1. Lectures 2. Perform test for estimation of glucose from blood/ plasma, CSF	10 hrs 9 hrs (3 practical)

12.	METABOLISM OF LIPIDS	1. Fatty acid oxidation : Beta oxidation: definition, fatty acid transport & carnitine, steps, Energetics, regulation & disorders. α - oxidation and Ω- oxidation 2. Ketone bodies: Formation & Utilization, Metabolic background of ketoacidosis in DM and starvation and differential diagnosis by laboratory 3. Lipoproteins: Definition, general structure of lipoproteins, classification, separation 4. Lipoprotein Metabolism of chylomicrons, VLDL & LDL, Metabolism of HDL, Reverse cholesterol transport and atherosclerosis, Lp(a) and its significance. 5. Dyslipidemia	1. Fatty and biosynthesis: Fatty acid synthase complex, reactions, regulation 2. Oxidation of odd chain fatty acid & fate of propionyl CoA 3. Adipose tissue: Adipokines, Hormone sensitive lipase 4. Fatty liver: causes, Lipotropic factors. 5. Cholesterol : Synthesis upto mevalonate in detail and mention the intermediates of important reactions upto cholesterol synthesis ,regulation of cholesterol synthesis.	1. Elongation and desaturation of fatty acids 2. Oxidation of unsaturated fatty acid: in brief, 3. Inborn errors associated, lipid storage disorders: Niemanna Pick, Tay Sach's, Gaucher's, Fabry's disease in brief.	Lectures Estimation of Cholesterol and TG and their interpretation, Amniotic fluid analysis	10 hrs 9 hrs (3 practical)
S/N	**TOPIC**	**MUST KNOW (A)**	**MUST KNOW (B)**	**NICE TO KNOW**	**T-L METHOD**	**DURATION**
METABOLISM IN HEALTH AND DISEASE CONDITIONS						
13.	METABOLISM OF LIPIDS	1. Cholesterol: Metabolic fate: Formation of bile salts and its significance, mention other biologically compounds derived from cholesterol.	1. Eicosanoids: Prostaglandins & Thromboxanes; major steps of formation; Biochemical actions & therapeutic uses. Leukotrienes & Lipoxins.		Lectures	3 hrs

		2. Lipid profile: Dietary management & role of statins				
14.	METABOLISM OF AMINO ACIDS	1. Dynamic state of body proteins, body amino acid pool, inter organ transport of amino acids 2. Reactions: transamination, oxidative deamination, Non oxidative deamination, transdeamination 3. Formation and detoxification of ammonia 4. Urea cycle- regulation, energetics, disorder of urea cycle Hyperammonemia, Biochemical basis of management of hyperammonemia. 5. Metabolism of glycine; compounds synthesized and inborn errors 6. Metabolism of aromatic amino acids, phenyl alanine and tyrosine; compounds synthesized inborn errors associated 7. Metabolism of Tryptophan and compunds (niacin, melatonin, serotonin, indoxyl) in brief. Harnup disease and its diagnosis. Effect of PLP on Tryptophan metabolism. FIGLU excretion test	1. One carbon metabolism, Metabolism of serine, glycine and other reactions. 2. Metabolism of sulphur containing amino acids: Metabolism Cysteine Glutathione, Taurine, Transulfuration, PAPS; Metabolism of Methionine, Transmethylation, inborn errors associated 3. Branched chain amino acid metabolism(1st two steps only) & MSUD 4. Synthesis of catecholmines, VMA formation and excretion and its significance 5. Biologically important amines 6. Amino acids and amino acid derivative acting as neurotransmitters	1. Histidine metabolism and associated inborn errors 2. Glutamic acid, GABA, Glutamine 3. Aspartic acid, Asparagine 4. Metabolism of Arginine , NO, Polyamines 5. Organic acidurias	Lectures Practical:- Total protein, Estimate of Albumin and AG ratio	8 hrs 3 hrs (1practical)

S/N	TOPIC	MUST KNOW (A)	MUST KNOW (B)	NICE TO KNOW	T-L METHOD	DURATION
METABOLISM IN HEALTH AND DISEASE CONDITIONS						
15.	ELECTON TRANSPORT CHAIN (ETC)	1. Bioenergetics 2. ETC: Components and sites of ATP synthesis: Chemiosmotic hypothesis Mechanism of oxidative phosphorylatin: ATP synthase inhibitors	1. High energy compunds: definition and examples 2. Brown adipose tissue	1. Disorders of mitochondria and effect of Inihibitors.	Lectures	4 hrs
16.	INTEGRATION OF METABOLISM	1. Integration of metabolism, Adaptations in starvation: Lifestyle diseases, BMI obesity, Metabolic syndrome(Mention NASH, PCOS)			Lectures	2 hrs
17.	METABOLISM OF HEME	1. Heme synthesis: Heme sysnthetic pathway, regulation and effects of lead poisoning 2. Heme catabolism: formation and fate of bilirubin (uptake, conjugation, secretion); formation and fate of urobilinogen and stercobilinogen 3. Serum bilirubin: Types, Blood levels in healthy subjects, properties, estimation. 4. Jaundice: Definition, classification, causes & differential diagnosis by biochemical tests	1. Porphyrias: Types, enzyme defects, manifestations and investigations of blood and urine(acute intermittent porphyria in detail and others in brief) 2. Neonatal hyperbilirubinemia, kernicterus and biochemical basis of treatment in brief.	1. Diagnostic tests for different porphyrias.	Lectures Case studies Practical on serum bilirubin estimation. Integration with physiology.	3 hrs 2 hrs 3 hrs 1hrs

18.	**FAT SOLUBLE VITAMINS**	**1. VITAMIN A:** different chemical forms, dietary sources, RDA Vitamin A: Absorption, transport and storage, functions of Vitamin A, Wald's visual cycle. Deficiency manifestation and its prevention; Hypervitaminosis	**1. VITAMIN K:** Chemicals forms, dietary sources, biochemical functions, RDA and deficiency manifestations, Vitamin K administration to preterm babies. **2. VITAMIN E :** Chemical forms, Biochemical functions (focus lipid peroxidation and antioxidant function in brief) and deficiency manifestations.	1. Pharmacological uses of fat soluble vitamins.	Lectures	3hrs
S/N	**TOPIC**	**MUST KNOW (A)**	**MUST KNOW (B)**	**NICE TO KNOW**	**T-L METHOD**	**DURATION**
METABOLISM IN HEALTH AND DISEASE CONDITIONS						
19.	FAT SOLBLE VITAMINS	1. VITAMIN D: Chemical nature, dietary sources, RDA vitamin D active form of vitamin D- its formation and actions, deficiency manifestation in children and adults and its prevention, its interaction with parathyroid				
20.	WATER SOLUBLE VITAMINS	1. THIAMIN 2. VITAMIN B12 3. FOLIC ACID 4. VITAMIN C chemicals nature, dietary sources, RDA, coenzyme form, biochemical functions, deficiency manifestations	1. RIBOFLAVIN 2. PYRIDOXINE 3. PANTOTHENIC ACID 4. NIACIN 5. BIOTIN 6. Chemical nature, dietary sources, RDA, role as coenzymes Biochemical functions, deficiency manifestations.	1. Transketolase assay to detect deficiency of vitamin B1. 2. Antivitamins	Lectures	6 hrs

21.	MINERALS	1. IRON 2. CALCIUM 3. PHOSPHORUS 4. MAGNESIUM 5. COPPER 6. ZINC Dietary sources, RDA, Absorption, transport and storage, excretion, biochemical functions, Blood levels in healthy subjects, regulation of blood levels, causes of deficiency ad deficiency manifestations. Disorders of an excess state wherever applicable.	1. Classification of minerals based on RDA 2. Iodine 3. Potassium 4. Sodium 5. Chloride 6. Selenium 7. Fluoride 8. Manganese 9. Magnesium 10. Dietary sources, functions, deficiency manifestations in brief.	1. Anemia due to mineral and vitamin deficiencies 2. Hereditary Hemochromatosis, siderosis 3. Cobalt 4. Chromium	Lectures Electrolyte estimation	8 hrs 3 hrs(1 practical)
22.	HOMEOSTATIC MECHANISMS IN THE BODY	1. ACIDE BASE BALANCE: Body buffers, respiratory & rental regulation f blood pH . Disorders of acid base balance	1. Anion gap assessment of acid base balance by blood gas parameters	1. Acids bases, pH, pK, Buffers, Henderson-Hasselbach's equation.	Lectures Case studies, OSPE	3 hrs 2 hrs
S/N	**TOPIC**	**MUST KNOW**	**DESIRABLE TO KNOW**	**NICE TO KNOW**	**T-L METHOD**	**DURATION**
METABOLISM IN HEALTH AND DISEASE CONDITIONS						
23.	FLUID AND ELECTROLYTE BALANCE	1. Regulation of osmolality and maintenance of fluids in the various body compartments and related disorders.	1. Lab diagnosis of electrolyte imbalance		Lectures	2hrs

24.	NUCLEOTIDE CHEMISTRY AND METABOLISM	1. Nucleotide chemistry, purine and pyrimidine bases, nucleosides, nucleotides, major and minor ones and their importance. 2. Purine metabolism: Salvage pathway, catabolism, primary and secondary Hyperuricemia, Gout, Biochemical principles of treatment of Gout.	1. Synthesis of dNTPs (deoxy nucleotide triphosphates). 2. Nucleotide analogues & folic acid antagonists. 3. Lesch Nyhan syndrome 4. Hypouricemia	1. De novo purine synthesis and in brief-source of constituent atoms, rate limiting steps 2. Pyrimidine synthesis and degradation, Orotic aciduria	Lectures	3 hrs
25.	NUCLEIC ACIDS	1. Structure and organization of DNA; Different types of RNA, difference between DNA & RNA. 2. DNA REPLICATION – Process of replication in eukaryotes, inhibitors and uses 3. TRANSCRIPTION: Process of transcription in eukaryotes, inhibitors, post transcriptional modification 4. TRANSLATION: Genetic code Different phases of translation in eukaryotes, post translational modifications, inhibitors, protein targeting	1. Minor RNAs and their applied aspects 2. Synthesis of rRNA primary tRNA transcript 3. DNA repair mechanism examples of DNA repair defects. 4. Reverse transcriptase 5. Ribozyme	1. Mitochondrial DNA 2. Telomerase 3. RNA editing with an example 4. Ribosomes & Polysomes 5. Ame's test 6. Protein targeting	Lectures	18 hrs

M.B.B.S CURRICULM

S/N	TOPIC	MUST KNOW (A)	MUST KNOW (B)	NICE TO KNOW	T-L METHOD	DURATION
METABOLISM IN HEALTH AND DISEASE CONDITIONS						
26.	NUCLEIC ACIDS	1. Regulation of gene expression in prokaryotes (Lac Operon) 2. Regulation of gene expression in eukaryotes (gene amplification, gene rearrangement) 3. Mutations: Definition, types with examples, Mutagens				
27.	RECOMBINANT DNA TECHNOLOGY	1. Recombinant DNA technology, applications in clinical medicine	1. Gene therapy, RFLP, DNA finger printing. Application in clinical medicine 2. Vectors 3. Blotting techniques (Southern, Northern & Western). DNA and diagnostics	1. Biochemical basis of inherited disorders and screening of genetic disorders. 2. Model of inheritance	Lectures Practical DNA extraction and PCR	6 hrs (2 practical)
28.	IMMUNOLOGY	1. Introduction to immunology 2. antigen presentation 3. B cell and Humoral immunity 4. T cell and cellular immunity 5. Cytokines 6. Immunoglobulin: Types, structure(general structure and structure of IgM & IgA & functions	1. Hypergammaglobulinemia 2. Biochemical diagnosis of multiple myeloma	1. AIDS (structure of HIV virus, major genes and antigens). Natural course of HIV infection immunology of AIDS, Laboratory diagnosis & monitoring, Biochemical basis of retroviral therpy.	Lectures Demonstration of ELISA, CLIA and immunoturbidimetry during practical	8 hrs 3 hrs(1 practical)

		7. Antibody diversity and class switching 8. Hypersensitivity reaction 9. Auto immunity 10. Monoclonal antibodies and their uses 11. Immunological techniques and their applications				
29.	BIOCHEMISTRY OF CANCER	1. Cell cycle, Cyclins and apoptosis 2. Aetiology of cancer, carcinogenesis: Oncogenic virus; Oncogenes; Tumour suppressor genes	1. Tumour markers	1. Anticancer drugs	Lectures	4 hrs
S/N	**TOPIC**	**MUST KNOW (A)**	**MUST KNOW (B)**	**NICE TO KNOW**	**T-L METHOD**	**DURATION**
METABOLISM IN HEALTH AND DISEASE CONDITIONS						
30.	CLINICAL BIOCHEMISTRY	1. Liver function tests and interpretation 2. Renal function tests and interpretation 3. Gastric function test, Pancreatic function test and intestinal function test. 4. Cardiac markers 5. Metabolism of alcohol 6. Reference ranges of commonly used biochemical tests	1. ELECTROPHORESIS of serum proteins; Multiple myeloma & Bence Jones Proteins 2. CHROMATOGRAPHY and diagnosis of inherited disorders of metabolism (Example : Aminoaciduria) 3. colorimetry 4. Spectrophotometry 5. Principles of automation 6. Blood collection- principles and vials used 7. Pre and post analytical errors.	1. RADIOACTIVITY: Radioactive isotopes used in Medicine, Diagnostic, therapeutic and research applications; Radiation hazards	Lectures Practical Liver enzymes, Urine examination, Blood urea Creatinine	6hrs 12 hrs (4 practical)

		10 hrs			
		Lectures	Lectures	Lectures	Lectures and OSPE
			1. Brief mention of food additives and environmental toxins		
				1. Free radicals: Generation, Types, lipid peroxidation. 2. Antioxidants: Different types	1. Calculations for total calories.
		1. Classification of hormones and mechanisim of hormone action 2. Pituitary (anterior and posterior) and Hypothalamic function 3. Thyroid hormone and thyroid Thyroid function tests and interpretation 4. Parathyroid hormones 5. Adrenal cortical hormones and adrenal function test 6. Adrenal medullary hormones 7. Gonadal steroid hormones. 8. Pancreatic hormones	1. Detoxification and Biotransformation of xenobiotics: different phases		1. SDA, Calorific value, BMR. 2. Balanced Diet for normal individuals and special cases 3. Malnutrition(PEM) and obesity
31.	ENDOCRIONOLOGY		XENO-BIOTICS	FREE RADICALS AND ANTIOXIDANTS	NUTRITION
			32.	33.	34.

		2 hrs	1 hr
		Integrated teaching & field visits.	
		3 hrs	3 hrs
		STP & Incineration Safe & Clean Environment	
		35.	

PRACTICALS

Based on principles of various conventional and specialized laboratory investigations and instrumentation, to substantiate and clarify the theoretical concepts with experimental evidences.

Practical bench work, demonstrations, session on analyses and interpretation of data and case discussions (on the practical) with the help of clinical and scientific problems will be conducted.

The student should demonstrate the skill

- Of performing basic biochemical tests important in clinical investigations
- Of performing the biochemical analysis making use of conventional techniques/ instruments that can be useful in clinicalscreening and diagnosis as well as analysis and interpretation of investigative data.
- Of solving clinical problems and decision making.

Topics for Practical / Demonstration:

Sl. No.	Topic	Teaching /learning method	Duration (No. of Sessions)
1.	Laboratory Instrumentation	Demonstration / laboratory visit	1
2.	Colour reactions of amino acids and proteins	Demonstration in small groups	1
3.	Practical on protein precipitation, fractionation, denaturation	Demonstration in small groups	1
4.	Carbohydrates: Reactions; reducing property, Oxidation, Reduction, Dehydration and condensation	Practical bench work	2
5.	Characterization of lipids with Qualitative tests for lipids	Demonstration in small groups	1
6.	Principles of Colorimetry and standardization of the Colorimeter	Practical bench work	1
7.	Estimation of Plasma glucose with standard curve	Practical bench work	1
8.	Oral Glucose tolerance test	Practical bench work with case discussion /Interpretation for diagnosis of Diabetes mellitus	1
9.	Serum Urea estimation	Practical bench work	1
10.	Serum Creatinine estimation	Practical bench work with case discussion on abnormal renal Function tests	1

11.	Total Protein estimation, Albumin estimation, calculation of A/G ratio	Practical bench work, Case study oriented interpretation of results	1
12.	Serum Amylase estimation	Practical bench work and Interpretation of report	1
13.	Serum lactate dehydrogenase activity	Practical bench workCase studies on Isoenzymes and Clinical enzymology	1
14.	Estimation of total cholesterol and HDL cholesterol	Practical bench work	1
15.	Estimation of Triglycerides and calculation of LDLc by Frieldewald's formula	Practical bench work, Case studies on Lipid profile	1
16.	Urine Analysis (Normal)	Practical bench work	1
17.	Urine Analysis (pathological)	Urine Analysis	2
18.	Liver function tests	Liver function tests	2
19.	Estimation of serum Uric acid	Practical bench work	1
20.	Gastric juice analyses	Practical bench work and Interpretation of report	1
21.	Plasma protein electrophoresis	Demonstrationand Interpretation of different patterns obtained	1
22.	Chromatography for separation of sugar	Demonstration	1
23.	Cerebrospinal fluid analyses	Practical bench work	1
24.	Amniotic fluid analyses	Demonstration with case discussion	1
25.	Electrolyte estimation and Interpretation of electrolyte imbalance	Demonstration in small group in Hospital laboratory	1
26.	ELISA techniques	Demonstration for thyroid function test	1
27.	Extraction of DNA and Gel electrophoresis of DNA	Demonstration in small group	1
28.	PCR technique	Demonstration in small group	1
29.	Case reports on Liver function tests and interpretation, Renal function tests and interpretation, Plasma Proteins(Types; functions; separation; Abnormal patterns in clinical diseases; A:G ration; Acute phase proteins) Cardiac Markers, Thyroid function tests and interpretation	Demonstration in small group	4

Distribution of Topics

Paper –I

Section A:

1. Cell, Cell Membrane,Transport across membrane and associated disorders
2. Chemistry and metabolism of Carbohydrate, Lipids and Proteins
3. Bioenergetics and ETC
4. Haemoglobin and Myoglobin
5. Haem Synthesis, degradation and Porphyrias

Section B:

1. Enzymes, Clinical Enzymology
2. Vitamins
3. Minerals
4. Water and electrolyte balance and disorders
5. Plasma Proteins

Paper – II

Section A:

1. Acid- base balance and disorders
2. Immunology
3. Free radicals and anti-oxidants
4. Xenobiotics, Detoxification and Environmental Biochemistry
5. Nutrition

Section B:

1. Hormones
2. Function tests : Liver, Kidney,Thyroid, Gastric
3. Nucleotide and Nucleic acids, its metabolism and repair
4. Recombinant DNA technology and DNA Diagnostics
5. Cancer Biochemistry and Tumour Markers

BIOCHEMISTRY QUESTION PAPER BLUE PRINT:

Question paper pattern:

Two theory papers of 100 marks each (Total marks = 200)

Paper -I & Paper - II

Duration - 03 Hours each

Each paper will have 2 sections,

A & B of 50 marks each.

Biochemistry theory paper of each section will be as follows:

1. Structured essay question (SEQ) - 1 question X 10 = 10 marks

   SEQ is to be given with a case study and objective questions can be framed is ranging from 1-3 marks

2. Short answer questions - 8 questions x 5 = 40 marks

   - Out of the 8 questions, 2 are to be framed from the integrated topics.
   - 5 marks question can be split in to 2 or more and marks distributed accordingly.
   - Questions in this section can be asked for diagnosis, compare and contrast, reasoning, biochemical basis and flow charts.
   - The topics allotted to the section A & B of paper -1 and Paper - II should be adhered to.
   - All topics must be covered is sitting up the question paper.
   - The weightage of questions should be as follows:

     70% from the "must 'know "section

     25-28% from the" desirable to know "section

     2-5% from the "nice to know" section.

MODEL QUESTION PAPER
BIOCHEMISTRY
PAPER-I

Duration: 3 hours **Total Marks: 100**

INSTRUCTIONS:

- Answer all questions
- Answer Sections A and B in separate answer booklets.
- Write answers in sequence.
- Strike off all blank pages.
- On additional answer sheets, do not write your registration number.
- Mention the number of additional answer sheets used and the sheet number on page one of the main answer booklet.

SECTION A

1. A 45-year old man was rushed to emergency after he complained of chest pain. His biochemical investigations showed RBS 99 mg/dL, serum total cholesterol 485 mg/dL & LDL 372 mg/ dL along with ECG changes.

   i) What is your provisional diagnosis?

   ii) What are the parameters included in lipid profile? (2)

   iii) Describe briefly the role of LDL in development of Atherosclerosis. (3)

   iv) Which lipid is known as "Good lipid" and why? (2)

   v) What other biochemical parameters you would like to estimate to confirm your diagnosis in the above case?

2. Short notes (5x8=40)

   a. What are the glycogen storage diseases? Why is there hyperuricaemia in Von Gierke's disease? (3+2)

   b. Describe the structural organisation of electron transport chain with suitable diagrams. (5)

   c. Compare and Contrast between the biochemical processes in Microsome and lysosomes? Write briefly about Zellweger Syndrome. (3+2)

   d. Mention the rate limiting steps of gluconeogenesis. What is the biochemical basis of regulation of blood glucose level in our body? (3+2)

   e. Name the primary ketone body. Describe briefly the formation of ketone bodies and their utilization in the body. (1+2+2)

f) Write an account of the high-energy compounds in metabolism. What are uncouplers? (3+2)

g) Write different structural organisation of protein. Explain the secondary structure with appropriate examples. (5)

h) Illustrate with diagram the co-operative binding of Hb with Oxygen. (5)

SECTION B

1. Mention the synthesis and activation process of Cholecalciferol. Write briefly the action of Vit.D on serum Calcium and phosphorus level. Write RDA of Vit.D in children and adults. Mention serum level of Calcium and Phopshorus.(4+3+1+2)

2. Write short notes (2X2.5=5)

   i) Regulation of Iron absorption

   ii) Actions and target sites of Vitamin D

3. Compare and contrast: (2X2.5=5)

   i) Transamination and Deamination

   ii) NAD and NADP

4. Justify the importance of plasma protein electrophoresis in diagnosis (2X2.5=5)

   i) Multiple myeloma

   ii) Chronic liver disease

5. Explain Wald's cycle with suitable diagram and Disorders associated with Vitamin A deficiency. (5)

6. Write briefly the biochemical basis of (2.5X 2=5)

   i) Vitamin B12 deficiency results in folic acid deficiency

   ii) Tryptophan deficiency results in folic acid deficiency.

7. Enumerate the steps of muscle contraction and relaxation events. Write 2 inherited conditions associated with defective contractile proteins. (5)

8. Define Isoenzymes? Enumerate the Isoenzymes of LDH. Mention some uses of Isoenzyme in clinical set-up. (1+2+2)

9. Compare and contrast between competitive and non-competitive enzyme inhibition. What is suicide inhibition? (3+2)

MODEL QUESTION PAPER
BIOCHEMISTRY
PAPER-II

Duration: 3 hours **Total Marks: 100**

INSTRUCTIONS:

- Answer all questions
- Answer Sections A and B in separate answer booklets.
- Write answers in sequence.
- Strike off all blank pages.
- On additional answer sheets, do not write your registration number.
- Mention the number of additional answer sheets used and the sheet number on page one of the main answer booklet.

SECTION A

1. A 24 year old man was admitted to the casualty in a confused state with deep gasping breathing. His blood sugar level was found to be 480mg%, blood pH was 7.0, HCO3- was 20mEq/L and Pco2 was 34mEq/L. His father is a Diabetic. (1+2+2+2+2+1=10)

   a. Give your provisional diagnosis.

   b. Mention two important abnormal urinary findings in this case.

   c. Write the name of the tests by which the above mentioned urinary findings can be identified.

   d. Define buffer.Write the most important extracellular buffer in the human body.

   e. The biochemical findings show compensated or uncompensated state of the disorder?

   f. Define anion gap and mention its normal level.

   g. What will be the anion gap in this case.

2. Write short notes on (2X 2.5=5)

   a. Oxidative stress and natural antioxidants of the body

   b. Phase 1 and 2 Detoxification reactions

3. Explain with diagram/flowchart (2X2.5=5)

   a. Type 1 Hypersensitivity reaction

   b. Antigen presentation to CD4+ cells

4. Compare and contrast: (2X2.5=5)
   a. Marasmus and Kwashiorkor
   b. Bicarbonate buffer and Phosphate buffer

5. Give reasons/Justify: (2X2.5=5)
   a. Metabolic acidosis leads to rapid breathing.
   b. HIV infection leads to severe immunodeficiency

6. Write true or false and justify: (1X5=5)
   a. Bicarbonate buffer is a biochemically efficient buffer.
   b. Rh Incompatibility is a type2 hypersensitivity reaction
   c. Glutathione protects RBC membrane
   d. Uric acid doesn't give positive Benedict's test results.
   e. Increased anion gap identifies metabolic acidosis with net acid gain

7. Explain the following : (2X2.5=5)
   a. Mantoux test is a Type 4 hypersensitivity reaction
   b. Protein is not considered as an ideal source of energy

8. Write with examples: (1X5)
   a. What are proteins of high biological value? Give example.
   b. Autoimmune disorders
   c. Increased basal metabolic rate
   d. Limiting amino acid
   e. Lipid peroxidation

9. Fill in the blanks and justify (1X5)
   a. ……..are part of Cell Mediated Immunity.
   b. Respiratory Quotient of Carbohydrates is……..
   c. Hemoglobin is an……buffer
   d. Diarrhoea leads to …….anion gap
   e. Vaccination is an example of……..immunity

SECTION B

1. A 34 year lady notices a round swelling on the right side of the neck that moves with deglutition. On examination it was found to be a thyroid swelling. The TFT values are as follows: (1+1+2+2+2+2)

   TSH-15.2mIU/ml (Normal 0.36-5.5 mIU/L)

   T4- 58nmol/L (Normal 70-150 nmol/L)

   T3- 1.1nmol/L (Normal 0.9- 2.8 nmol/L)

   a. Give your diagnosis on the above condition.
   b. Name the enzyme which brings about the oxidation of Iodine for thyroid hormone synthesis.
   c. Name two antibodies associated with thyroid disorders.
   d. Explain the reason for T3 being within normal range.
   e. What is grave's disease?
   f. Explain the importance of estimation of free T4 and free T3.

2. What is polymerase chain reaction? Describe the principle and steps. Give an account of the applications of PCR. (1+2+2=5)

3. Name the inhibitors and its use in clinical practice (1x5=5)
   a. DNA Replication
   b. Translation
   c. Thyroxine
   d. mRNA
   e. Xanthine oxidase

4. What are vectors in recombinant DNA technology? Describe the uses and characters of any two of them. (2+3=5)

5. A 65 year old obese lady attended the medicine OPD with complains of indigestion, nausea, bloating of abdomen fatty "clay" colour stool, dark yellow colour urine, and itching over body since 6 months. On examination her sclera looked yellow and there was tenderness over the right hypochondrial region. (1×5=5)

   The physician advised LFT to be done.

   i) Give your probable diagnosis

   ii) What will be the level of serum total bilirubin in this case?

iii) Name two enzymes expected to be raised in this disease.

iv) Give reasons for the discolouration of the stool and urine as complained by the patient.

v) What is "delta"bilirubin?

6. What is the difference between RNA editing and splicing? (5)

7. How will you do an antenatal screening and diagnosis for sickle cell anaemia? (5)

8. Explain the following : (2X2.5=5)
   a. Clearance tests are done to diagnose glomerular dysfunction.
   b. Zone specific steroidogenesis occurs in Adrenal cortex.

9. Write the biochemical basis of the following : (1X5=5)

   i) Water deprivation test doesn't assess tubular function of kidney.
   ii) Irreversible GPCR activation leads to the diarrhoea associated with cholera
   iii) In presence of both Lactose and Glucose ,the Lac Operon is inactivated.
   iv) Pentagastrin test is done to assess the acid secretion in stomach.
   v) DNA methylation is a method of regulation of gene expression.

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 pathologic basis of disease, in order to enable him/her to achieve complete understanding of the natural course, clinical manifestations, complications and sequele of disease.

OBJECTIVES

1. **KNOWLEDGE**

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

   - Describe the structure and ultra structure of a pathologically altered cell, mechanisms of cell degeneration, cell death and repair and be able to correlate structural and functional alterations.
   - Explain the pathophysiologic processes which govern the maintenance of homeostasis, mechanisms of their disturbance and the morphological and clinical manifestations associated with it.
   - Describe the mechanisms and morphologic patterns to tissue response to injury so that she/he can appreciate the pathophysiology of disease processes and their clinical manifestations.
   - 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.

2. **SKILLS**

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

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

3. **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

GENERAL CONSIDERATION:

The curriculum/course content shall include the topics in following categories: up to 70% of the content as a whole and chapter-wise should be from MUST KNOW category; 20-25% should be from DESIRABLE TO KNOW category; and remainder 5% should be from NICE TO KNOW category. Accordingly, the THEORY LECTURES and FINAL (SUMMATIVE) ASSESSMENT should be as per the above.

The CHAPTER WISE course contents as per the category are as follows:

The topics for PRACTICAL (Pr) will be covered as a lecture during 1st hour of the Practicals followed by demonstration of gross specimens, microscopic slides, OSPE charts, instruments, or clinicopathological discussion (pertaining to the topic) to be covered in next 2 hours (Total duration of practical 3 hours, twice weekly). The goal should be to maintain the temporal correlation between the theory topics and the corresponding practical.

A. GENERAL PATHOLOGY:

1. **CELL INJURY:**

   - **MUST KNOW:** Causes and mechanism of ischemic, toxic, free- radical/reperfusion induced injury; pathogenesis and pathology of reversible and irreversible cell injury; hyaline and fatty change (Pr). Necrosis: compare and contrast between different morphological patterns and their clinical correlation; gangrene (dry and weight) (Pr); compare and contrast between necrosis and apoptosis; mechanism of apoptosis and their clinical implications, compare and contrast between dystrophic and metastatic calcification; pigment deposition such as melanin, bilirubin, haemosiderin and anthracotic pigments **(Pr).**
   - **DESIRABLE TO KNOW:** Necroptosis.
   - **NICE TO KNOW:** Cellular ageing, Telomeres
   - **Pr: Practical topics**

2. **INFLAMMATION AND REPAIR:**

   - **MUST KNOW:** Features and causes; vascular events, cellular events in acute inflammation; cells and mediators of inflammation; morphological variant and outcome (ulcer, granulation tissue) (Pr) of acute inflammation; chronic inflammation (Pr): causes, types, non-specific and granulomatous (Pr) with examples; cutaneous wound healing and repair by primary and secondary union and factors modifying them; fracture healing.
   - **DESIRABLE TO KNOW:** Growth factors, scar formation, keloid.
   - **NICE TO KNOW:** Cell cycle and Stem cells.
   - **Pr: Practical topics**

3. HEMODYNAMIC DISTURBANCES:

- **MUST KNOW:** Pathogenesis and types of edema (Transudate vs Exudate); hyperaemia vs congestion; chronic venous congestion (Pr): Lung (with heart failure cells), Liver (Nutmeg Liver) and Spleen (Gamna Gandy bodies); normal haemostasis, Virchow triad, coagulation cascade; thrombosis; infarct (Pr): red vs pale; embolism: formation, types and fate, effect on tissues; Shock: pathogenesis, types and organ specific changes.
- **DESIRABLE TO KNOW**: Rare causes of thrombophilia (antiphospholipid antibody syndrome, Factor V Leiden mutations, etc)
- **Pr: Practical topics**

4. GROWTH DISTURBANCE AND NEOPLASIA:

- **MUST KNOW: Cellular adaptation (Pr):** 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 (Pr), Nomenclature. Malignant Neoplasms: Grade and Stage, metastasis and invasion. Carcinogenesis: Environmental carcinogens, viral, chemical, occupational, hereditary. Gross and microscopic features, clinical correlation, mode of spread and prognosis of common benign and malignant tumors **(Pr).**
- **DESIRABLE TO KNOW:** Laboratory diagnosis of cancer, Tumor markers, Paraneoplastic syndromes.
- **NICE TO KNOW:** Newer diagnostic tool in cancer: immunohistochemistry, flow cytometry, karyotyping
- **Pr: Practical topics, Soft tissue tumours of both benign/malignant (compare and contrast)**

5. IMMUNOLOGY:

- **MUST KNOW:** Immune system: organization (central and peripheral organs), cells, molecules and regulation; T and B cell receptor; Human Leukocyte Antigen/MHC; mechanism of different hypersensitivity reactions with examples; central and peripheral tolerance; autoimmune diseases: both organs specific and systemic with specific examples like SLE; Amyloidosis: classification, morphology (Pr), diagnosis;.
- **DESIRABLE TO KNOW:** Immunology of Sjogren syndrome, Hashimoto thyroiditis, pathology of transplant rejection, graft versus host reaction.
- **Pr: Practical topics**
- **Redundant topic:** Immune deficiency: primary and secondary, tumor-host interaction, tumor immunology.

6. GENETIC DISORDERS:

- **MUST KNOW:** Basic concepts of genetic disorders (mutations, autosomal dominant, recessive, X-linked disorders) and some common examples. Down syndrome, Turner syndrome and Klinefelter syndrome.
- **DESIRABLE TO KNOW: Karyotyping**
- **NICE TO KNOW: Pedigree chart analysis**
- **Practical topics: None**
- **Redundant topic:** All other rare genetic disorders, storage disorders, mutation analysis, molecular diagnosis, etc.

7. INFECTIOUS DISEASE:

- **MUST KNOW:** Tuberculosis, Leprosy and HIV/AIDS to be included with HORIZONTAL INTEGRATION with Microbiology.
- **DESIRABLE TO KNOW (Pr):** Actinomyosis, Mycetoma, Rhinosporidiosis, Hydatid disease, Molluscum contagiosum; Parasitic diseases: Malaria, Filaria, Amoebiasis
- **Pr: Practical topics**
- **Redundant topic:** All other bacterial, viral disease, Leishmania, Parasitic disease, etc.

8. INFANCY AND CHILDHOOD:

- **DESIRABLE TO KNOW:** Cystic fibrosis, Tumors: Neuroblastoma, Wilm tumor, Sacrococcygeal Teratoma.
- **Redundant topic:** Nutritional disorders - Protein Energy Malnutrition, Vitamin deficiency.

9. MISCELLANEOUS DISORDERS (for student symposium):

- Occupational and environmental pathology.
- Alcohol and health
- Smoking and its effect
- Obesity & its relation with disease
- Diet and its relation to cancer & atherosclerosis
- Nutritional disorders - Protein Energy Malnutrition, Vitamin deficiency.

B. HEMATOPATHOLOGY:

- **MUST KNOW:** Constituents of blood and bone marrow, regulation of hematopoiesis. **Anemia (MODULE) (Pr) (OSPE charts):** Classification and clinical features, Laboratory approach. Nutritional anemia: Iron deficiency, Vitamin B12 and Folate deficiency. Hemolytic Anemia: Classification and Laboratory diagnosis. Thalasemia, Haemoglohinopathies like Sickle cell anemia, Hereditary Spherocytosis. Aplastic Anemia, Pancytopenia. Leukemoid reaction, Leukemia (Pr) (OSPE): Acute and Chronic - classification (myeloid and lymphoid) and diagnosis. Multiple myeloma.
- **DESIRABLE TO KNOW:** G6PD deficiency, Acquired hemolytic anemia: PNH**,** Leukoerythroblastic blood picture, Autoimmune hemolytic anemia, hemolytic disease of newborn, MDS, Approach to a bleeding child, ITP, Coagulation disorders like Hemophilia, Von Willebrand Disease, DIC.
- **NICE TO KNOW: Flow cytometry in leukemia, Rare thrombophilic states - APLA syndrome**
- **Practical topics**: Blood transfusion practice: Grouping, Cross Matching, Donor selection, and Component Therapy, Rational Use of blood transfusion, adverse reactions and transmissible infections.

C. SYSTEMIC PATHOLOGY:

1. CARDIOVASCULAR PATHOLOGY:

- **MUST KNOW:,** Rheumatic heart disease, & Infective endocarditis, **Vegetation in heart**
- Hypertension, Pathogenesis, pathology and morphology of atherosclerosis and ischemic heart disease (acute myocardial infarction) **(Pr)**
- **DESIRABLE TO KNOW:** Vasculitis (Classification and selected entities), aneurysms, pericarditis
- **NICE TO KNOW: Cyanotic and acyanotic heart disease (VSD, Fallot tetrology)**
- **Pr: Practical topics**
- **Redundant topic: Cardiomyopathis, cardiac tumours, and others.**

2. RESPIRATORY PATHOLOGY:

- **MUST KNOW:** Structure of bronchial tree and alveoli, defence mechanism, normal and altered lung function, concept of obstructive and restrictive lung disease, Pneumonia (lobar vs bronchopneumonia) (Pr), Lung Abscess. Chronic Obstructive Pulmonary disease: Emphysema, Chronic Bronchitis, Bronchial Asthma, Bronchiectasis (Pr). Lung tumors (Pr): aetiopathogenesis and types (including newer prognostic and therapeutic markers).
- **NICE TO KNOW:** Mesothelioma, Interstitial lung disease, Hyaline Membrane Disease and ARDS.

- **Pr: Practical topics**
- **Redundant topic: Pulmonary hypertension**

3. HEAD and NECK and GASTROINTESTINAL PATHOLOGY:

- **MUST KNOW:** Oral pathology: Leukoplakia, Premalignant conditions and Carcinoma. Salivary gland pathology: Common benign and malignant tumors (pleomorphic adenoma, Warthin tumor, Mucoepidermoid carcinoma, Adenoid cystic carcinoma) (Pr). Barrett Esophagus. Gastritis - types, H. Pylori vs. autoimmune gastritis. Benign vs malignant gastric ulcer (Pr), Tumors of stomach: carcinoma (Pr), MALT lymphoma. Inflammatory diseases of intestine: Typhoid vs Tubercular ulcer, Amoebic colitis, Ulcerative colitis (Pr) vs Crohn's disease, Appendicitis (Pr). Intestinal tumors: Polyps (Pr), adenoma-carcinoma sequence.
- **DESIRABLE TO KNOW:** Coeliac disease, GIST, Carcinoid
- **NICE TO KNOW: Hirschsprung disease**
- **Pr: Practical topics**
- **Redundant topic: Nasopharyngeal carcinoma, Laryngeal lesion, Ischemic bowel ds.**

4. LIVER AND BILIARY PATHOLOGY:

- **MUST KNOW:** Jaundice: types, aetiopathogenesis **(Pr/OSPE),** and differential diagnosis Viral Hepatitis: Acute and Chronic, Cirrhosis: Etiology, classification, Post necrotic, alcoholic, metabolic (Wilson), Morphology, complications. Alcoholic liver disease, NAFLD. Gall bladder diseases (Pr): Cholecystitis, cholelithiasis, carcinoma. Tumors of liver: hepatocellular carcinoma, metastasis.
- **DESIRABLE TO KNOW: LFT, Portal hypertension, Liver failure**
- **NICE TO KNOW: Neonatal cholestasis, biliary atresia,** Molecular classification of hepatic adenomas, carcinomas.
- **Pr: Practical topics**
- **Redundant topic: Vascular disease of liver, acute fatty liver of pregnancy,** Pancreatitis and Pancreatic tumors

5. LYMPHORETICULAR PATHOLOGY:

- **MUST KNOW:** Lymphadenopathy - Causes, Lymphoma: Hodgkin and Non-Hodgkin - classification scheme and morphology of selected lymphomas, Diseases of spleen - splenomegaly, Hypersplenism
- **Pr: Practical topics**
- **Redundant topic:** Rare causes of lymphadenopathy, rare lymphomas

6. URINARY TRACT PATHOLOGY:

- **MUST KNOW:** Structure and function of normal glomerulus, glomerular response to injury, Nephritic vs Nephrotic syndrome **(OSPE),** Glomerlonephritis: Acute Post streptococcal/

post infectious, Crescentic/RPGN, Nephrotic Syndrome (MCD, MGN,

- MPGN, and FSGS), diabetic nephropathy, chronic renal failure, polycystic kidney disease (Pr), Urinary tract infection and Pyelonephritis, Obstructive uropathy, Hydronephrosis, Nephrolithiasis. Renal tumors: Renal cell carcinoma (Pr), Benign hyperplasia of prostate, carcinoma prostate **(Pr).**
- **DESIRABLE TO KNOW:** Acute tubular necrosis, benign and malignant nephrosclerosis, Urinary bladder: cystitis, urothelial carcinoma
- **NICE TO KNOW: Gleason scoring for carcinoma prostate**
- **Pr: Practical topics:** Renal function tests, Urinalysis

7. REPRODUCTIVE SYSTEM PATHOLOGY:

- **MUST KNOW:** Diseases of cervix: Cervical carcinoma (Pr), PAP stain, Screening and diagnosis (CIN). Hormonal influences and histology of different phases of Endometrium. Endometrial hyperplasia and carcinoma (Pr), Smooth muscle tumor (Pr), Endometriosis/ adenomyosis (Pr). Hydatidiform mole (Complete vs partial) (Pr) and Choriocarcinoma, Ovarian tumors (Pr). Diseases of breast- fibrocystic disease, Fibroadenoma, Breast Carcinoma, Phylloides tumor, Tumors of testis.
- **DESIRABLE TO KNOW:** Molecular basis of endometrial carcinoma
- **NICE TO KNOW: Uncommon ovarian and testicular tumors, DUB**
- **REDUNDANT:** Pelvic inflammatory disease, Vulval and vaginal diseases, Genital tuberculosis. Paget disease of vulva. Semen analysis and investigation of infertility.
- **Pr: Practical topics**

8. MUSCULOSKELETAL PATHOLOGY:

- **MUST KNOW:** Osteomyelitis - Acute, chronic, tuberculous. Tumors: Classification, Osteosarcoma (Pr), Chondrosarcoma (Pr), Giant cell tumor (Pr), Ewing's sarcoma.
- **DESIRABLE TO KNOW: Rheumatoid arthritis (Panus), Gout, Paget disease of bone,**
- Osteoporosis, Osteoarthritis.
- **NICE TO KNOW: Rickets, Osteomalacia**
- **REDUNDANT:** Tuberculous. Jaw- Ameloblastoma.
- **Pr: Practical topics**

9. ENDOCRINE PATHOLOGY:

- **MUST KNOW:** Non neoplastic lesions of thyroid: Colloid Goitre (Pr), Autoimmune thyroiditis (Hashimoto thyroiditis (Pr), thyrotoxicosis/Grave disease), tumors of thyroid (papillary, follicular, and medullary) **(Pr).**
- **DESIRABLE TO KNOW: MEN syndrome, phaeochromocytoma**

- **NICE TO KNOW:** Pituitary hyperfunction tumors, Hyperparathyroidism
- **Pr: Practical topics.**

10. NEUROPATHOLOGY:

- **MUST KNOW:** CSF and its disturbance, inflammatory disorders: Meningitis (Pyogenic, Tubercular, Viral, Others) with CSF charts (Pr) and Brain abscess. CNS tumors: Astrocytoma and Meningioma (Pr): classification
- **NICE TO KNOW: Cerebrovascular accident,** hemorrhage, aneurysm, Oligodendroglioma, ependymoma
- **REDUNDANT TOPIC:** Neurodegenerative / demyelinating disorder, muscular dystrophy, neuropathies
- **Pr: Practical topics**

11. SKIN TUMORS:

- **Squamous cell carcinoma, basal cell carcinoma, malignant melanoma (Pr)**
- Molecular mechanism of melanoma pathogenesis **(NICE TO KNOW)**
- **Pr: Practical topics**

PRACTICAL SKILLS

Acquisition of Skills:

The students should be able to:

- Acquire knowledge to collect, store and transport materials for various pathological tests including histopathology, Cytopathology, hematopathology, Blood bank and clinical pathology in a proper manner.
- Describe accurately and arrive at a logical diagnosis of common macroscopic findings in a pathological specimen such as pneumonia, cirrhosis, gangrene etc.
- Specimens (gross appearance) such as pneumonia, cirrhosis, gangrene etc.
- Interpret and arrive at a conclusive diagnosis in the microscopic analysis of common diseases like tuberculosis, carcinoma, acute inflammation, etc.
- Perform with accuracy and reliability various commonly performed hematological procedures such as Hemoglobin estimation, peripheral smear staining and reporting. At the same time, they will acquire knowledge on recent techniques of automation during their visit to lab.
- Calculate red cell indices and interpret the significance as well as common hematological abnormalities (microcytic hypochromic anemia, megaloblastic./macrocytic anemia/ pancytopenia) in CBC charts.

- Perform independently complete examination of urine and detect abnormal findings and interpret the results. They should also have an exposure to diagnostic kits available for urine tests.
- Perform independently grouping of blood.
- Aware of the procedure for common tests like ESR, PCV, vacutainers, bone marrow examination, semen analysis and interpret abnormal findings.
- Interpret abnormal laboratory (biochemical, hematological and serological) values of common diseases.
- Adopt universal precautions for self protection and patient safety.

Practicals

1. Up to 15 hours (maximum) will be devoted to practical skills pertaining to haematology, clinical pathology, and blood banking as mentioned below:
   - Perform a complete urine examination and detect abnormalities and correlate clinically.
   - Perform with accuracy and reliability various hematological procedures such as Hemoglobin estimation, peripheral smear staining and reporting and blood grouping.
   - Observing or performing under guidance tests like ESR, PCV, bone marrow examination, and interpret abnormal findings.
2. *Remainderl30-135 hours* of the entire practical shall be devoted to Identify and interpret gross and microscopic feature of pathological specimens and slides (as mentioned as **Pr** in course contents). This will also include discussion of case studies based on the real case scenario and appropriate laboratory findings of patients along with gross and microscopic findings wherever applicable to learnclinicopathological correlation (OSPE charts).
3. *Upto 3 hours each (total 12 hours) may be devoted for REVISION PURPOSE before formative and final/summative assessment*.

EXAMINATION PATTERN

- **Three FORAMTIVE examinations (two + one prefinal): 2 hours each**
  - **1st**: General Pathology and Hematology- Short answer, very short answer, MCQ
  - **2nd** : All systemic pathology: Short answer, very short answer, MCQ.
  - **3rd (PRE FINAL):** Entire syllabus (same as SUMMATIVE type)
- **Internal assessment marks will NOT be added to final examination marks.**
- **Interna assessment is only for eligibility for appearing FINAL/SUMMATIVE exam.**

DISTRIBUTION OF MARKS (SUMMATIVE ASSESSMENT)

A. THEORY: Two papers (I and II)	**100x2=200 marks**
B. PRACTICALS	**80 marks**
C. VIVA	**20marks**
TOTAL MARKS	**300 marks**

GENERAL CONSIDERATION:

- 60-70 % of question topic should be from MUST KNOW category.
- Modified Essay Question/CASE BASED QUESTION (STRUCTURED) should be from MUST KNOW category.
- Total number of SHORT ANSWER QUESTION (SAQ) is 16 in each paper of which maximum 5 or 6 should be from DESIRABLE/NICE TO KNOW category.
- Undue repetition should be avoided and near total representation of the entire course content should be there.
- OBJECTIVE ASSESSMENT of PROCEDURE PRACTICAL SKILLs by checklist.
- MODEL ANSWER PAPER should be prepared by the EXAMINER framing the question paper.

A. THEORY	**200 marks**
4. **Paper I (two Sections)**	
• **Section A (General Pathology)**	**50 marks**
i) Modified Essay Question (Must be Structured)	10 marks
ii) Eight Short answer questions (5marks each)	40 marks
• **Section B (hematopathology, Childhood disease)**	**50 marks**
i) Modified Essay Question (Must be Structured)	10 marks
ii) Eight Short answer questions (5 marks each)	10 marks
5. **Paper II (two Sections)**	
• **Section A (Systemic 1)**	**50 marks**
i) Modified Essay Question (Must be Structured)	10 marks
ii) Eight Short answer questions (5marks each)	40 marks

- **SECTION B (SYSTEMIC 2)** **50 marks**
  - i) Modified Essay Question (Must be Structured) 10 marks
  - ii) Eight Short answer questions (5 marks each) 40 marks

B. PRACTICALS **80 marks**

- **SPOTTERS(N=15) (X2)** **30 marks**
  - o Gross specimen
  - o Microscopic slides
  - o OSPE charts
  - o Instruments
- **Slide for comments (identification/diagnosis with justification and level diagram)** **10 marks**
- **Compare and contrast (N=2) (5x2)** **10 marks**
- **Cause and effect (N=2) (5x2)** **10 marks**
- **PROCEDURE/PRACTICAL SKILLS**
  - o Peripheral smear staining and comment **10 marks**
  - o Urine examination (case based) **5 marks**
  - o Blood grouping **5 marks**
- **VIVA** **20 marks**

MODEL QUESTION PAPER
PATHOLOGY
PAPER I

(General Pathology, Hematology, Childhood diseases)

Time: 3 hours **Maximum marks= 100**

Answer all questions SECTION WISE separately and in SERIAL ORDER. Illustrate your answer with suitable labelled diagrams

SECTION-A

1. A 29 year old male presented with persistent low grade fever and cough since last 3 months associated with night sweat and weight loss. On examination, he had matted right cervical group of lymph nodes with draining sinus and cheese like purulent material. His erythrocyte sedimentation rate was 100mm/ 1st hour.
   a. What is the most probable diagnosis? Explain with reasons [2]
   b. Draw a labelled diagram depicting the likely morphological changes in this case. [3]
   c. Discuss in brief the immunological mechanism associated with this morphology. [3]
   d. Enumerate the pertinent laboratory investigations to reach at a diagnosis. [2]
2. Answer the following questions with appropriate illustrations wherever applicable [8x5=40]
   a. Draw a labelled diagram of T cell receptor
   b. Mention the systematic approach to laboratory diagnosis of cancer
   c. Compare and contrast in tabular format between dystrophic and metastatic calcification
   d. Enumerate the various morphology and staining pattern of amyloid
   e. Draw a pedigree chart of Autosomal dominant disease with examples
   f. What is Telomere? Briefly discuss its role in aging.
   g. Draw labelled diagrams depicting different mechanisms of Graft versus host disease
   h. Mention in tabular format the difference between cutaneous wound healing by primary and secondary intension.

SECTION- B

1. A 34 year old male presented with generalised malaise and fatigue along with vague upper abdominal discomfort since last three months. On examination, he had atrophic glossitis, conjuctival pallor and lemon yellow coloured sclera. Upper gastrointestinal endoscopy revealed a flattened gastric regae. Peripheral smear examination showed pancytopenia with ovalomacrocyte.

   a. What is the most probable diagnosis? Explain with reasons. [2]

   b. Enumerate with a labelled diagram the sequence of laboratory investigations to reach at a diagnosis in this case. [4]

   c. Discuss in brief the aetiopathogenesis of this condition. [4]

2. Short answer type questions: [8x5=40]

   a. Mention in tabular form the differences between leukemoid reaction and chronic myeloid leukemia.

   b. What are the differential diagnoses of microcytic hypochromic anemia? Enumerate the laboratory diagnostic parameters to differentiate between them.

   c. What is a reticulocyte? Mention the various pathophysiologic conditions associated with abnormal count.

   d. Draw a labelled schematic diagram depicting pathogenesis of spherocytosis.

   e. What is Landsteiner law? Enumerate the various complications of mismatched blood transfusion.

   f. Enumerate the common pediatric solid tumors. Mention with diagram the gross and microscopic features of Wilm tumor.

   g. What is leukoerythroblastic blood picture? Enumerate four causes for the same.

   h. Draw a labelled diagram of the peripheral smear finding in acute myeloid leukemia and mention the tests to confirm the diagnosis.

MODEL QUESTION PAPER

PATHOLOGY

PAPER II

(Systemic Pathology)

Time: 3 hours Maximum marks= 100

Answer all questions SECTION WISE separately and in SERIAL ORDER. Illustrate your answer with suitable labelled diagrams

SECTION-A

1. A 59 year old male, known type 2 diabetic for the last 15 years presented with gradually decreasing urinary output (30 ml/day, serum urea=134mg/dl, serum creatinine=4.5 mg/dl),and ascites. His fasting plasma glucose was 234 mg/dl, HbA1c=9.5%. His ultrasound abdomen showed bilateral shrunken kidneys with altered cortico-medullary distinction.

   a. What is the most probable diagnosis? Explain with reasons. [2]

   b. Discuss with labelled diagrams depicting the sequential morphological changes in the kidneys. [4]

   c. Draw a flowchart depicting aetiopathogenesis of diabetic microangiopathy with examples. [4]

2. Answer the following questions with appropriate illustrated diagrams wherever applicable. [8x5=40]

   a. Enumerate the gestational trophoblastic diseases. Mention in tabular form the differences between partial and complete mole.

   b. Draw a labelled diagram of gross and microscopic feature of seminoma testes.

   c. Cervical intraepithelial neoplasia: pathology and screening technique used.

   d. Enlist the various prognostic markers in carcinoma of breast.

   e. What is dense deposit disease? Mention the pathogenesis with a flow chart.

   f. Enumerate the epiphyseal tumors of the bone and draw a labelled diagram on giant cell tumor.

   g. Enumerate the risk factors and briefly outline the pathogenesis of endometrial carcinoma.

   h. Classify Hodgkin lymphoma. Draw diagrams depicting morphological variants of Reed Sternberg giant cell

SECTION- B

1. A 34 year old female presented with bleeding per rectum associated with crampy abdominal pain. On colonoscopic examination, she had an ulceroproliferative growth in the rectum along with numerous polyps throughout the colon.

   a) What is the most probable diagnosis? Explain with reasons. [2]

   b) Discuss the pathogenetic mechanism linking the patient diagnosis. [5]

   c) Discuss in brief the different type of polyps in the gastrointestinal tract. [3]

2. Answer the following questions with appropriate illustrated diagrams wherever applicable [8x5=40]

   a) What are COPDs? Draw a flow chart depicting the pathogenesis of bronchial asthma.

   b) What is Aschoff body? Draw a labelled diagram highlighting various types of vegetations seen in heart.

   c) Pathology and clinical implications of Buerger disease.

   d) Enumerate the different types of gall stones with examples. Briefly highlight the pathogenesis of gall stone formation.

   e) Briefly outline the recent classification and clinical significance of hepatic adenoma.

   f) Classify bronchogenic carcinoma. Briefly mention the molecular alteration and implication in adenocarcinoma.

   g) Enumerate common salivary gland neoplasms. Discuss the gross and microscopic appearances of Warthin tumor.

   h) Define hypersplenism and mention four common important causes of the same.

Learning Resource:

- Kumar, Abbas, Aster: Robbins and Cotran Pathologic Basis of Disease, Vol I and II, South Asia Edition, Elsevier, 2014.
- Kumar, Abbas, Aster: Robbins Basic Pathology: First South Asia Edition, Elsevier, 2017.
- Bharadwaj and Deb: Boyd's Textbook of Pathology, 10th Edition, Lippincott Williams and Wilkins.
- Tejinder Singh: Atlas and Text of Hematology, 3rd Edition, Avichal Publishing Company.
- Tejinder Singh and K. Uma Chaturvedi: Practical Pathology (with viva voce questions), 3rd edition, Arya Publications.
- Gross specimen catalogues, slides, OSPE charts, and instrument
- Vinay Kamal. Textbook of Pathology, CBS Publishers and Distibutors Pvt. Ltd., First edition, 2017

MICROBIOLOGY

MICROBIOLOGY

OBJECTIVES

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.

SPECIFIC LEARNING OBJECTIVES

a. Cognitive domain

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

1. State the infective microorganisms of the human body and describe the host parasite relationship.
2. List pathogenic microorganisms (bacteria, virus, parasites, fungi) and describe the pathogenesis of the diseases produced by them.
3. State or indicate the modes of transmission of pathogenic and opportunistic organisms and their sources, including insect vectors responsible for the transmission of the 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. Plan laboratory investigations for the diagnosis of infectious diseases and to correlate the clinical manifestations with the etiological agent.
7. Awareness of principles of biomedical waste management in the hospital as well as at primary care level.
8. Acquire knowledge of the emerging and reemerging infectious agents.

b. Psychomotor domain

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

1. Use the correct method of collection, storage and transport of clinical material for microbiological investigations.
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 tests for the detection of infectious agents suchas blood film for malaria, filaria, gram staining, albert staining and acid-fast staining. Stool sample for ova and cyst.

4. Apply methods of sterilization and disinfections to control and prevent hospital and community infections.
5. Apply methods of infection control, hand hygiene, standard precautions in their hospital practice to control and prevent hospitalacquired infections and patient's safety.

c. Affective domain:

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

1. Interpret laboratory investigations for the diagnosis of infectious diseases and to correlate the clinical manifestations with the etiological agent.
2. Recommend laboratory investigations regarding bacteriological examination of food, water, milk and air
3. More emphasis on analytical interpretation of integrated topics which are important from public health view.
   - Tuberculosis, Sexually transmitted diseases, HIV, Hepatitis, Malaria, Dengue, Influenza etc.)
4. Involvement of other specialties like pathology, radiodiagnosis, medicine, surgery, pediatrics etc.to teach such diseases in integrated manner.
5. Also, interpretation of syndromic approach for diagnosis of infectious diseases needs to be emphasized. This will help to understand the diagnosis and management on clinical level.

COURSE CONTENT

The student must know the following principles in:

General Microbiology:

- General concepts of infectious diseases prevalent in India (morbidity, mortality data)
- Significant milestone in history of infectious diseases
- Definitions pertaining to infectious diseases, (e.g.: host, parasite, endogenous, exogenous infection 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 morphology, physiology and genetics in relation to virulence and human infections.
- Sterilization, disinfections and standard precautions in patient care and disease prevention including hand hygiene.
- Bacteriophage: Structure, role in virulence and antibiotic resistance.

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

Immunology:

- Immune apparatus, lymphoid organs, Immunobiology
- Antigen and antibody.
- Antigen-Antibody reactions, serological and immunological assays.
- Cell and humoral immunity in health and disease
- Hypersensitivity
- Immunodeficiency diseases
- Tumor immunity / transplant immunity and auto-immunity
- Immunoprophylaxis

Bacteriology:

- Common Gram positive / negative cocci / bacilli, associated with human infections
- Mycobacteria.
- Anaerobic bacteria
- Spirochetes
- Chlamydia, Rickettsia, Mycoplasma
- Miscellaneous bacteria of clinical importance.

Virology:

- General properties, structure, replication, classification.
- Virus, host interaction and pathogenesis
- Antiviral agents
- General concepts in laboratory diagnosis of viral infections.
- Common clinically important DNA and RNA viruses such as: Herpes viruses, Adenovirus, Poxvirus, Parvovirus, Papillomavirus, Polyomavirus, Picomavirus, Orthomyxovirus, Paramyxovirus, ARBO viruses, Rabies virus, HIV, Hepatitis viruses, Rotavirus etc.
- Prion and oncogenic viruses
- Viral infections in immunocompromised patients
- Miscellaneous virus of medical importance: Coronavirus, Ebolavirus, Zika virus etc.

Parasitology

- General concepts and definition of key terms, classifications, infections of national
- prevalence.

- Protozoal infections prevalent in India:
- Intestinal, Blood, Genital, &Other protozoal infections
- Helminths (Intestinal and tissue) prevalent in India.
- Cestodes
- Nematodes
- Trematodes
- Opportunistic Parasitic infections

Mycology:

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

Applied Microbiology:

CNS Infections: Acute and chronic meningitis, encephalitis and brain abscess. PUO/FUO: Infective and non-infective causes and approach to diagnosis of sepsis, diarrhoeal diseases (including food poisoning) respiratory tract infections (upper & lower) UTI, skin, soft tissue, bone and joint infections eye and ear infections, sexually transmitted infections, Infections in immuno-compromised individuals, congenital infections, Healthcare associated Infections and its prevention. (Standard precautions and hospital waste management) including patient's safety. Zoonotic diseases and emerging diseases Bacteriology of food, water and milk

SKILLS

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

1. Collection of relevant clinical samples.
   - Blood/ urine/ sputum/ body fluids etc. for bacterial and fungal culture
   - Samples for viral diagnosis (culture/ PCR)
   - Swabs for microscopy and aerobic culture
   - Blood and other samples for serological test Storage and transport of the clinical specimens
2. Preparation of smears from clinical material
3. Microscopic Examination -

   Gram stain, special stains, Ziehl - Neelsen stain

   Stool for ova and cyst

   Blood smear for parasites (MP, Mf, LD bodies).

Albert stain for diphtheria

India ink preparation for capsulated organisms (Ex: *Cryptococcus)*

Under supervision (Demonstration purpose)

Modified Z-N stain for M. *leprae*, coccidian parasites KOH for fungal elements

4. Standard precautions: hand wash, asepsis and antisepsis.
5. Biomedical waste disposal: Disposal of Needle, sharps and other infectious materials
6. Interpretation of Microbiology reports: Culture/ microscopy/ serology
7. Serological tests: VDRL, HIV, Hepatitis, ASO, RF, Widal Test.
8. Antibiotic sensitivity testing.

METHODS OF ASSESSMENT:

Theory: Long answer, short answer and multiple choice questions

Practical: Practical exercise, record review and viva voce

TEACHING LEARNING METHODS:

Didactic lectures, small group discussion, tutorial, Practical including demonstration,

Case based exercise, self-learning tools, interactive learning

Sequential organization of contents and their division

The areas of study in Microbiology will include General Microbiology, Systemic Microbiology including Bacteriology, Immunology, Mycology, Virology, Rickettsia, Chlamydia, Parasitology and Applied microbiology in relation to infections and diseases of various systems of the body.

A) GENERAL MICROBIOLOGY:

No	Topic of lecture	Must know (MK)	Desirable to know(DK)	Nice to Know (NK)
1.	Introduction and Historical background	Definitions: Medical Microbiology, pathogen, commensal, symbiont etc. In History: Scope to cover the importance of Med. Microbiology on diagnosis and prevention of infectious diseases with important milestones. Koch's postulates.	Microorganisms as models in Molecular Biology and Genetic engineering.	To cover Anton van Leuwenhoek, Pasteur, Lister, Koch, Fleming contributions in detail
2.	Morphology of bacteria and Classification	Bacterial cell and its organelles, morphological classification, methods of studying bacteria, staining methods & their principles Grams & Ziehl Neelsen staining, their importance in presumptive diagnosis, negative staining. Principles and applications of all microscopes.	Dark ground illumination, phase contrast and fluorescent microscopy	Electron microscopy
3.	Physiology of bacteria including growth requirements & metabolism	Nutrition, respiration (anaerobic & aerobic)and growth of bacteria, growth curve, physical factors influencing growth. Culture media: Definition, classification and application.	Important constituents of culture media.	Chemostat, Turbidostat
4.	Sterilization	Definition of sterilization, disinfection, asepsis, antiseptics. Ubiquity of bacteria, modes of killing microbes and preventing them, factors determining selection of the mode, factors adversely affecting sterilization. Enumeration of physical methods of sterilization including principle& their application. Central Sterile Supply Department (CSSD)- concept only.	Working and Efficacy testing of autoclave, inspissator and hot air oven.	Plasma sterilization, Ethylene oxide
5.	Disinfectants	Asepsis and antisepsis, modes of Action of chemical agents on microbes. Phenols, Halogens, Aldehydes, Acids, Alcohol, heavy metals, oxidizing agents etc. Standard precautions.	Dyes, soaps and detergents. Concentration and contact time.	

No	Topic of lecture	Must know (MK)	Desirable to know(DK)	Nice to Know (NK)
6.	Waste disposal	Definition of waste, classification, segregation, transport and disposal.	About common treatment facility site of waste disposal	Working of incinerator plant, Hydroclaving
7.	Bacterial genetics and drug resistance to antimicrobial agents.	Introduction - codon, Lac operon, mutation, transformation, transduction &conjugation, R factor, mode of action of antimicrobials on bacteria, mechanism of drug resistance and antimicrobial susceptibility tests, steps taken to minimize emergence of resistant strains	Concept of Antibiotic Policy and antibiotic stewardship	Antibiotic policy, formulation
8.	Host parasite relationship and bacterial infections	Commensal, pathogenic and opportunistic organisms, their pathogenic factors and modes of transmission. Microbial factors: spores, capsule, toxins, enzymes, intracellular parasitism, etc. Types of infection: primary, secondary, general, local, natural, nosocomial, iatrogenic, zoonotic.	Antigenic variation extrinsic factors leading to establishment of infection.	------
9.	Normal flora	Introduction -various sites, types and role	Fecal microbiota transplantation, probiotics	-------
10.	Methods of identification of bacteria. Diagnosis of infectious diseases (direct and indirect)	Principles of laboratory diagnosis of infectious diseases. General procedures for collection transport, processing of specimens for microbiological diagnosis.	PCR, RIA, DNA probes. Immunofluorescence	Automated culture & identification system. MALDI-TOF
11.	Patient Safety	Physical methods of sterilization like autoclave, Hot air Oven demonstration of various disinfectants (High, Intermediate and Low) and antiseptics (alcohol-based hand Rub) Health care associated Infection. Hand hygiene, Infection control	Detailed description of biomedical wastes (according to current guidelines)	Quality assurance

B) IMMUNOLOGY

No.	Topic	Must know	Desirable to know	Nice to know
1.	Introduction	Definition of immunity, types of immunity, factors responsible, mechanism of innate immunity, active and passive immunity, local immunity.	Herd immunity	Toll like receptor Pathogen associated molecular pattern
2.	Antigens, HLA	Definition, types, antigen determinants, properties of antigen. MHC- concept, class-I, II & III functions, indication of typing, MH restriction.	Nature of determinants, e.g. of haptens, e.g. of cross- reactive antigen.	HLA typing methods
3.	Antibodies	Definition, nature, structure& physical and biological properties of immunoglobins. immunoglobulin classes,	Understand isotypic, allotypic and idiotypic markers, abnormal immunoglobins.	Pepsin digestion, amino acid sequence, immunoglobin domain,
4.	Serological Reactions	Definition, characteristics, titre, sensitivity& specificity, antigen-antibody interaction-primary, secondary & tertiary, prozone phenomenon, principle, types and application of precipitation, agglutination, enzyme immunoassay, radioimmunoassay, immunofluorescence test, neutralization and opsonization.	Techniques of precipitation and their uses, blocking antibodies, antiglobulin reactions, complement fixation, co-agglutination, techniques of EIA, IF	Immune electron microscopy.
5.	Immune Response	Types, development, role of --thymus, bone marrow, lymph nodes& spleen, cells of lymphoreticular system, morphology and role of T subsets, NK cells, B cells, plasma cells and macrophages, B&T cell activation, antigen processing and presentation, primary and secondary immune response, principle and uses of monoclonal antibodies types, role of T cell and macrophages, definition of immune tolerance and mechanism of tolerance. Lymphokines and their role	Mechanism of immunoregulation, techniques of monoclonal antibody formation, detection of CMI, types of immunotolerance.	Theories of antibodies formation, clonal selection theory

M.B.B.S CURRICULM

No.	Topic	Must know	Desirable to know	Nice to know
6.	Complement	Definition, components, synthesis, activation, pathways, & biological functions,	Regulation of complement activation deficiency	Measurement of complement components,
7.	Hypersensitivity	Definition, classification & difference between immediate and delayed reaction, mechanism & types of anaphylaxis, atopy, examples of anaphylactic reaction, manifestations of anaphylaxis, mechanism of type-II, Type-III &delayed hypersensitivity.	Tests for anaphylaxis TypeV hypersensitivity	Desensitization in anaphylaxis, Schwartzman phenomenon
8.	Autoimmunity	Definition, classification, examples	Mechanism	Pathogenesis
9.	Transplantation & tumor Immunology	Types of transplants, mechanism of transplant rejection, graft rejection, GVH reaction,	Type of tumor antigens, immune surveillance.	Immune response to tumors, tumor antigens, mechanism of Immune response to tumors.
10.	Immuno Deficiency	Classification, examples,	Disease manifestations	Laboratory tests for detection,

C) BACTERIOLOGY :

No	Topic/ hours	Must know	Desirable to know	Nice to know
1.	Staphylococci (1 hour)	Classification, morphology, culture, isolation, biochemical reaction &identification, viability, antigens virulence, diseases, pathogenesis, lab diagnosis, prevention & control,	Special test for culture & identification of S. aureus, MRSA	Coagulase negative Staphylococci
2.	Streptococci Pneumococci (3 hour)	Classification, morphology, culture isolation, biochemical reaction identification, viability, virulence, diseases, pathogenesis, lab diagnosis, prevention & control	Immune response to S. pyogenes	Antimicrobial resistance of S Pneumomae
3.	Neisseria (1 hour)	Morphology, classification, culture, identification, pathogenesis, diseases, lab diagnosis, prevention & control of N. meningitidis& N. gonorrhoeae	Antigens, virulence factors	Drug resistance, Commensal Neisseria
4.	C. diphtheriae (1 hour)	Morphology, viability, virulence, diseases , pathogenesis , lab diagnosis, prevention & control	Classification, Culture & isolation, biochemical reaction, immune response.	Schick test, Danysz phenomenon
5.	M. tuberculosis (2 hours)	Classification, morphology, Culture & isolation on LJ Media, identification, viability, virulence, diseases, pathogenesis, lab diagnosis, prevention & control	Biochemical reaction, immune response	Drug susceptibility & newer methods of identification
6.	Atypical M ycobacteria (lhour)	Classification, morphology, viability, virulence, diseases, pathogenesis, lab diagnosis, prevention & control	Culture & isolation	Biochemical tests for identification
7.	M. leprae (1 hour)	Classification, morphology, pathogenesis, lab diagnosis, prevention & control,	Isolation, viability, virulence factors	Immune response
8.	Bacillus (1 hour)	Classification, morphology, Culture & isolation, viability, virulence, diseases , pathogenesis , lab diagnosis, prevention & control	Biochemical reactions	Bioterrorism
9.	Anaerobes (1 hours)	Classification, morphology, methods of anaerobiosis, viability, diseases, pathogenesis, lab diagnosis, prevention & control	Non sporing anaerobes	Biochemical reactions for identification
10.	Clostridium welchii, tetani, botulinum (1 hour)	Morphology, viability, virulence, diseases, pathogenesis, lab diagnosis, prevention & control	Culture, isolation &biochemical reactions	Antibiotic associated diarrhea

M.B.B.S CURRICULM

No	Topic/ hours	Must know	Desirable to know	Nice to know
11.	Enterobacteriaceae (1 hour)	Classification, morphology, viability, virulence, diseases , pathogenesis , lab diagnosis	Culture & isolation, biochemical reactions, Antigens	Hemolytic uremic syndrome
12.	Salmonella typhi & parat yphi (2 hour)	Classification, morphology, culture, isolation & biochemical reactions viability, virulence, diseases, pathogenesis , lab diagnosis, prevention & control& immune response	Antigens Non-typhoidal Salmonella, Typhoidal vaccines	Antigenic variation
13.	Shigella(I hour)	Classification, morphology, Culture, isolation & biochemical reactions viability, virulence, diseases, pathogenesis , lab diagnosis, prevention & control& immune response	Antigens	Drug resistance
14.	Vibrio & Campylobacter (2 hour)	Classification, morphology, Culture, isolation & biochemical reactions viability, virulence, diseases, pathogenesis , lab diagnosis	Halophilic Vibrio	Cholera vaccine
15.	Pseudomonas (1 hour)	Morphology, Culture, isolation & biochemical reactions viability, virulence, diseases, lab diagnosis	Hospital acquired infection due to Pseudomonas	Drug resistance
16.	Miscellaneous bacteria (2 hours)	List of clinically relevant species, morphology, lab diagnosis	Culture & isolation	--
17.	Spirochetes (2 hours)	Classification, morphology, viability, diseases	Culture & isolation, immune response	Non venereal treponematoses Lyme disease
18.	Actinom ycetes & Nocardia(I hour)	Morphology, lab diagnosis	Classification, culture & isolation	Epidemiology
19.	Rickettsia (1 hour)	Classification, morphology and lab diagnosis		Q fever
20.	Chlamydia & Myco plasma (2 hour)	Classification, morphology and lab diagnosis		Ureaplasma
21.	Bacteriology of air, water, milk and food (1 hour)	Method of air, water & milk culture for presence of bacterial pathogen		Presumptive coliform identification

D) MYCOLOGY:

No	Topic	Must know	Desirable to know	Nice to know
1.	Introduction to Mycology	Nature of fungus (definition, differences with bacteria),characteristics of fungi, common terminologies, brief account of types of sporulation and morphological classification of fungi. Methods of identification, Infections produced, Lab Diagnosis, processing of skin, hair and nail,	Growth requirements, Ecological & medical importance,	Industrial importance of fungi, mycotoxins
2.	Agents of Superficial mycosis	Enumerate, predisposing factors, morphological features, Lab. Diagnosis	Colony characteristics of dermatophytes	Morphology on Lactophenol cotton blue mount.
3.	Agents of Subcutaneous Mycosis	Predisposing factors for Mycetoma, Rhinosporidiosis, Pathogenesis, Lab. Diagnosis	Chromoblastomycosis	Slide culture technique
4.	Systemic mycosis Opportunistic fungal infections	Classification, predisposing factors, *Candida, Cryptococcus, Histoplasma* morphology, pathogenesis, lab. Diagnosis Classification, predisposing factors, *Mucor, Aspergillus, Pneumocystis carinii*	Cultural characteristics	*Candida auris*

E) VIROLOGY

No	Topic lecture	Must know	Desirable to know	Nice to know
1.	General Virology	Size, shape, symmetry, structure, resistance & classification of viruses, pathogenesis.	Viral replication	Bacteriophages
2.	Laboratory diagnosis of viral infections	Collection of samples, transport & methods of diagnosis	Cultivation of virus	Concept of viral load & detection.
3.	Virus host interaction immunity	Viral immunity, interferon, viral vaccines	Newer viral vaccines	Chemoprophylaxis & chemotherapy of viral diseases
4.	**DNA viruses** Papilloma Adenovirus Herpes viruses (Herpes simplex, Varicella zoster, CMV, EBV) Parvovirus	Morphology, pathogenesis, laboratory diagnosis, prevention and control	Pox viruses Epidemiology of DNA viruses	Polyoma viruses
5.	Orthomyxoviruses	Morphology, epidemiology, antigenic shift & drift, pathogenesis, laboratory diagnosis, prevention and control	Avian influenza	Drug resistance
6.	Paramyxoviruses	Morphology, pathogenesis, laboratory diagnosis, prevention and control	Epidemiology	-----

No	Topic lecture	Must know	Desirable to know	Nice to know
7.	Picornaviruses: polio & Non-polio enteroviruses	Morphology, pathogenesis, epidemiology, laboratory diagnosis, prevention and control	Rhinovirus , Hand foot & mouth disease virus	ECHO virus
8.	Rabies virus	Morphology, pathogenesis, laboratory diagnosis, prevention and control	Chandipura ,Ganjam& other Rabies related viruses	Lassa fever virus
9.	Hepatitis viruses	Morphology, pathogenesis, epidemiology, laboratory diagnosis, prevention and control	Molecular epidemiology	Hepatitis G
10.	Arboviruses	Dengue, chikungunya, Japanese encephalitis, KFD, CCHF -classification, arboviruses in India, Pathogenesis, laboratory diagnosis and control	Molecular epidemiology Uncommon Arboviruses causing hemorrhagic fever & encephalitis	West Nile virus
11.	Human oncogenic viruses	List of oncogenic viruses	Mechanism of oncogenesis	Viral markers of oncogenesis Anti & proto oncogenes
12.	Slow viruses & Emerging viruses	List of Slow & Emerging viruses pathogenesis & associated diseases	Characteristics of slow virus Laboratory diagnosis	--------
13.	Retroviruses	Morphology, pathogenesis, epidemiology, laboratory diagnosis, prevention and control	HIV 2	--------

M.B.B.S CURRICULM

Parasitology

Geographical distribution, habitat, morphology, life cycle, pathogenesis, laboratory diagnosis, treatment and control of following parasites: E. histolytica, free living amoeba, Giardia lamblia, Leishmania donovani, Plasmodium spp, Toxoplasma gondii, Taenia solium, Taenia saginata, Echinococcus granulosus, Schistosoma, Ascaris lumbricoides, Ancylostoma duodenale, Enterobius vermicularis and Wuchereria bancrofti

No.	Topic of lecture	Must know	Desirable to know	Nice to know
1.	Introduction to Medical Parasitology	Parasites: their nature, classification, explanation of terminologies, epidemiology, pathogenicity and laboratory diagnosis.	Emerging parasitic infections	Immunity to parasitic diseases
2.	E. histolytica, Free living amoeba	Amoebic infections	E. dispar	Nonpathogenic amoeba
3.	Flagellates	Giardia and Trichomonas	Trichomonas	Chilomastix mesnili
4.	Hemoflagellates	Leishmaniasis	Trypanosomes	
5.	Malaria	Malarial parasites	Babesia	Plasmodium knowlesi
6.	Misc. Pathogenic protozoa	Toxoplasma	Cryptosporidium, Isospora, Cyclospora	B. coli
7.	Cestodes	Taenia saginata & solium, Echinococcus granulosus	Cysticercosis	H. diminuta
8.	Trematodes	Schistosomiasis	Fasciola hepatica, Paragonimus westermani	Clonorchis sinensis
9.	Intestinal nematodes	A. duodenale, A. lumbricoides, E. vermicularis, S. stercoralis	Larva migrans	T. trichiura
10.	Tissue nematodes	W. bancrofti, B. malayi T. spiralis	D. medinensis	Onchocerca & Loa loa

List of Lectures (Department of Microbiology)

SL No	Topics		Topics
1.	Introduction to Microbiology	25.	MHC & Transplant Immunity
2.	Morphology & classification of bacteria	26.	E. histolytica
3.	Physiology, growth & metabolism of bacteria	27.	Free living amoeba,
4.	Sterilization physical Methods-1	28.	Flagellates & Ciliates
5.	Sterilization physical Methods -2	29.	Intestinal Sporozoa
6.	Disinf ection & Standard precaution	30.	Malaria - 1
7.	Bacterial genetics -1	31.	Malaria-2
8.	Bacterial genetics -2	32.	Toxoplasma & Babesia
9.	Bacterial virulence	33.	Hemoflagellates- 1
10.	Common Culture media methods & Antimicrobial susceptibility test	34.	Hemoflagellates -2
11.	Methods of bacterial identification	35.	Helminths: Gen f eatures & properties
12.	Introduction to immunity	36.	Intestinal nematodes: *(A. lumbricoides, E. vermicularis, Trichuris trichiura)*
13.	Antigen	37.	Intestinal nematodes: *(Ancylostoma duodenale, S trongyloides stercoralis, Trichinella spiralis)*
14.	Immune System Structure & function -	38.	Tissue nematodes classification &filariasis
15.	Immune System Structure & function -	39.	Tissue nematodes: II Guinea worm & Larva migrans
16.	Antibody	40.	Cestodes-I *(T. saginata, T. solium)*
17.	Antigen-antibody reaction: I	41.	Cestodes - 2 E. granulosus, D. latum & H. nana
18.	Antigen-antibody reaction: 2	42.	Trematodes
19.	Antimicrobial resistance: I	43.	S treptococcus - part 1Gr A
20.	Antimicrobial resistance-2	44.	Streptococcus - 2 GR B, C, D
21.	Complement	45.	Pneumococcus
22.	Introduction to parasitology	46.	S taphylococcus
23.	Immune Response	47.	Neisseria
24.	Hypersensitivity	48.	C. diphtheriae

SI. No	Topics		Topics
49.	Patient Safety	71.	*H. influenzae*
50.	Hand hygiene	72.	*Mycoplasma* -
51.	*Bacillus*	73.	*Actinomycetes, Nocardia*
52.	Introduction to *Enterobacteriaceae* & *E. coli*	74.	Rickettsia
53.	*Klebsiella, Enterobacter, Proteus*	75.	Yersinia, Pasteurella, Francisella
54.	*Shigella*	76.	Miscellaneous Bacteria-1
55.	*Salmonella*- I	77.	Miscellaneous Bacteria-2
56.	*Salmonella*- II	78.	Introduction to Mycology -
57.	Introduction to Anaerobes, *C. perfringens*	79.	Superficial mycoses Dermatophytes
58.	Other *Clostridia* & Non-sporing anaerobes	80.	Subcutaneous mycoses
59.	*Vibrio*- I	81.	Candida
60.	*Vibrio* -II	82.	Cryptococcosis
61.	Pseudomonas, Burkholderia	83.	Deep mycoses
62.	M. Tb. - I	84.	Opportunistic mycoses I
63.	M. Tb. - II	85.	Opportunistic mycoses-11
64.	*M. leprae*	86.	Patient safety
65.	*Brucella*	87.	Introduction to Virology
66.	Spirochete -1 (*T. pallidum*)	88.	Cultivation of viruses
67.	Spirochete -2 (*T. pallidum*)	89.	Viral Replication
68.	*Borrelia, Leptos pira*-	90.	Virus host interaction
69.	NTM	91.	Lab diagnosis of viral inf ection-
70.	*Chlamydia*	92.	Bacteriophage

SI. No	Topics		Topics
93.	Adeno, Parvo	117.	Normal Microbial Flora
94.	Pox, Papova-	118.	Skin, Soft tissue, bone Inf ection
95.	Herpes- part l(simplex)	119.	Eye & Ear Inf ections
96.	Herpes	120.	Diarrhoea & Food Poisoning
97.	Orthomyxovirus	121.	Zoonoses
98.	Paramyxovirus	122.	HAI
99.	Picorna -1	123.	CNS Infections
100.	Picorna-2	124.	BSI & Inf ective Endocarditis
101.	Arbo-2 Dengue, CCHF & other viral hemorrhagic fevers	125.	Emerging & Reemerging Infections
102.	Arbo-3JE, Y. F, KFD	126.	Immunoprophylaxis
103.	Infective Hepatitis- (A, E)	127.	Infections of Respir. tract
104.	Rhabdo-	128.	Bacteriology of Air, Water, Milk
105.	Hepatitis - B	129 .	*Bordetella*
106.	Hepatitis - C		
107.	Oncogenic & emerging Viral infections -		
108.	HIV -1		
109.	HIV -2		
110.	Miscellaneous Viruses -1Corona, Rubella-		
111.	Miscellaneous Viruses - 2Prion, SSPE		
112.	Viral Diarrhoea		
113.	UTI		
114.	Congenital Inf ections-		
115.	Recent Advances in Diagnostic Microbiology-		
116.	PUO		

TUTORIALS /SYMPOSIA/SEMINARS (Including student presentation) :

No.	Topics for Tutorial	Hrs
1.	General Microbiology	4
2.	Immunology	2
3.	Systematic Bacteriology	12
4.	Parasitology	4
5.	Mycology	2
6.	Virology	8
7.	Inf ectious disease syndromes (Applied Microbiology)	4
8.	Patient safety	1
9.	Emerging and re-emerging infectious diseases	2
10.	Hospital acquired inf ection	1

Suggested topics for integrated teaching with departments involved & duration

SI No.	Topics	Departments involved					Totald duration
1.	Tuberculosis	**Microbiology** Organism & its Lab diagnosis	**Pathology** Pathogenesis& histopathological features	**Pulmonary medicine** Pulmonary Tuberculosis	**Medicine** Extra pulmonary tuberculosis	**PSM** Epidemiology & prevention	**3 & ½ hrs**
2.	Eye & ear infection	**Microbiology** Normal flora Organisms involved Lab diagnosis	**Ophthalmology** Mode of transmission, Clinical presentation, differential diagnosis Treatment	**ENT** Mode of transmission, Clinical presentation, differential diagnosis Treatment			**1 & 1h hrs**
3.	HIV infection	**Microbiology** Virology & pathogenesis of HIV virus Lab diagnosis	**Medicine** Clinical presentation, D/D, Management 2 classes	**PSM** Epidemiology & prevention			**3 hrs**
4.	CNS Infection	**Microbiology** Etiology, Lab diagnosis	**Neurology** Clinical presentation, D/ D, Management				**3 hrs**
5.	STDs	**Microbiology** Etiology, Lab diagnosis	**Obs & Gynae** presentation, D/ D, Management	Dermatology presentation, D/ D, Management			**1.5 hrs**
6.	Diarrhoea & dysentery	**Microbiology** Etiology, Lab diagnosis	**Medicine/ Pediatrics** Clinical presentation, D/ D, Management				**1.5 hrs**
7.	Skin & soft tissue infection	**Microbiology** Etiology, Lab diagnosis	**Dermatology** Clinical presentation, D/ D, Management				
8.	Viral Hepatitis	**Microbiology** Virology, epidemiology, pathogenesis and diagnosis	**Gastroenterology** Clinical feature, complication and management				**3 hrs**

summative (Professional) Assessment

Question Paper pattern & Division of syllabus	**Paper I (100 Marks) - Time 3 hours** Part A - 50 marks Part B - 50 marks **Paper II (100 Marks) - Time 3 hours** Part A - 50 marks Part B - 50 marks In each part the questions will be framed as follows: 1. Modified structured long question: 10 marks 2. Short notes/ short answer type question: 8x5=40 Marks **Paper wise division of topics** **Paper I** 1. General Microbiology, 2. Immunology, 3. Systematic Bacteriology **Paper II** 1. Virology, 2. Parasitology, 3. Mycology 4. Applied Microbiology
	Viva-voce: Total 20 marks The viva -voce examination will be conducted in two tables (10 marks each) and will be structured to cover all the portions covered during the period and test the student on applications, problem-solving, rather than recall only. **Practical: Total 80 marks** Practical examination includes spotting, different bacterial staining procedures, identification of bacterial strains using conventional methods and stool examination for ova/cyst

MODEL QUESTION PAPER
MICROBIOLOGY
PAPER I

Time:3 Hours **Total Marks:100**

SECTION A

1. Read the clinical history and answer the following questions:

   A 24 year old man was admitted in medical ward with a history of diarrhea for the past two days. On clinical examination he was severely dehydrated. The macroscopic appearance of the stool resembled 'rice water[1].

   Answer the following: (1+2+2+4+1=10)

   a. What is the probable diagnosis and name the causative agent?
   b. Mention the method of sample collection and transportation of the sample to the laboratory.
   c. What is the pathogenesis of the above disease?
   d. Describe the laboratory diagnosis.
   e. Which drugs are used for the treatment?

2. Short answer questions. (8X5=40)

   a. Contribution of Robert Koch to Microbiology
   b. Sterilization by moist heat
   c. Bacterial spore
   d. Transduction
   e. Difference between exotoxin and endotoxin
   f. Type-I hypersensitivity
   g. Widal test
   h. Direct complement pathway.

SECTION-B

1. Read the clinical history and answer the following questions:

   A 33-year-old woman presented with a 1-month history of cough, fever, reduced appetite and weight loss. She had taken an incomplete course of antitubercular therapy about a year prior with partial improvement in symptoms.

   Answer the following: (1+3+3+3=10)

   a. What is the most probable diagnosis?
   b. Describe the culture media used.
   c. Describe the mechanisms of drug resistance to 1st line drugs?
   d. Name the drugs that can be used for the treatment of this patient?

2. Structured short answer questions. (8X5=40)

   a. Antigenic structure of Streptococcus pyogenes
   b. MRSA
   c. VDRL test
   d. Helicobacter pylori
   e. EHEC
   f. NK cell
   g. Lepromin test
   h. Laboratory diagnosis of Diphtheria

MODEL QUESTION PAPER
MICROBIOLOGY
PAPER II

Time:3 Hours **Total Marks:100**

SECTION A

1. Describe the morphology of Rabies virus. Discuss the laboratory diagnosis and prophylaxis of Rabies. (2+4+4=10)

2. Write short notes (8X5=40)

   a. Interferon
   b. Viral cultivation
   c. Prophylaxis of polio.
   d. Serological diagnosis of HIV infection.
   e. Serological markers of Hepatitis B virus infection
   f. Varicella zoster
   g. Lab diagnosis of Dengue fever
   h. Antigenic variation in Influenza virus

SECTION B

3. Discuss the life cycle, pathogenesis and laboratory diagnosis of *Leishmania donovani* infection. (3+2+5 =10)

4. Short answer questions. (8X5=40)

   a. Life cycle of Fasciolahepatica
   b. Rhinosporidiosis
   c. Dermatophytes
   d. Cryptococcal meningitis
   e. Cysticercus cellulose
   f. Free living amoeba
   g. Mycotoxin
   h. Mycetoma

PHARMACOLOGY

PHARMACOLOGY

GOAL

The goal of teaching pharmacology to undergraduate students is to impart the knowledge, skills and attitudes that a student should learn in order to prescribe drugs safely and effectively and ethically to maintain this competence throughout his/her professional life.

OBJECTIVES

A) Knowledge & Intellectual skills

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

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

11. Judiciously use “over the counter” drugs and be aware of ill effects of the social use of intoxicants.

12. Cognizant of the activities under national programmes related to monitoring of drugs and devices (such as Pharmacovigilance Programme of India, Adverse Event Following Immunization Programme, Hemovigilance Programme of India and Materiovigilance Programme of India).

13. Understand the common operational aspects of medication safety such as the 5 rights in drug use, injection safety, high alert medication (HAM), ‘sound alike and look alike’ medication and handling of cytotoxic medication.

14. Understand the legal aspects of prescribing drugs.

B) Psychomotor Skills:

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

1. Write a correct, complete and legible prescription for common ailments including the diseases in the National Health Programmes.

2. Calculate the drug dosage using appropriate formulae for an individual patient.

3. Administer the required dose of different drug formulations using appropriate devices and techniques (e.g., hypodermic syringes, inhalers, transdermal patches etc.).

4. Advice and interpret the therapeutic monitoring reports of important drugs.

5. Recognize and report adverse drug reactions to suitable authorities.

6. Analyse critically, drug promotional literature for proprietary preparations, in terms of the (a) pharmacological actions of their ingredients (b) claims of pharmaceutical companies (c) economics of use (d) rational or irrational nature of fixed-dose drug combinations.

7. Retrieve drug information from appropriate sources, especially electronic resources.

8. Recognize, through use of appropriate information resources (printed and electronic), potentially dangerous drug-drug interactions in multiple drug use situations and suitably modify drug choices and doses to avoid harm

C) Attitudes & Communication skills:

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

1. Communicate to patients regarding the optimal use of drug formulations, devices and storage of medicines.

2. Follow the drug treatment guidelines laid down for diseases covered under the National Health Programmes and be capable of initiating, monitoring treatment, recording progress, and assessing outcomes.

3. Motivate patients with chronic diseases to adhere to the line of management outlined by the healthcare provider.

4. Appreciate the relationship between the cost of drugs and patient compliance.

5. Exercise caution in prescribing drugs likely to produce dependence and recommend the line of management.

6. Evaluate the ethics, scientific procedures and social implications involved in the development and introduction of new drugs.

7. Appreciate the role of counselling in making pharmacotherapy more acceptable in situations in which drug use can be distressing as in cancer chemotherapy.

TEACHING-LEARNING (TL) METHODS

The above-mentioned objectives will be covered using theory lectures, small group discussions, clinical case scenarios, problem-solving exercises, computer-assisted learning, tutorials and any other teaching-learning method which the teacher chooses to select. An overlap between theory and practical classes will serve to reinforce and complement the two. Points not covered in theory can be covered during practical classes.

COURSE CONTENT

MUST KNOW CATEGORY

General Pharmacology:

Pharmacology: Definition, scope, various branches. General principles and mechanism of drug action. The 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, and pharmacogenetics. Adverse drug reactions and Pharmacovigilance. Therapeutic drug monitoring and adherence. Essential drug and fixed-dose drug combinations, pharmacoeconomics, rational drug use, P - drugs. Phases of clinical trials. Drugs and drug combinations that are banned in India.

Autonomic Pharmacology:

General principles of autonomic neurotransmission. Systemic actions of neurotransmitters. Various types and subtypes of receptors and their agonists and antagonists, therapeutic indications, contraindications and common side effects of agonists and antagonists. Pharmacotherapy of organophosphorus 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. 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.

Central Nervous System:

Antiepileptic drugs - Classification, pharmacological actions, uses, adverse effects, contraindications and selection of appropriate drug of various types of epilepsy. Sedative & Hypnotics - Classification, pharmacological actions, uses, adverse effects and contraindications, Management of Insomnia. General anaesthetics - Cardinal features merits & 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 de-addiction. 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, contraindications, adverse effects and 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 the basis of combination therapy, Management of hypertensive emergencies. Pharmacology of anti-anginal drugs, management of angina pectoris and myocardial infarction. Drug therapy for heart failure including cardiac glycosides. Pharmacology of diuretics and antidiuretics.

Drugs affecting blood and blood formation:

Anti-anaemic drugs: Haematinics and Haematopoietic growth factors including erythropoietin. Drugs affecting coagulation, bleeding and thrombosis. Pharmacology of vitamin K and other haemostatics. Pharmacology of anticoagulants and their antidotes. Pharmacology of Fibrinolytics and antifibrinolytics. Hypolipidaemic drugs - classification, mechanism of action, indications and adverse drug reactions.

Respiratory system:

Anti-asthmatic 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.

Gastrointestinal system:

Drugs for peptic ulcer - classification, mechanism of action, uses, adverse drug reactions, contraindications. Pharmacotherapy of GERD. Anti - H. Pylori drugs, Antiemetic and Prokinetic drugs - mechanism of action, use, side effects and adjuvant antiemetics. Pharmacology of drugs used in constipation and diarrhoea, principles for using ORS.

Drugs acting on the Endocrine system:

Pharmacology of Thyroid hormones and anti-thyroid drugs - Management of thyroid storm and myxoedema coma. Pharmacology of drugs used in diabetes - Management of hypoglycaemia 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 antiviral drugs. Antimalarial, antiamoebic and other antiprotozoals. Anthelminthic drugs.

Anticancer drugs –

Principles of cytotoxic chemotherapy, endocrine therapy and targeted therapy; examples of major groups of cytotoxic drugs with their broad mechanisms of action and indications, use of hormonal drugs in cancer, examples of more commonly used targeted drugs (e.g. receptor tyrosine kinase inhibitors and monoclonal antibodies like trastuzumab) with their advantages over conventional chemotherapy, precautions and toxicity amelioration for cytotoxic drugs.

Toxicology:

General principles in the management of poisoning including snake bite and insect stings. Chelating agents and management of heavy metal poisoning. Management of overdosage 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.Activities under PvPI & AEFI programmes.

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 bio standardisation. Pharmacoeconomics. Drug abuse in sports.

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. Drugs used in the treatment of Alzheimer's dementia.

Cardiovascular system: Pharmacology of antiarrhythmic drugs. Vasoactive peptides and nitric oxide. Pharmacological management of peripheral vascular diseases. Plasma expanders and management of shock.

Drugs affecting blood and blood formation: Erythropoietin and its analogues

Respiratory system: Management of COPD.

Gastrointestinal system: Emetics. Digestants and gallstone dissolvent. Anti-obesity drugs. Appetite stimulants. Drug therapy for inflammatory bowel diseases and Irritable bowel syndrome.

Drugs acting on the Endocrine system: Pharmacology of hypothalamic and pituitary hormones. 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. Ocular pharmacology other than antiglaucoma drugs. Phases of clinical trials and ethical considerations in drug development including Declaration of Helsinki, the role of institutional ethics committee and informed consent in clinical studies

NICE TO KNOW CATEGORY

General Pharmacology: Pharmacokinetics - a brief overview of compartment models. Membrane Transporters. Chronopharmacology. Pharmacoepidemiology.

Central Nervous System: Designer drugs. Drugs used in Multiple Sclerosis. Nicotine Dependence. Management of stroke.

Cardiovascular system: Mechano-pharmacology: Drug-eluting stents.

Respiratory System: Pharmacotherapy of Pulmonary arterial hypertension.

Chemotherapy: Antibiotic stewardship. National treatment guidelines for antimicrobial use in infectious diseases, Cancer chemotherapy - Monoclonal antibodies -nomenclature, uses, adverse effects.

Miscellaneous: Pleiotropic effects of drugs (Melatonin, Metformin etc). Tolerogens. Antioxidants.

Theory

Sl. No.	**Systems**	**Allotted teaching hours**
1.	General Pharmacology	14
2.	Autonomic Nervous System	12
3.	Local Anaesthetics and skeletal muscle relaxants	02
4.	Cardiovascular System	14
5.	Autacoids	06
6.	Drugs affecting blood and blood formation	07
7.	Central Nervous System	19
8.	Endocrinology	16
9.	Gastrointestinal system	06
10.	Respiratory system	03
11.	Drugs acting on kidney	03
12.	Chemotherapy (including cancer chemotherapy)	28
13.	Miscellaneous (Immunomodulators, Chelating agents, Drugs in dermatology, Drugs in hepatic & renal disorders, Drugs in pregnancy & lactation, Monoclonal antibodies in pharmacotherapy, Vitamins, Vaccines, Antiseptics & disinfectants)	12
Total theory teaching hours		**142**

Students'Seminar

Sl. No.	Topic / System	Allotted hours
1.	General Pharmacology	03
2.	ANS	03
3.	CNS	03
4.	CVS	03
5.	Endocrine	03
Total hours		**15**

Practical

Sl. No.	Topic / System	Allotted teaching hours
1.	Handling of common dosage forms and drug delivery devices and safe injection practice: (Use of metered dose inhalers, dry powder inhalers, compressed air nebulizers, transdermal patches, suppositories and pessaries, eye-ear-nasal drops, insulin pen injectors, various routes of injection (ID, SC, IM and IV), setting up of an IV drip. Students will be given access to manikins to develop safe injection skills.)	16
3.	Calculation of drug dose and percent solution	06
4.	Study of absorption and bioavailability	03
5.	Dose Response Curve, ED50 calculation	03
6.	ADR reporting and causality analysis	09
7	Computer Assisted Learning (CAL) a) Effect of miotics & mydriatics on rabbit eye b) Matching Bioassay c) Effect of drugs on frog heart, ANS Charts d) Effect of drugs on the ciliary movement of frog oesophagus	16
8.	The concept of essential medicine, selection of P drug	03
9.	Critical appraisal of drug promotional literature	06
10.	Critical appraisal of fixed-dose drug combinations	03
11.	Drug labelling	03
12.	Pharmacoeconomic analysis of drugs	06

13.	Medication safety	06
14.	Therapeutic Problems a) Discussion on real hospitalised cases b) Discussion on simulated clinical problems	18
16.	Prescription writing (General guidelines, Respiratory system, cardiovascular system, Blood & autacoids, Gastrointestinal system, Endocrine, Emergency Medicine)	25
17.	Criticise, correct and rewrite (CCR) prescriptions	06
18.	Patient-doctor communication (including Informed consent process for procedures and research)	06
Total practical teaching hours		**135**

Total Teaching Hours: 142+15 +135 = 292 hours

Recommended books for undergraduates

1. Basic and Clinical Pharmacology by Bertram G Katzung
2. Principles of Pharmacology by H L Sharma, K K Sharma
3. Essentials of Medical Pharmacology by K D Tripathi
4. Pharmacology and Pharmacotherapeutics by Goodman & Gilman (reference)
5. Clinical Pharmacology by Laurence, Bennet & Brown.

ASSESSMENT

Formative Assessments

CRITERIA	CONDITION
Number of examination	05
Time of examination	3rd Mid-semester examination (Sept-Oct) 3rd End semester examination (Nov - Dec) 4th Mid-semester examination (Feb - March) 4th End semester examination (April- May) 5th End semester examination (October)
Method of assessment	Mid-semester examinations: Multiple Choice Questions, Modified Structured / Short notes / Short answer type questions, Spotters / OSPE etc. Marks for practical record book will be included under practical marks. No viva-voce will be conducted during mid-semester examination. End semester examinations: Theory, practical and viva-voce – same pattern as summative assessment.
Duration	Theory- 2 hours 30 minutes. Practical (writing part) – 1 hour
Maximum marks	• Theory – MCQ (25 Marks), Main theory (50 Marks)- Total-75 Marks • Practical -50 Marks, Viva -25 Marks – Total 75 marks
Question paper pattern	1. Modified structured Long question – 10 Marks 2. Short notes/ short answer type question – 8x5=40 Marks 3. MCQs – 25x1=25 Marks (No negative marking)

Summative Assessment

CRITERIA	CONDITION
Question Paper pattern & Division of syllabus	**Paper I (100 Marks) – Time 3 hours** Part A – 50 marks Part B – 50 marks **Paper II (100 Marks) – Time 3 hours** Part A – 50 marks Part B – 50 marks In each part the questions will be framed as follows: 1. Modified structured long question: 10 marks 2. Short notes/ short answer type question: 8x5=40 Marks **Paper wise division of topics** **Paper I** **Part A** 1. General Pharmacology including Drug Discovery & clinical trials 2. Drugs acting on Autonomic Nervous System 3. Drugs acting on Cardiovascular system 4. Drugs acting on Kidney (Diuretics & Anti-diuretics) **Part B** 5. Autacoids and related drugs 6. Skeletal Muscle Relaxants 7. Local Anaesthesia 8. Drugs acting on Central Nervous System **Paper II** **Part A** 1. Hormones and Related drugs 2. Drugs acting on Respiratory system 3. Drugs affecting blood and blood formation 4. Drugs acting on gastrointestinal system 5. Miscellaneous topics i) Immunomodulators ii) Drugs acting on the skin and mucous membrane iii) Antiseptics, Disinfectants an ectoparasiticides iv) Chelating agents v) Vitamins, Vaccines and sera vi) Drug therapy in paediatric, geriatric and pregnancy **Part B** 6. Antimicrobial Drugs 7. Chemotherapy of neoplastic diseases

Assessment Method	Theory paper correction: One examiner will correct one part. **Viva-voce: Total 20 marks** The viva-voce examination will be conducted in two tables (10 marks each) and will be structured to cover all the portions covered during the period and test the student on applications, problem-solving, rather than recall only. **Practical: Total 80 marks** 1. Graphical calculation of ED50 or AUC/Bioavailability – 10 Marks 2. Prescription writing / CCR – 10 marks 3. Clinical problem – 10 marks 4. Experimental pharmacology charts or graphs – 10 marks 5. ADR reporting / critical appraisal of promotional literature or FDC – 10 marks 6. OSPE / Spotters – 10 marks 7. Communication skill – 10 marks 8. CAL exercise – 10 marks

MODEL QUESTION PAPERS
PHARMACOLOGY
PAPER I

Time: 3 hours **Max. Marks: 100**

Answer all questions. Answer sections A & B in separate booklets.

SECTION A

1. A 45 years old male patient with chronic heart failure (Stage C, NYHA Class IV) was treated with frusemide, ramipril, metoprolol and combination of hydralazine & nitrate. As the symptoms were persisting, the treating physician decided to start digoxin. After giving the oral loading dose of digoxin, the patient was on a maintenance dose of 0.25 mg daily. On the third day, the patient complained of nausea and vomiting and ECG showed ventricular ectopics. (2+2+2+2+2=10)
   a. Why the patient developed ventricular ectopics?
   b. Why was a loading dose of digoxin given?
   c. How should ventricular ectopics be treated?
   d. Suggest one investigation (other than ECG) in this scenario with rationale.
   e. What is present status of Digoxin in the treatment of heart failure?

Write short notes/answer on the following: **(8x5=40)**

2. Select the most appropriate route of drug administration for the following scenario. Justify with reasons.
   a. A 30-year-old man requiring an irritant drug parenterally.
   b. A 25-year-old woman requiring hypersensitivity testing for penicillin G. (2 ½ +2 ½)

3. Explain the following terms. Mention the critical consequences of inhibiting these processes with suitable examples. (2 ½ + 2 ½)
   a. Enterohepatic circulation
   b. Biotransformation

4. Discuss the role of beta blockers and prostaglandin analogues in the pharmacotherapy of glaucoma. (2 ½ + 2 ½)

5. Explain with a diagram: Neural control of urinary bladder and role of alfa blockers in benign hypertrophy of prostate.

6. a) Why Adrenaline (Not Noradrenaline) is given in Anaphylactic shock?
   b. Why Dopamine preferred over Noradrenaline in cardiogenic shock? (2 ½ + 2 ½)

7. What are the effects of furosemide and thiazide on serum calcium level? What is the rationale for using furosemide in hypercalcemic states? (3+2)

8. What are the important differences between Verapamil and Nifedipine? Why is long-acting dihydropyridine (DHP) preferred over short-acting DHP in Myocardial infarction? (3+2)

9. What is a hypertensive emergency? How is hypertensive emergency treated? (1+4)

SECTION B

10. An epileptic patient on Phenytoin for the past two years was brought to the hospital with a continuous attack of seizures. Relatives gave a history of stopping Phenytoin for the past 7 days. Gums were found to be hypertrophied and bleeding. Peripheral smear showed megaloblastic anaemia.

    a. What is the diagnosis?

    b. Mention the line of management.

    c. Why the patient developed megaloblastic anaemia?

    d. Name two drugs used for petit mal epilepsy. (2+5+2+1=10)

Write short notes/answer on the following: **(8x5=40)**

11. The anaesthetist injected succinylcholine I.V. for endotracheal intubation before an elective abdominal surgery. The patient developed prolonged apnoea. (2+2+1)

    a. What is the reason for this prolonged apnoea?

    b. What is the line of management for recovery?

    c. Suggest two alternative agents for the procedure.

12. A psychiatric patient was on a large dose of Haloperidol (20mg), thrice daily for the past one week. He developed rigidity, tremors of the skeletal muscles, mask-like face, shuffling gait and bradykinesia.

    a. What is the diagnosis?

    b. What drugs are used for correction of these effects?

    c. Name two other drugs responsible for such side effects. (1+2+2)

13. A 50 years old chronic alcoholic opted for de-addiction. He was hospitalized and was put on Disulfiram 500 mg per day. Ten days later he was allowed to visit his family where he attended a cocktail party.

    a. What signs and symptoms you expect in this patient?

    b. What is the underlying mechanism?

    c. Name two other drugs causing a similar reaction. (2+2+1)

14. Discuss the role of sumatriptan in the treatment of an acute attack of a migraine. Name two drugs used for prophylaxis of a migraine with rationale. (3X2)

15. Why can local anaesthetics not provide good analgesia in inflamed tissue? What are the common complications of spinal anaesthesia? (2 ½ + 2 ½)

16. What are the advantages of SSRI over TCAs? What are the therapeutic uses of SSRI? (2+3)

17. Explain second gas effect and its clinical implication with the help of a diagram. (5)

18. A patient with bipolar disorder was on Lithium for last one year. His mood was stable but presented with a complaint of weight gain and on examination, goitre was found. (3+2)

    a. What is the reason of developing goitre?

    b. What will be your future treatment strategy?

MODEL QUESTION PAPERS
PHARMACOLOGY
PAPER II

Time: 3 hours **Max. Marks: 100**

Answer all questions. Answer sections A & B in separate booklets.

SECTION A

1. A 50-year-old man presents with weight loss despite increased appetite. He has polyuria and polydipsia. His fasting blood glucose is 170 mg/dl and 2-hour postprandial glucose is 250mg/dl. (3+2+1+4=10)
   a. What is the drug of choice for this patient? Justify With Reasons.
   b. How is treatment initiated and titrated with this drug?
   c. If the patient was started on this drug, gradually titrated to a maximum dose and now fails to be controlled, how can therapy be modified to obtain a better control?
   d. Compare and contrast the mechanism of action of the drug of choice and the drug started later.

Write short notes/answers for the following: **(8X5=40)**

2. Explain the rationale for the following treatment strategies with glucocorticoids. Name a clinical condition where each of these strategies is employed. (2½ + 2½)
   a. Alternate day therapy
   b. Mega dose pulse therapy
3. Which drug/regimen is preferred over the other for the respective condition? Explain with reasons. (2½ + 2½)
   a. Streptokinase versus Alteplase as fibrinolytic for acute myocardial infarction.
   b. Enoxaparin versus unfractionated heparin for deep vein thrombosis.
4. Outline the pharmacotherapy of (2½ + 2½)
   a. Status asthmaticus
   b. Thyrotoxic crisis
5. Discuss one treatment regimen (with dose and duration) each for the following conditions:
   a. Emergency contraception (2½ + 2½)
   b. H. pylori infection
6. Explain the use of different drugs for the treatment of gastroesophageal reflux disease with the help of a diagram. (5)

7. What are the differences between Domperidone and Metoclopramide? Why has cisapride been banned from clinical use? (3+2)
8. Choose a right chelating agent for the following conditions with reason: (2½ + 2½)
   a. Transfusion siderosis in thalassemia patients
   b. Wilson's disease
9. Name the common immunosuppressants used in organ transplantation. What are the adverse effects of immunosuppressant therapy? (2+3)

SECTION B

1. A 36-year-old man weighing 50 kg presents with evening rise of temperature, cough with expectoration and weight loss for the past one month. Sputum microscopy reveals acid-fast bacilli and chest radiography shows cavitary lesions. (3+3+3+1=10)
   c. Explain the treatment for this patient according to the national programme.
   d. If this patient becomes a defaulter during therapy and later presents after one year how should he be treated?
   e. List three serious adverse effects of this therapy and mention ways to prevent/reduce each of them.
   f. Mention briefly the mechanism of action of one first-line agent for this disease.

Write short notes/answers for the following: **(8X5=40)**

2. Explain the pharmacotherapy for the following conditions
   a. Filariasis
   b. Visceral Leishmaniasis (2½ + 2½)
3. For each of the following patients, select the most appropriate antimicrobial for prophylaxis. Mention the dose and duration of treatment. (2½ + 2½)
   a. A 50-year-old man scheduled for abdominal surgery
   b. A person travelling to an endemic area for malaria
4. Which drug/ regimen is preferred over the other for the respective condition? Explain with reasons. (2½ + 2½)
   a. Albendazole versus Praziquantel for neurocysticercosis.
   b. Griseofulvin versus Fluconazole for candidiasis.
5. Explain the adverse effects that are common to most of the anticancer agents. Mention the ways to prevent/ reduce each of them. (2 ½ + 2 ½)

6. Explain the pharmacological rationale for
   a. Once a day aminoglycoside therapy
   b. Combining trimethoprim with sulphamethoxazole (2½+ 2½2)
7. Mention two serious adverse effects of the following drugs/group of drugs. Explain the ways to avoid/ reduce each adverse effect. (2½ + 2½)
   a. Fluoroquinolones
   b. Tetracyclines
8. Mention whether the following patients require chemotherapy. Wherever indicated mention the therapy. (2½+ 2½)
   a. A 40-year-old man suspected to have avian influenza
   b. A 50-year-old woman with herpes zoster for the past two days.
9. Which drug or group of drugs is preferred over the other for the respective condition? Explain with reasons. (2½ + 2½)
   a. Ampicillin versus amoxicillin for sinusitis
   b. Metronidazole versus vancomycin for pseudomembranous enterocolitis

FORENSIC MEDICINE & TOXICOLOGY

FORENSIC MEDICINE & TOXICOLOGY

GOAL

The teaching of forensic medicine & toxicology in under graduate aims at producing physicians who would understand their medicolegal responsibilities in the practice of medicine & uphold medical ethics in high regard. Also, they would acquire knowledge of laws related to medicine & its application in civil and criminal matters related to medico legal issues.

LEARNING OBJECTIVES

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

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

FORENSIC MEDICINE & TOXICOLOGY

THEORY

A. Forensic Pathology

1. Chapter: History of Forensic Medicine

Must Know

History, Definition of Forensic Medicine, Medical Jurisprudence, State Medicine,

Medical Ethics and Medical Etiquette.

Desirable to Know

Development of Forensic Medicine in India

2. Chapter: Indian Legal System

Must Know

Offences, Cognizable and non – cognizable offences, Criminal and Civil cases, Criminal Procedure Code, Courts in India and their Powers: Supreme Court, High Court, Sessions Court, Additional Sessions Court, Magistrate's Court. Inquest: definition, different types of inquest, procedures of police inquest, magistrate inquest, Summons, conduct money, Witness, Rules of giving evidence, Evidence – Oral and Documentary, Medical evidence, Medical certificates, Dying declaration, Dying deposition, Conduct of doctor in witness box.

Desirable to Know

Procedure of criminal trial, Perjury, Summon case, Warrant Case, Jury system, Jury trial, Corner's court, Corners inquest, Medical examiners system, Difficulties of detection of crime in India.

Nice to Know

Investigation of the scene of death

3. Chapter: Thanatology

Must Know

Autopsy type, Aim & objects of Medico legal autopsy, Rules of Medico legal autopsy, Visit to Scene of Crime, Contents of P.M report, Procedure of Conducting Post mortem examination, Skin Incision, Method of removal of organs (Virchow, Rokitansky, Lettulle, Ghon), Preservation of viscera, Obscure autopsy, Negative autopsy, Examination of skeletal remains, Autopsy instruments, Osteometric board.

Definition of death and it's types: Somatic & cellular, Modes of death, Manner of death: Natural and unnatural death, Gordon classification of death, Sudden Death, Suspended animation, Signs of death, Brain stem death, changes in skin, changes in the eyes, Muscular flaccidity, and Contact flattening, Cooling of the body (Algor Mortis), Post mortem caloricity, Post mortem staining, Fluidity of cadaveric blood, Cadaveric changes in muscle, Rigor mortis, Condition simulating rigor mortis (Heat stiffening, Cold stiffening), Cadaveric spasm, Putrefaction, Marbling of Skin, Gas stiffening, Adipocere formation, Mummification, Maceration, Putrefaction in water and burial, Estimation of time since death. Exhumation, Second Autopsy, Death certification

Desirable to Know

Morbid anatomy of Heart and it's blood supply, Types of occlusion, Sequelae of coronary occlusion, Post mortem demonstration of Myocardial infarction, Pulmonary embolism, Vagal Inhibition of sudden death, Agonal thrombi, Post mortem Clot, Psychological autopsy, Examination of mutilated bodies and fragmentary remains, Post mortem damage by predators, Entomology of the cadaver, Examination of Decomposed body, Examination of a deceased of AIDS, Criterial for Brain death certification, Process of preservation of dead body, Presumption of death and survivorship, Embalming.

Nice to Know

Cause of death as per international classification of diseases – WHO guidelines, Autopsy room photography, Autopsy and disposal of Radioactive corpse, National Human Right Commission's recommendation on autopsy,

4. Chapter: Violent Asphyxial Death

Must Know

Anoxia and it's types, pathophysiology of asphyxia, Signs & symptoms of Asphyxia, Medico legal interpretation of post mortem findings of in asphyxia deaths, hanging and strangulation: Definitions, types, causes of death, postmortem findings and medico legal aspects of death, examination and dispatch of ligature material, Hyoid bone & its fracture, sexual asphyxia, lynching, suffocation, smothering, overlaying, gagging, choking, Café Coronary, traumatic asphyxia, Burking, Bansdola, Mugging, Drowning: definition, types, pathophysiology, clinical features, post mortem findings and medico legal aspects, Diatoms test, Gettlers test.

Desirable to Know

Floatation of body in water, asphyxia Stigmata, burial alive, judicial hanging, positional asphyxia.

5. Chapter: Thermal Deaths & Electrocution, lightning

Must Know

Different classification of burns, rule of Nines, causes of death due to Burn, age of burn injuries, Autopsy findings, Medico legal aspects of death due to burns, antemortem and postmortem differentiation of burns, scalds and its medicolegal aspects, pathophysiology of Hypothermia, frost bite, trench foot, immersion foot, autopsy findings of death due to sun stroke, heat Exhaustion, heat cramp (Miners Cramp) Types of fatal electrocution, factors influencing effects of electricity, mechanism of death, autopsy findings in electrocution, Joule burns, Lightning.

Desirable to Know

Characters of burns produced by various agents, Legal provisions in relation to Dowry death, Autopsy findings in death due to cold, Judicial electrocution, Circumstances of lightening death.

Nice to Know

Neonatal cold injuries, Spontaneous combustion, Preternatural combustibility, Burns by Radioactive substances, Burns by X ray, Iatrogenic electrocution,

6. Chapter: Infanticide, Starvation and Neglect, Death associated with Surgery & Anesthesia, Custodial death

Must Know

Definition of Infanticide, feticide, still birth, dead born, live born, age of viability & its medico legal significance, signs of live birth & separate existence, proof of live birth, hydrostatic tests & its importance, other tests for separate existence, acts of commission & omission, development of fetus, Haase's Rule, autopsy findings in still birth, dead born, live born, Munchausen's syndrome by proxy, starvation & its medicolegal aspects.

Desirable to Know

Circumstance of death in starvation, malnutrition, infanticide related law, Abandoning of children and concealment of birth, Precipitate labour, Battered baby syndrome, Sudden infant death syndrome (SIDS), Cot death.

Nice to Know

Role of autopsy surgeon in custodial death & death on the OT table.

B. Clinical Forensic Medicine

7. Chapter: Identification

Must Know

Definition corpus delicti., Identification of living persons: race, age, sex, religion, complexion, stature, tattoo marks, identification of dead, unknown persons, intersex, sex chromatin, nuclear sexing, concealed sex, centre of ossification, importance of dentition in medico legal field, development of teeth & age estimation from it, bite mark, metopic Syndrome, age of adult, Medicolegal importance of age, Bertillon system, , lip prints, hair & fiber, anthropometry, dactylography, footprints, scars, poroscopy

Desirable to Know

Deoxyribonucleic acid (DNA) fingerprinting, Superimposition, Medico legal information from blood.

Nice to Know

Symphyseal surface in estimating age, forensic odontology, animal bite marks.

8. Chapter: of the injured and the injuries

Must Know

Definition: Wound, injury, assault, battery, hurt, Simple hurt, Grievous hurt, Dangerous injury, Homicide, Dowry death, classification of injury, mechanism of production of mechanical injuries, differences between antemortem and post mortem wounds, wound healing, Important sections of the Indian Penal Code relating to offences against the human body, Abrasion and it's type, Fate of abrasion, Medico legal aspects of abrasion, Bruise (contusion)

and factors influencing the production, Migratory and ectopic bruise, fate of bruise, patterned bruising, Differentiation between antemortem and post mortem bruising, Medico legal aspect of bruising, Lacerated Wound and its type, Incised looking wound, Features of laceration, Differences between antemortem and post mortem laceration, Incised/cut/ slice wound, Features of incised wound, Bevelled cuts, Hesitation Cuts, Defense Wound, Chopping wound, Types and features of Stab wound, Factors influencing size, shape and configuration of stab wound, Cut throat wound, Immediate or direct causes of Death, Firearm: Types, parts of cartridge and their functions, Gun powder, Mechanism of bullet wound production, characters of wound produced by Rifled and smooth – bored firearms, Exit wounds by rifled and smooth bored weapons, Direction of fire, Autopsy in firearm fatalities, Suicide, accident or homicide, Mechanism of production of injuries by bomb blast, Autopsy in explosion fatalities, Medico legal considerations in explosion injuries, Injuries of the Scalp including forensic anatomy of the scalp, Fracture of the skull including forensic anatomy of the skull, Mechanism of production of Skull fracture, Intracranial hemorrhages, Mechanism of production of cerebral injuries, Medico legal aspect of Coup and Countercoup injuries, Concussion of Brain, Spinal injuries with their medicolegal aspects, Mechanism of vehicular accident, Pattern of injuries to the Driver, Front seat occupant and rear seat occupant of Motor car, pattern of injuries to the pedestrians, motor cycle and pedal cyclist.

Desirable to Know

Forensic anatomy of skin, wounds by glass, fractures of bones and dislocation of joints, unusual circumstances in firearm injuries, various tests for firearm residues, head injuries in boxer, injuries of face, neck, abdomen, extremities and genitals, fabricated and self-inflicted wound.

Nice to Know

Aircraft and railway injuries, relationship of disease with trauma, work and crime, weapon: its medicolegal importance, use and abuses

9. Chapter: Medicolegal aspects of sex and sex related offence

Must Know

General consideration, Male genitalia, Female external genitalia, Impotence, Sterility, Frigidity, Examination of a person towards determination of his sexual capacity, Sterilization, Artificial insemination, Surrogate mother, Virginity and Defloration, Pregnancy, Delivery, Legitimacy, Paternity, Atavism, Superfecundation, Superfoetaion, Sexual offence, Rape, Proposed amendment to law relating Sexual offences including Rape and related provision, Examination of Victim of Rape, Examination of the accused of rape, Incest, Unnatural sexual Crimes, Paraphilias, Sodomy: Examination of Passive agent, Examination of active agent, Buccal coitus, Tribadism, Bestiality, Sexual perversion, Abortion, MTP act, Criminal Abortion, Doctors duty in a case of criminal abortion.

Desirable to Know

Seminal fluid examination, Semen bank, Test tube baby,

Nice to Know

Rape by a female on male, Social bearing of male homosexuality,

C. Medical Jurisprudence (legal aspects of medical practice)

10. Chapter: Medical Ethics and Law

Must Know

State medicine, Medical council of India, Declaration of Geneva, Charka's oath, Hippocratic oath, State medical council, Duties of Medical practitioner to his patient, Professional Secrecy, Privileged communication, Duties of Medical practitioner towards one another, Duties of patient towards fellow physician, Professional misconduct, Professional Negligence, Doctrine of Res Ipsa Loquitur, Doctrine of common Knowledge, Precaution against charge of negligence, Contributory Negligence, Product Liability, Novus Actus interveniens, Medical Maloccurance, Therapeutic Misadventure, Ethical Malpraxis, Consent, Type of consent, Rule of Informed consent, Therapeutic privilege, Vicarious liability.

Desirable to Know

Euthanasia, Medical Records, Transplantation of Human organ act, Consumer protection act. IPC related to medical practice, Prenatal Diagnostic Technique act.

Nice to Know

Composite negligence, Corporate negligence, Defensive Medicine, ESI act, Workmen's Compensation act, Protection of Human Right act, Malingering, Medical Indemnity Insurance, Human Experimentation, Biomedical Waste Rules, NHRC and Doctor, Doctor and Media, Ethics related to HIV patients.

D. Forensic Psychiatry

11. Chapter: Forensic Psychiatry

Must Know

Definition of Forensic Psychiatry, Various terms in the mental health act, Signs and Symptoms of Mental Diseases with their medico legal importance, Delusion: definition and types, medicolegal importance, Hallucination, Illusion, Phobia, Obsession, Impulse, Mania, Delirium, Somnambulism, Bulimia, Anorexia nervosa, Mental retardation, Psychosis, Neurosis, Classification of mental disorder, Diagnosis of Insanity, Differences between True & Feigned insanity, Psychopath, Lucid interval, Dementia, Restrain of Mentally ill, Civil & Criminal responsibility of the mentally ill, Testamentary capacity, Mc Naughten Rule, Section 84 IPC,

Desirable to Know

Drugs induced Psychosis, Automatism, Somnolentia.

Nice to Know

Association of Cerebral tumor, pregnancy, and epilepsy with psychosis, Durham rule, Curren's rule, American Law Institute rule.

E. Forensic Science laboratory (FSL)

Must Know

Definition of DNA fingerprinting, Application of DNA profiling in Forensic Medicine, Locard's exchange principle, Hazards of blood transfusion.

Desirable to Know

Examination, preservation, identification of blood and its medicolegal aspects, Saliva, Vaginal swab, Examination of skin, nail, tooth pulp,

Nice to Know

Technique of DNA fingerprinting, Polygraph, Narcoanalysis, Hypnosis, Word association, Brain mapping (Brain fingerprinting)

F. Toxicology

1. Chapter: General Toxicology

Must Know

Forensic toxicology, define poison, Ideal Homicidal Poison, Ideal suicidal poison, Cattle poison, Arrow poison, Abortifacient, Domestic household poison, Classification of poison, Route of administration of poisons, Action of Poison, Factors modifying the action of poison, Fate of poison in the body, Elimination of poison in the body, Diagnosis of poisoning, Diagnosis of Chronic poisoning, Legal duties in case of poisoning, General principle of management of poisoning, Emetics, Procedure of Gastric lavage, Antidote: Physical, chemical, physiological antidote, chelating agent, universal antidote, medico legal autopsy in case of poisoning, preservation and dispatch of routine viscera in chemical analysis.

Desirable to Know

History of toxicology from ancient times, a view point about the poisoner, sale of poison in India, Indian Penal Code and Poison, The opium Act- 1857, The opium Act- 1878, The dangerous drug act - 1930, NDPS act – 1985

2. Chapter: Corrosive poisons

Must Know

Classification and mechanism of action, Sources, properties, mechanism of action, fatal dose and fatal period, clinical features and management of Sulphuric acid, Nitric acid and Hydrochloric acid poisoning, Post mortem appearance and medico legal aspects in such cases, Vitriolage, Sources, properties, mechanism of action, fatal dose and fatal period, clinical features and management of Carbolic acid, Oxalic acid poisoning, Post mortem appearance, Phenol Marasmus

Desirable to Know

Formic acid, Boric acid, Detergent or Chemical suicide, Caustic alkalis, Lye, Miniature(Button) batteries, Ammoniacal vapour, Chemical Burn.

3. Chapter: Inorganic Irritant poisons

Must Know

Phosphorus: varieties, mechanism of action, clinical features and management of poisoning, post mortem appearance and medico legal aspects of the poisoning.

Arsenic: Different poisonous compound of arsenic, mechanism of action, metabolism, clinical features, fatal dose, fatal period, diagnosis, and management, postmortem appearance, medicolegal importance. Difference between Arsenic poison and cholera.

Mercury: Action, Poisonous compounds, Clinical features of acute mercury poisoning, fatal dose, fatal period, management of mercury poisoning, postmortem appearance, Hydrargyrism (chronic mercury poisoning), Acrodynia or pink disease, Minimata disease.

Lead: Action, Poisonous compounds, Clinical features of acute lead poisoning, fatal dose, fatal period, management of lead poisoning, postmortem appearance, Chronic lead poisoning (plumbism; saturnism)

Desirable to Know

Copper; Poisonous compounds, sign and symptoms, fatal dose, fatal period, management of copper poisoning and post mortem appearance, Chronic poisoning of copper. Iron; Poisonous compounds, sign and symptoms, fatal dose, fatal period, management of Iron poisoning and post mortem appearance, Metal fume fever.

Nice to Know

Iodine, Chlorine, Powdered glass, Thallium; Poisonous compounds, sign and symptoms, fatal dose, fatal period, management of Iron poisoning and post mortem appearance. Manganese, Potassium permanganate, Barium, Antimony, Nickel, Cadmium (Ouch – Ouch disease)

4. Chapter: Organic Irritant poisons

Must Know

Active principle(s), clinical features, fatal dose and fatal period and medico legal aspects of: Ricinus communis, Croton tiglium, Abrus precatorius, Semecarpus anacardium, Calotropis,

Epidemiology, anatomy/ identification of poisonous snake and non-poisonous snakes, composition of the venom, classification of poisonous snakes, clinical features and management of snake bite, Post mortem appearance and medico legal aspect of snake bite.

Desirable to Know

Capsicum, Ergot, Scorpion, Spider

Nice to Know

Plumbago rosea and Zeylanica, Claviceps purpurea, Bees and Wasps, Centipedes, lizards, Ants, Cantharides (Spanish fly)

5. Chapter: Agrochemical poisons

Must Know

Classification, sources, properties, mechanism of action, clinical features, diagnosis, and management of organophosphorus poisoning, postmortem appearance and medicolegal aspects of the same, Carbamate poisoning.

Desirable to Know

Medicolegal aspects of organochlorine compounds like DDT, Endrin (plant penicillin), Sources and clinical features and management of Paraquat poisoning, Rodenticides like aluminum phosphide (fumigants), zinc phosphide,

Nice to Know

Chlorophenoxyacetate (plant hormone), Chlorate (weed killer), Pyrethrins & pyrethroids, Dinitro compounds, Fluoride.

6. Chapter: CNS depressant poisons

Must Know

Alcohol, types and various concentration, Consumption, absorption, elimination, with medicolegal interpretation, Stages of alcoholic intoxication, fatal dose, fatal period, Alcholic withdrawal syndrome, Drunkenness, Ethanol and vehicular accident, Breath analyzer, Ethanol & crime, Widmark's formula, collection and preservation of sample, alcoholism and drug dependency, Methanol: source, mechanism of action, clinical features, management, fatal dose and fatal period, postmortem appearance, medicolegal aspects. Hazards of alcohol, Opium & opioids, Sources, properties, preparation, mechanism of action, metabolism, clinical features, postmortem appearance, medicolegal aspects.

Desirable to Know

Barbiturate poisoning, Heroin, kerosene poisoning,

Nice to Know

Ethylene glycol, Isopropanal, Chloroform, Ether, Pethidine, Methadone, Fentanyl, Methaquolone, Chloral hydrate, Bromides, Paraldehyde, Turpentine, Naphthalene.

7. Chapter: Psychotropic Drugs

Desirable to Know

Psychoactive drug classification, Antidepressant, methamphetamine, cyclic antidepressant, monoamine oxidase inhibitors, Benzodiazepine, Hallucinogens (LSD, Phencyclidine)

8. Chapter: Deliriant poison

Must Know

Types, active principles, mechanism of action, clinical features, fatal dose, fatal period, management of Dhatura poisoning. Alkaloids, Road poison, Different preparation of Cannabis, symptoms of intoxication, fatal dose, fatal period, management of cannabis poisoning, features of chronic cannabis poisoning, Run amok,

Desirable to Know

Cocaine: mechanism of action, signs & symptoms, management of cocaine poisoning, post mortem appearance, Cocaine habit, Magnan's symptoms.

9. Chapter: Drug dependence and abuse

Must Know

Method of abuse, hazards of drug abuse, Designer drug, Drug dependence, symptoms of drug dependences, management and rehabilitation, Types of dependences, Body packer syndrome (Surgical mules), Body stuffer syndrome.

Desirable to Know

Cotton fever, Drug abuser's elbow, volatile substance abuse, Huffing, bagging, Sniffing, Investigation of drug abuse death, Autopsy findings in such deaths, Turkey skin,

Nice to Know

Toxicologic radiology (Radio opaque poison, Drug abuser)

10. Chapter: Spinal poison

Must Know

Sources, active principle, Mechanism of action, clinical features, fatal dose, and fatal period, management of Strychnine poisoning.

Desirable to Know

Sources, active principle, Mechanism of action, clinical features, fatal dose, and fatal period, management of peripheral nerve poison, Conium Maculatum (Hemlock)

11. Chapter: Cardiac poison

Must Know

Oleander, Aconite, Nicotine, - Sources, active principle, clinical features, management, fatal dose, fatal period, medicolegal aspects

Desirable to Know

Sources, active principle, clinical features, management, fatal dose, fatal period, medicolegal aspects of cerbera odallam, Quinine, Cleistanthus collinus

12. Chapter: Asphyxiant

Must Know

Hydrocyanic acid and its salt, Sources, mechanism of action, clinical features, fatal dose and fatal period, diagnosis and management of poisoning, postmortem appearance and medico legal aspects. Carbon monoxide poisoning: clinical features, management, post mortem appearance and medico legal aspects, War gases, Biological warfare

Desirable to Know

Carbon dioxide, Hydrogen sulphide, Sulphur dioxide, Methane, Methyl isocyanate,

13. Chapter: Food poisoning

Nice to Know

Food poisoning, details of bacterial food poisoning, Botulism, Poisonous food (Lathyrus Sativus, Mushrooms, Argemone Mexicana), Fish and Marine animal

14. Chapter: Miscellaneous poisoning

Nice to Know

Acetyl salicylic acid, paracetamol, water intoxication, Insulin, NSAID, Antihistaminic, Sulphonamides, Formaldehyde, Carbon tetrachloride.

PRACTICALS

1. Demonstration of ten medicolegal autopsies (RTA, Assault, Hanging, Drowning, Poisoning, Infanticide, Burn, Dowry death, Electrocution, Lightening, Snake bite)
2. Age estimation from bones, X-rays and dentition.
3. Injuries and weapons.
4. Examination of intoxicated persons (Drunkenness Certificate).
5. Examination of victim and accused in sexual offences.
6. Specimens of poisons.

Practical Skills

1. Examine and prepare proper certificates in the following medicolegal situations:
   a.Injured patient.
   b.Sexual offences.
   c.Determination of age.
   d.Intoxicated patient.
2. Prepare proper certificates of birth and death.

3. Prepare dying declaration.
4. Give evidence in a court of law as an expert witness.
5. Collect and do proper labeling, preservation and dispatch of medicolegal specimens.
6. Witness, record the findings and issue a report for a medicolegal autopsy.
7. Diagnose and manage common acute and chronic poisonings.

Pratical Exercises

1. Medicolegal autopsies: Witnessing and recording (10 cases)
2. Age estimation of an individual by physical, dental and radiological examination.
3. Examination of skeletal remains.
4. Study of:
   a. Lethal weapons.
   b. Wet specimens/models/photography/microslides like sperm, diatoms, hairs, human and animal RBCs.
   c. Poisons.
5. Medical certificates/medicolegal reports, physical fitness, sickness and death certificates, injury report, drunkenness, sexual offences.
6. Students should be taken to courts whenever possible to acquaint themselves with the court proceedings.

Suggested topics for integrated teaching

1.	Death and Brain stem death	(With Anesthesia department)
2.	Organ transplant	(With Surgical disciplines)
3.	Snake & Scorpion bite	(With Medicines)
4.	Child abuse	(With Pediatrics)
5.	Drug abuse and substance abuse	(With Psychiatric department)
6.	Criminal abortion and MTP act	(With O&G department)
7.	Organophosphorus poisoning	(With Pharmacology and Medicine department)
8.	Sudden death	(With Pathology department)

Teaching Learning Methods:

Didactic lecture, Structured interactive sessions, Small group discussion, Problem based exercises, seminar by student, Video clips, Written case scenario, Self-learning tools, demonstration, practical

Learning Resource materials

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

Suggested books

1. Dr.K.S.N.Reddy- The essential of Forensic Medicine & Toxicology 34thEdition 2017. Published by-K.Saguna Devi, H,No. 16-11-15/2/2, Saleem Nagar Colony, No.1, Malapet, Hyderabad-500036.
2. Modi's Textbook of Medical Jurisprudence and toxicology- Edited by BV Subramanyam, Butterworths India, New Delhi.25th edition, 2016.
3. Dr. C.K.Parikh- A text book of Medical Jurisprundence, Forensic Medicine & Toxicology, CBS Publishers, Delhi, Seventh Edition, 2016.
4. Dr. Apurba Nandy- Principles of Forensic Medicine,2013, New Central Book Agency (P) ltd. Calcutta.
5. Dr. KrishanVij- Text book of Forensic Medicine & Toxicology- Principles and Practice, BI Churchill Livingston, New Delhi, 6th edition, 2014.
6. V.V. Pillay. Text book of Forensic Medicine and Toxicology . 18th Edition, Paras Medical Publishing, Hyderabad, 2017.
7. Putul Mahanta. Modern Textbook of Forensic Medicine & Toxicology, Jaypee Publisher, 1st Ed, 2014

Reference Books:

1. Knight's Forensic Pathology, 4th Edition, 2016, Edited by Pekka Saukko and Bernard Knight, Arnold Publication, London, Co-published by Oxford Publications, USA

Method of Assessment:

By internal assessment and evaluation

Internal assessment: (1) By periodic test one at the end of each term(3rd, 4th and one pre-final test) (2) By seminars, group activity/assignments, (3) Practical tests and viva voce one at the end of each term(3rd, 4th and one pre-final test)

Evaluation: At the end of 5th semester of MBBS, one theory paper with two sections (Sec. A & B, each of 50 totaling to 100 marks) and one practical examination (80 marks with viva voce (20 marks).

OSPE's (Any Seven of the following exercises, 10 marks each)

1. Medico-legal report writing in Injury case
2. Medico-legal report writing in Age determination case

3. Examination of a case of Drunkenness and prepare a Medico-legal report
4. Examination of Accused and Potency certification in a case of sexual assault /Examination of the Victim in a case of sexual assault.
5. Examination and report of bones
6. Age determination from X-ray with reasons.
7. Age determination from dental examination.
8. Medical certification of cause of death.
9. Interpretation of the autopsy reports.
10. Interpretation of age of the fetus
11. Weapon examination and medico-legal report writing
12. Wet specimen examination
13. Examination of a case of simulated poisoning case.
14. Breaking of death or bad news to the patient and relative
15. Informed consent for Major surgery and blood transfusion

Short OSPE'S / Spotter (10 marks)

1. Wet specimen
2. Weapon.
3. Photograph/Image
4. Poison.
5. Appliance/Autopsy instrument
6. Summon/ Medical certificate/ Medico-legal report.
7. Viscera Packing.
8. Interpretation of the age of foetus
9. Slides

Internal assessment:

1. By periodic test one at the end of each term (3rd, 4th & pre-final test)
2. Practical tests and viva voce one at the end of each term (3rd, 4th pre-final test)

EXAMINATION SCHEDULE AND DISTRIBUTION OF MARKS

Total Marks- 200 Theory-100 Practical-100

For Internal assessment examination is held three times ordinarily in following dates-

a. IIIrd End Semester Examination

b. IVth End-semester Exam

c. Vth End-semester(Pre-final) Exam.

Marks distribution for each semester exam –Theory: 50 marks & Practical: 50 marks

Marks distribution for IInd Professional Final Exam.

Total	Theory	Practical + Viva voce
200	100	80+20=100

Theory paper consists of two sections– Sec. A & B

A. Forensic Medicine 50 marks

B. Toxicology 50 marks

Both sections have to be answered on separate sheet

Suggested pattern and marking for paper of 100 marks

Section	Question	Pattern of Question	Number of question	Marks	Time
Sec. A	1	Structure long answered question(LAQ	01	01 x 10=10	03 Hours
	2	Short answeres question (SAQ)	08	8 x 5 each=40	
Sec. B	3	Structure long answered question(LAQ)	01	01 x 10=10	
	4	Short answeres question (SAQ)	08	8 x 5 each=40	
Total				100 marks	03 hours

Passing:

A candidate must obtain 50 percent aggregate with 50 percent theory and 50 percent in practical +Viva. If a candidate fails either in theory or in practical Examination of a subject he / she will be declared failed in that subject and he / she will have to appear for theory and practical Examination again.

MODEL QUESTION PAPER

FORENSIC MEDICINE & TOXICOLOGY

Time: 3 hours **Max. Marks: 100**

INSTRUCTIONS

1. *Use blue/black ball pointpen*
2. *All questions are compulsory*
3. *The number to the right indicates marks*
4. *Draw diagram wherever necessary*
5. *Answered each section in the respective answer book only. Answer written in the inappropriate sectional answer book will not be assessed in any case.*
6. *Do not write anything on the blank portion of the question paper. If written anything, such type of act considered as attempt to resort to unfair means.*

SECTION A

1. An unmarried female student of age about 19 years is brought to the casualty around 5 pm by her friends with complaints of severe pain abdomen and bleeding per vagina. As per her history, she had undergone treatment by a quack doctor in the forenoon for missed period of 45 days. (4+4+2=10)

   a. Write duties of Doctor in this case keeping in mind the responsibilities towards the investigating agencies.

   b. Mention signs suggestive of recent abortion

   c. Enumerate four immediate causes of death due to criminal abortion

2. Write short notes on: (8x5 = 40 Marks)

   a. Blanket consent is invalid in the eyes of law. Explain with reasons.

   b. Explain how Post-mortem lividity is helpful to determine the cause of death.

   c. Mention why medico-legally bruise is less valuable than abrasion.

   d. Differentiate between entry wound and exit wound in rifled firearm.

   e. Chloride level of right chamber of heart declines in fresh water drowning. Explain why?

   f. Write various external injuries found in Battered baby syndrome.

   g. Define Professional negligence and explain ingredients of it. (2+3)

   h. Classify Sexual offences. Enumerate materials to be collected as evidence from a rape victim.

SECTION B

3. A person was found in disoriented condition in a train at Bhubaneswar Railway station. On enquiry, he told that he was given cream biscuits to eat by a co-passenger following which he became drowsy and lost all his belongings. (1+3+2+4=10)

   a. What could be the name & nature of poison?

   b. Mention its signs and symptoms.

   c. How will you manage this case?

   d. Write the legal duties and responsibilities of the CMO in this case?

4. Write short notes on: (8X5 = 40)

   a. Mention five contraindications of Gastric lavage with reasons.

   b. Mention disadvantages of decline of RBC Cholinesterase level in diagnosis of Organophosphate poisoning.

   c. Write the mechanism of action and treatment of cyanide poisoning

   d. Write how drunkenness affects driving?

   e. Write the differentiating features in autopsy findings between Viper and cobra bite in case of person survived for two days

   f. Differentiate between Strychnine poisoning and Tetanus

   g. Mention five common sources of Lead poisoning. Write haematological changes in Chronic lead poisoning. (2½ +2½)

   h. Mention external Autopsy findings in drug abuse death.

COMMUNITY MEDICINE

COMMUNITY MEDICINE

GOAL:

The broad goal of teaching Community Medicine is to prepare the students to function effectively as a community physician and provide comprehensive care to individuals, families and communities through organized health care.

OBJECTIVES:

2.1 Cognitive Domain

2.1.1. Identify various concepts of health & diseases and levels of prevention for health-related events and conditions.

2.1.2. Compare various epidemiological methods and their application in rational decision making.

2.1.3. Identify appropriate biostatistics methods and apply it to make inference in health and medicine in respect to hospital and community data.

2.1.4. Describe the demography pattern of the country and its relation to health and identify sources of vital statistics.

2.1.5. Identify the role of environment and occupation in health and disease

2.1.6. Recognize the health problems of general population and special groups.

2.1.7. Compare and contrast the health care delivery system in India including organization and function at each level of care

2.2. Psychomotor Domain

2.2.1. Elicit the clinic-social history and conduct examination for diagnosis and treatment at individual level and to identify factors determining health of individual and family.

2.2.2. 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 prevailing socio-cultural beliefs.

2.2.3. Diagnose and manage common nutritional problems at the individual and community level and conduct nutritional assessment surveys.

2.2.4. Collect, analyze, interpret and present simple community and hospital-based data.

2.2.5. Conduct environmental assessment of defined community and relate them with prevailing morbidity and mortality.

2.3. Affective Domain

2.3.1. Formulate and implement health communication and health education programme

for common diseases and specific population groups using appropriate tools and technologies.

2.3.2. Interact effectively with other members of the health care team and participate in the organization of health care services and implementation of national health programs.

2.3.3. Plan strategies for prevention and control of diseases in the paradigm of national health programs applying principles of health management.

3. Course Content:

3.1. General concepts in Public Health, Community Medicine and Family Medicine

3.2. Principles and Practices of Health Promotion

3.3. Epidemiology, Biostatistics and Research Methodology

3.4. Demography and Population Health

3.5. Public Health Nutrition

3.6. Environment and Occupational Health including disaster management.

3.7. Health Care Delivery Systems in India, Health Planning and Management Including Health Policies, International Health.

3.8. Health Care Delivery for Specific Population Groups: Reproductive Health, Child Health, Adolescent Health, Geriatric Health, Tribal Health, Urban Poor, Migrants, People with Disability groups including related National Health Programs.

3.9. Communicable Diseases including related National Health Programs.

3.10. Non-Communicable Diseases including related National Health Programs

3.11. Family Medicine

3.1. General concepts in Public Health, Community Medicine and Family Medicine

Must Know

- Concept and definitions of health
- Dimensions and determinants and indicators of health
- Concept and definitions of disease including epidemiological tetrad, Concept of disease prevention, including level of prevention and control
- History of medicine and evolution of public health
- Concept of social medicine, social epidemiology and common social problems
- Investigation of an epidemic and control measures
- Differences and similarities in public health, community medicine and clinical medicine

- Concept of wellbeing and spectrum of health
- Quality of life indices
- Need, principles 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.

Expected Skills

- Able to link with social model of disease causation beyond medical model of disease
- Should be able to investigate an epidemic and apply prevention and control measures
- Evaluation of a screening programme

3.2. Principles and Practices of Health Promotion

Must know

- Types and barriers of communication,
- Different methods used for health education
- Interview techniques
- Steps of counseling
- Role of humanities in community medicine
- Communication
- Principles of sociology in health promotion
- Approaches to health education

Expected Skills

- Should be able to communicate with family members at home and patients at clinic or at homes
- Should be able to elicit the tetrad of disease in family visits
- To organize and actively engage in community care program focusing on health promotion and maintaining health

3.3. Epidemiology, Biostatistics and Research Methodology

Must know

- Use of basic epidemiological tools to make a community diagnosis of the health situation 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.
- Know about the measures of association and criteria of causality.
- Use of biostatistics, type of data, normal distribution, measures of central tendency and measure of depression,
- Interpretation of tests of significance, standard errors t teat and chi square tests, types of errors
- Formulating hypothesis and research questions
- Study designs & its utility for finding answers for research question
- Sampling techniques, sample size calculation
- Data Collection Techniques: Qualitative or quantitative methods
- Preparation of protocol for research
- Use of reference management softwares

Desirable to Know

- 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.

Nice to know

- Spearman's and Pearson's correlation coefficient, ANOVA
- Systematic review techniques.
- Other nonparametric tests of significance, survival analysis

Expected Skills:

- Use epidemiology as a scientific tool to make rational decisions relevant to the community and individual patient intervention.
- Collect, analyze, interpret and present simple community and hospital-based data.
- Interpret the indicators of morbidity, mortality measurement and vital 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.

3.4. Demography and Population Health

Must know

- Demography cycles
- Sex ratio and Population pyramid
- Fertility related statistics
- Contraceptive methods
- Surveillance
- Community-based monitoring
- Social audit

Desirable to know

- Demography indicators
- National population policy

Nice to know

- Dependency ratio
- Newer contraceptive methods

Expected Skills:

- Calculate and interpret indicators related to demography

3.5. Public Health Nutrition

Must know

- Macro and micro nutrients- physiological functions, dietary sources
- Recommended Dietary Allowances or Intake age per age, sex and activity
- Classification of Major Food and their Nutritive value
- Nutritional Assessment of Individual, family and community- Diet Survey
- Plan and recommended suitable diet for individual, family and community as per economic status and availability of local food
- Clinical diagnosis deficiencies - Vitamin A deficiency, Iodine deficiency disorder, nutritional Anaemia, protein energy Malnutrition

- Social and cultural practices in nutrition and health
- Nutritional Programme including ICDS
- Nutritional Requirement of special groups
- Food Hygiene
- Junk food and Food Toxicants
- Food adulteration and Prevention of food adulteration act
- Food fortification
- Food processing additives

Desirable to know

- National Nutrition Policy
- Nutritional Rehabilitation
- Nutritional rehabilitation Centre

Nice to know

- Slaughter House sanitation
- Nutrition in special situation-disasters, fairs

Expected Skills:

- Nutritive values of common Indian foods
- Nutritional assessment of Individual, family and community
- Plan diet for Male, female, Pregnant Lady, Diabetic patient, Obese patient etc
- Dietary survey and calculation
- Identification of common nutritional problems and their prevention and control

3.6. Environment and Occupational Health including disaster management

Must know

- 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.
- 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- 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.
- Identification of Hazards of occupational environment -physical, chemical and biological hazards
- Occupational Diseases - Pneumoconiosis, silicosis, anthracosis, etc. lead poisoning
- Occupational cancers
- Occupational dermatitis
- Radiation Hazards
- Prevention and control of occupational diseases
- Employee State Insurance schemes and Act and Factory Act
- Concepts of Ergonomics
- Health protection of workers
- Sickness absenteeism
- Social security of workers
- Types of disaster and Disaster cycle
- Natural and man-made disasters
- Health Hazard of Disaster
- Disaster Preparedness
- Disaster Mitigation and Management and its application

Desirable to know

- Steps of management of a case of insecticide toxicity
- Conservation and preservation of forests
- Disaster in India and work of agencies to mitigate impact

Expected Skills:

- Conduct environmental assessment of the family and community
- Assessment of air quality and noise pollution

- Assessing the quality of water
- Procedure of household level and medium scale water purification
- Steps of water treatment procedure,
- Techniques of waste disposal
- Water quality assessment
- Steps of biomedical waste
- Entomology: studying characteristics of important vectors
- Identification of common occupational hazards
- Measures to prevent and control the occupational hazards
- Learn the steps in disaster management

3.7. Health Care Delivery Systems in India, Health Planning and Management Including Health Policies, International Health.

Must know

- 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 Insurance; (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 recommendation of different health committees such as Bhore, Mudalair etc
- 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 Centre, rural health center and subcentre.
- The job descriptions of health supervisor (male and female); health workers; village health guide; ASHA, 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.
- Appreciate the role of national, international voluntary agencies in health care delivery
- Millennium and Sustainable Development Goals

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

Desirable to know

- Health system research,
- Operational research

Expected Skills:

- Be an effective team leader and motivator. Guide and train workers. Supervision of workers and program.
- 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 Program

3.8. Health Care Delivery for Specific Population Groups: Reproductive Health, Child Health, Adolescent Health, Geriatric Health, Tribal Health, Urban Poor, Migrants, People with Disability groups including related National Health Programs

Must Know

- Integrated Child Development Services Scheme
- Reproductive, maternal, neonatal, child health plus adolescent
- India Newborn Action Plan
- National Health Mission
- Integrated Management of Neonatal and Childhood illnesses,
- Rashtriya Bal Suraksha Karyakram,
- Rashtriya Kishori Shakti Karyakram,
- Perinatal, Neonatal, Infant - Mortality Rate
- Adolescent health,
- Feeding of infant, growth and development,
- Indicators of MCH care,
- School Health and Programs
- Geriatric Health and their Programs

- Tribal Health-role of Mobile Medical Unit (MMU)
- Evidence based potential innovations and solutions in healthcare

Desirable to know

- Juvenile delinquency
- Participation of the teachers in the school health program
- Including maintenance of records; defining healthful practices; early detection of abnormalities.

Nice to know

- National policy for children

Expected Skills:

- Able to enumerate different MCH activities, goals, objectives and strategies in national health programs
- Diagnose and treat according to standard and relevant guidelines
- Growth monitoring by different anthropometric indicators using MUAC tape, Salter scale etc. and plotting growth chart
- Enumerate causes and measures for reduction of MMR, IMR, U5MR
- Demonstrate counselling skills including risk assessments in ANC clinics etc. for e.g. hematological diseases, RH incompatibility and Preventive Oncology clinic at AIIMS
- Able to advice proper type of Contraceptive methods to the clients
- Identify common health problems among the school children, to arrange for regular medical examination of school children
- Identification of common geriatric health problems and their prevention and control

3.9. Communicable Diseases including National Health Programs

Must know

- Epidemiology of Communicable diseases (Respiratory, Intestinal, Arthopod-borne Infection and Zoonoses, surface infections and Emerging and Reemerging disease, including hospital acquired infection and their prevention and control with their National Programs
- Parasitic diseases
- Antimicrobial Resistance strategies
- Link between veterinary health and human health

Expected Skills:

- Eliciting clinic - social history and examining the patient for diagnosis and treatment in relation with Communicable disease
- Collection of appropriate material for microbiological, tests for locally prevalent health conditions.
- Use of appropriate method as per diagnostic tool for the diseases
- Take necessary steps in disease outbreak/ epidemics/ investigation of epidemic, notification.
- Knowledge on epidemiology in health and disease and their prevention and control
- Should be able to list goals, objectives and strategies in national health programs

3.10. Non-Communicable Diseases including National Health Programs

Must know

- Epidemiology of Cardiovascular and coronary heart diseases, Hypertension, stroke, Diabetes and Obesity, Rheumatic heart diseases, blindness and Cancers and Road Traffic Accident and Injuries, there prevention and control with their National programs
- Mental Health and National Mental Health Program
- Synergies for beating NCDs and promoting mental health and well-being

Expected Skills:

- Eliciting clinic - social history and examining the patient for diagnosis and treatment in relation with Non-Communicable disease
- Risk assessments and Risk Predication of common NCDs

3.11. Family Medicine

Must know

- Treatment of common medical disease and emergencies
- Communication skills for Indian family practitioner
- Use of behavioral sciences related to family practice
- Patient management in family practice including home visits
- Solving patient problems within a particular socio-cultural setting, harnessing available community services.

Desirable to know

- Domiciliary care
- Setting up a family practice
- Research in Family Practice

Nice to know

- Newer aspects in Family Medicine
- Family Practice- Changing Scenario

Expected Skills:

- Effective management of common diseases within the limited resources
- Early Identification of common medical emergencies and their appropriate referral

4. Teaching Plan

4.1 Early community health Exposure

Teaching learning methods will include workshop and group discussions, field visits, health camps in community and school, group presentation by students etc.

Session	Domain	Topic
1.	➢ Concept of health and disease ➢ Health priorities in India ➢ Public health approach vs Clinical approach	• Introduction to basic concepts of health and disease • Introduction to Community Medicine and Family Medicine • Workshop /Group discussion to discuss the health problems of India
2.		• Classic success stories in public health • Smallpox eradication • Cholera control (John snow) etc • Difference and similarities in public health approach and clinical approach • Determinants of health
3.	➢ Health Facility visit	• Visit to District Hospital
4.		• Visit to Community Health Centre (CHC)
5.		• Visit to Primary Health Centre (PHC)
6.	➢ Health Facility visit	• Visit to Subcenter (SC) and interaction with MPW (M/F)
7.		• Report submission, presentation and discussion

8.	➢ Health Care Services at Community Level ➢ Interaction with Community Health Workers (CHWs) and other stakeholders associated with Health ➢ Health Camp ➢ School Health	• Interaction with Accredited Social Health Activist (ASHA) • Observation of Village Health and Nutrition Day (VHND) session
9.		• Visit to Anganwadi Centre (AWC) and interaction with Anganwadi Workers (AWW)
10.		• Meeting with various stakeholders of Gram Panchayat • Concept of Panchayati Raj system • Mapping of the village with respect to • (ASHA, AWC, SC, Gram Panchayat, PHC and CHC)
11.		• Health Camp in the village • Utility of Campaign approach in health care delivery • Anthropometric measurement • (Height, Weight and MUAC) • Identify health priorities of villages • Salt testing for adequate Iodination • Water testing for quality • Understand the determinants of health • Identify the health priorities of village/community
12.		• Visit to the School. Observation of -Iron supplement program and service delivery/ Deworming /RBSK activity. • Importance of school health • Health delivery in school through health camps in school
13.		• Report submission, Presentation and Discussion

14.	➢ Determinants of Health ➢ Influences of Family on Health ➢ Nutrition ➢ Environment ➢ Social Issues and its impact on Health	• Role of family in individual health (Qualitative methods)
15.		• Nutrition ➢ Visit to local market and household for enumeration of commonly available food, their caloric value and cost. ➢ Cultural practices related to different food
16.		• Environment-1 (Water) ➢ Water quality testing and methods of water purification
17.		• Environment-2 (Air) ➢ Visit to air and noise pollution centre. Demonstration for assessment of the air quality
18.		• Social issues and its impact on health (poverty, gender preference, dowry, Alcoholism, Addiction etc.) One social issue (Gender Preference/ Alcoholism) ➢ Its impact on health will be demonstrated through community survey
19.	Planning and delivery of health interventions (Health education and others)	• Planning of Health Education session
20.		• Village Walk for awareness of Health and Hygiene
21.		Delivery of Health Education at family level; considering the findings in health camp, preparation of local balanced diet , hygiene and health
22.	Assessment	Internal Assessment

4.2. Teaching from 3rd to 7th Semester

4.2.1. Theory Third Semester (40 Hours)

1. General Concepts in Public Health, Community Medicine and Family Medicine

- Introduction, definitions & general concepts in public health & community medicine
- History of Public Health
- Changing concepts in Public Health
- Dimensions and determinants of health
- Concepts of well-being
- Indicators of mortality, morbidity and disability
- Philosophy Behind "Health For All (HFA)"
- Elements of "Primary Health Care" (PHC)
- Public health in developed countries, developing countries and countries with transitional economies - history, development & policies
- Risk factors, risk Groups, iceberg of diseases, spectrum of diseases
- Theories of disease causation
- Natural history of disease
- Monitoring and surveillance
- Concepts of prevention, modes of intervention
- Classification of diseases
- Dynamics and modes of disease transmission
- Diseases prevention and control
- Investigation of an epidemic
- Community diagnosis
- Concepts of screening

2. Principles and Practices of Health promotions, Social Sciences, Humanities and Communications

- Social factors influencing health of people, concepts in sociology
- Role of emotions in health and disease, learning, intelligence
- Personality, motivation and theories
- Social Psychology
- Social Organization
- Family in health and disease
- Cultural factors in health and disease

- Socio-economic status
- Hospital Sociology
- Rights of individuals and consumer's protection Act
- Social Problems
- Economics, Poverty
- Social security and social assistance process, types and barriers of communication
- Different methods used for health education
- Interview techniques, Operational Research
- Steps of counseling
- Principles of sociology in health promotion
- Approaches to health education
- Family health history & individual Medico - Social History - Taking
- Behaviour Change Communication
- Information, Education, Communication

Fourth Semester (40 Hours)

3. Environment and Occupational Health, Disaster management

3A. Occupational health

- Concepts of ergonomics
- Identification of hazards of occupational environment - physical, chemical and biological hazards
- Occupational Diseases - Pneumoconiosis, silicosis, anthracosis, etc.,
- Occupational cancers, Occupational dermatitis, Radiation Hazards, Occupational hazards of agricultural workers
- Industrial toxicology
- Industrial accidents
- Sickness absenteeism
- General measures of prevention & control of occupational diseases
- Social security and labour laws, employee state insurance schemes and act and factory act
- Medical evaluation of workers

3B. Disaster Management

- Types of disaster and Disaster cycle
- Health Hazard of Disaster

- Disaster Preparedness, Disaster Mitigation and Management and its application
- Natural and Man-Made Disasters, Bioterrorism

3C. Environment

- Concept of safe and wholesome water
- Water pollution and requirements of a sanitary source of water.
- Methods of purification of water on large and small scale with stress on chlorination of water.
- Water quality and standards
- Surveillance of drinking water quality
- Hardness of water and treatment
- Swimming pool sanitation
- Rain water harvesting
- Assessment of air quality and pollution
- Assessment of ventilation, lighting, noise and radiation
- Assessment of humidity, air temperature, air velocity
- Public health aspects of global warming.
- Standards of housing and the effect of poor housing on health
- Disposal of solid waste
- Disposal of excreta both in the context of urban and rural conditions in the country
- Modern sewage management of sewage and sullage
- Conservation and preservation of forests
- Environmental assessment of the family and community
- Management of bio-medical wastes.
- Water, sanitation and hygiene

3D. 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, application cycle and techniques of commonly used insecticides.
- Steps of management of a case of insecticide toxicity

4. Public Health Nutrition

- Classification of major food and their nutritive value
- Macro and micro nutrients- physiological functions, dietary sources, recommended dietary allowances or intake age per age, sex and activity

- Micronutrients: Vitamins
- Micronutrients: Minerals
- Major Foods and their Nutritive Value
- Dietary goals and balance diet
- Nutritional requirements of special groups: Mothers, Children and the Elderly
- Nutritional deficiency diseases of public health importance - Vitamin a deficiency, iodine deficiency disorder, nutritional anaemia and programs related to them
- Protein Energy Malnutrition, Severe Acute Malnutrition and Management of Severe Acute Malnutrition Children
- Social and cultural practices in nutrition and health
- Junk food and food toxicants
- Public health aspects of food hygiene & sanitarytion: Regulation of eating establishments, slaughter house sanitation
- Nutritional assessment and surveillance of a community
- Plan and recommended suitable diet for individual, family and community as per economic status and availability of local food
- Food Adulteration and Prevention of Food Adulteration act
- Food Processing, Food Additives, Preservatives, Food fortification
- Food safety and Food Safety and Standards Act
- Nutrition during Special Situations : Disasters, fairs and festivals, Community feeding of children
- Nutritional programmes in India including ICDS, National Nutrition Policy

5. Demography and Population Health

- Demography cycles, Demographic Indicators like sex ratio and Population Pyramid, Dependency
- Fertility related Statistics
- Health aspects of Family Planning and Welfare concept: Eligible Couple, Target Couple, Couple Protection rate
- National population policy
- Contraceptive Methods - I
- Contraceptive Methods - II
- MTP Act
- Surveillance, Unmet Needs of Family Planning, Community Need Assessment Approach, Social Marketing
- Evaluation of Family Planning

Fifth Semester (36 hours)

6. Epidemiology and Biostatistics

6A. Epidemiology

- Introduction, definition and uses of epidemiology
- The Essential "Building Blocks" of epidemiology and research methodology
- Measurements of disease frequency and outcomes in epidemiology
- Sources of information in epidemiology
- Measures of association & effect
- Errors of measurement, confounding and bias
- Architecture of epidemiological (research) designs (epidemiologic methods)
- Descriptive studies (including ecological studies) & epidemiological distribution according to person, place & time
- Cross - Sectional Studies
- Case Control Studies
- Cohort Studies
- Experimental (Intervention) Studies
- Non-Randomized Trials
- Planning, design and conduct of epidemiological surveys
- Epidemiological basis of public health surveillance for disease
- Association and causation
- Uses of epidemiology
- Writing the research findings
- Writing the research proposal
- Critical appraisal of a published article
- Ethical issues in epidemiology & medical research
- Qualitative research: an overview
- Applications of computers in epidemiology
- Use of reference management software

6B. Statistics

- Introduction to Biostatistics
- Fundamental principles of data management
- Populations and samples
- Descriptive statistics: displaying the data

- Summarizing the data: measures of central tendency and variability
- Introducing Inferential Statistics: Gaussian distribution and Central limit theorem, Confidence Interval
- Inferential Statistics: Estimation and hypothesis testing
- Inferences with Single mean
- Inferences with Single population proportion
- Hypothesis Testing: The difference between two population means
- Hypothesis Testing: The difference between two population proportions
- Chi-square Test
- Sample Size determination
- Sampling methods
- Simple correlation and regression
- Advanced regression models
- Life Tables and Survival Analysis
- Non-parametric tests
- Which statistical procedures to use depending upon exposure and outcome variable

Sixth and Seventh Semester: (132 Hours)

7. Health Care Delivery for Specific Population Groups and their related National Health Programs

7A. Maternal Health

- Introduction to Maternal and Child Health
- Risk approach in MCH
- Maternal health care-antenatal care
- Maternal health care-post natal care
- Indicators of MCH care - I (Maternal mortality)

7B. Child Health

- Intranatal Care & Neonatal Care
- Low birth weight babies & small for date babies
- Kangaroo Mother Care
- Feeding of Infants
- Care of Under Five Children- Growth and Development
- Indicators of MCH care - II (IMR, Under-5 MR etc.)
- Psycho-social problems in children

7C. Adolescent health- Health problems, ARSH Clinic

7D. Geriatric health- Health problems, social problems, various schemes for geriatrics

7E. Tribal health – specific health problems and service delivery approach

7F. Programs

- Janani Surakshya Yojana,
- Janani Sishu Surakshya Karyakram
- Integrated Management of Neonatal and Childhood Illnesses (IMNCI)
- India Newborn Action Plan
- Rashtriya Bal Suraksha Karyakram,
- Rashtriya Kishori Shakti Karyakram
- Reproductive, maternal, neonatal, child health plus adolescence
- National Rural Health Mission
- National Urban Health Mission
- National Program for Health Care of Elderly, National Policy on Older Persons

8. Health Care Delivery Systems in India, Health Planning and Management Including Health Policies, International Health.

8a. Health care of the Community

- Explain the terms: public health, public health administration, regionalization, comprehensive medical care, delivery of health care, planning management, evaluation.
- Components of health care delivery
- National Health Policy
- Universal health coverage
- Health manpower development
- Planned development of health care facilities
- Indigenous systems of medicine
- Different health committees
- Primary health care in india
- Sustainable Development Goals
- Evaluation of health services
- Urban health
- Impact of urbanization on health and disease. Common health problems (medical, social, environmental, economic, psychological) of urban slum dwellers.
- Health Insurances
- Voluntary health agencies

8b. Health Care Infrastructure

- Health systems and health infrastructure at Centre, state and district levels.
- Inter-relationship between community development block and primary health Centre.
- Organization, functions and staffing pattern of community health centers, primary health Centre, rural health center and subcentre
- Job descriptions of health supervisor (male and female); health workers; village health guide; ASHA, Anganwadi Workers traditional birth attendants
- Organization of health services for slum dwellers. Organization of health services to address the common health problems in urban areas

8c. Planning and Management

- Planning Cycle
- General Concepts in Management Sciences
- Modern Management Techniques
- Logistics and Finance Management

8d. International Health-

- Organizations, International health Regulation, Public Health Emergency of International Concern

9. Communicable Diseases including National Health Programs

9a. Respiratory infections

- Respiratory Infections - I
- Respiratory Infections - II
- Respiratory Infections - III
- Respiratory Infections - IV

9.b. Intestinal Infections

- Intestinal Infections - I
- Intestinal Infections - II
- Intestinal Infections - III
- Intestinal Infections - IV

9c. Arthropod Borne Infections

- Arthropod Borne Infections - I
- Arthropod Borne Infections - II
- Arthropod Borne Infections - III

9d. Zoonoses

- Zoonoses - I
- Zoonoses - II
- Zoonoses - III
- Zoonoses - IV

9e. Surface Infections

- Surface Infections - I
- Surface Infections - II
- Surface Infections - III
- Surface Infections - IV

9f. Emerging and Reemerging Infections

9g. Hospital Acquired infections

9h. Programs

- Revised National TB Control Program
- National Leprosy Eradication Programme
- National Vector Borne Disease Control Programme
- National AIDS Control Programme
- Integrated disease surveillance program

10. Non-Communicable Diseases including National Health Programs

10a. Diseases

- Cardiovascular and coronary heart diseases
- Hypertension
- Stroke
- Diabetes
- Obesity
- Rheumatic heart disease
- Blindness
- Cancer
- Road traffic accidents
- Mental health

10b. Programs

- National Mental Health Program
- National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke
- National Programme for Control of Blindness

11. Family Medicine

- Treatment of common medical disease and emergencies
- Solving patient problems within a particular socio-cultural setting, harnessing available community services
- Patient management in family practice including home visits
- Use of behavioral sciences related to family practice
- Public Mental health
- Public Dental Health

4.2.2. Practical

4th Semester: (20 session x 3 hours)

Public health Nutrition, Environment, Occupational Health, Demography

- Nutritive value of food and food labelling
- Planning of balanced and therapeutic diets
- Exercise on nutrition
- Visit to milk pasteurization plant
- Visit to the Dietetic center at Capital Hospital
- Visit to Slaughter house
- Nutrition Exercise: PEM, Vit. A
- Occupational Health Models/Equipment
- Family planning specimen
- Entomology
- Water Exercises
- Study of the Model Instrument in Environment
- Visit to the Water Treatment Plant
- Demographic Exercises
- Visit to air pollution monitoring station
- Visit to bio-medical waste center

6th Semester (32 session x 3 hours and 10 session x 2 hours)

1. Epidemiological and Biostatistics Exercise

- Measures of Mortality
- Measures of Morbidity
- Vital Statistics
- Analysis in epidemiological studies
- Cohort study and case control study
- Presentation of data
- Normal distribution curve
- Measures of central tendency
- Measures of dispersion
- Confidence interval
- Hypothesis testing and test of significance i
- Hypothesis testing and test of significance ii
- Screening Exercises
- General and Communicable Disease, epidemiology, demography exercises
- Immunization and calculation of vaccine requirements

2. Clinico-Psycho-Social Case Review (CPSCR)

- Antenatal care
- Postnatal care
- Infant
- Malnutrition
- Low Birthweight Weight
- Breast feeding
- Diarrhea
- ARI
- Measles
- Under-five child
- Adolescent
- Anemia
- Geriatric
- Tuberculosis
- Lactating women

7th Semester (32 session x 3 hours and 10 session x 2 hours)

1. Family Health Advisory Services (FHAS)

- Introduction to Family Health Advisory Services
- Map of the Village with the Index House Location
- Demography
- Socio Economic Status
- Housing and Environment
- Nutrition
- Dietary intake of the family - 24 hours recall - field
- Diet planning for the family & amp; intervention - Class
- Health assessment of family member
- Social habits and family relationship
- Family diagnosis and community diagnosis
- Preparation of family data and presentation
- Review of health records and interaction with health workers
- Health Education Session (Roleplay)
- Initiatives in Swachh Bharat Abhiyan

2. Maternal and child health practical
3. Outbreak Investigation
4. Palliative care
5. Entomology Revision
6. Spotters on Environment-Revision
7. Revision of Immunization Spotters
8. Revision of General and Communicable Disease Epidemiology, Demography and Biostatistics exercises

4.2.3. Clinical/Community posting (6th and 7th Semester) – 240 hours

A. Research posting

- How to develop research question and hypothesis
- Review of literature
- Development of interview schedule/ Questionnaire
- Development of protocol
- Importance of ethics in research

- Confounding, Bias
- Data Collection
- Data entry and Analysis
- Presentation

B. Visit to Clinics

- Non-Communicable Disease (NCD) clinic: hypertension, diabetes, osteoarthritis, hypothyroidism
- Immunization- Universal Immunization Program, Animal bite management, Yellow fever vaccination,
- Integrated Counselling and Testing Centre (ICTC)- Pretest and Posttest counselling, STI/ RTI Management
- DOTS clinic- Treatment of TB patients under Daily Regimen (Cat-1,2,4)
- Preventive oncology

C. Case Based Discussion on Common diseases presenting in Urban Health Centre

- Medicine
- Ophthalmology
- Obstetrics and Gynecology
- Pediatrics
- Skin
- Psychiatry

D. CPSCR presentation

- Malnutrition, Under-five, antenatal case, post-natal case, Geriatric, Infant, Pneumonia, Diarrhoea, TB

E. Visit to Health Facility, Data Collection and Presentation

- Visit to Anganwadi center, Interaction with Anganwadi worker and ASHA, Outreach immunization
- Visit to subcentre and MPW(M/F) interview
- Visit to PHC
- Visit to CHC- Data collection, Presentation
- Visit to District HQ hospital and ICTC
- Visit to regional vaccine store
- Visit to District Tuberculosis Unit (DTU)
- Visit to school for school health and preparation for health education

5. Assessment Plan

5.1. Formative assessment

5.1.1. Theory: Semester examination in 2nd semester, end of 3rd ,4th ,5th, and 6th semester

5.1.2. Practical: End posting assessment at the end of posting at the end of 2nd, 4th and 6-7th Semester

5.2. Summative assessment (Total Marks = 300)

5.2.1. Theory (Total Marks = 200)

- Two papers (Paper I & Paper II)
- Each paper has two sections (Section A & B)
- Each section has one long question (10 marks) and eight short questions (5 marks each)
- Maximum marks for each paper is 100 (Total: 200)

Blue print for framing final professional theory question paper

i) The paper should have weightage of 70% marks from must know areas, 20% from desirable to know and 10% from nice to know areas.

ii) Topic wise weightage should be as follows

Paper 1

Topic	Marks allotted
General concepts in Public Health, Community Medicine and Family Medicine	20
Principles and Practices of Health Promotion	10
Epidemiology, Biostatistics and Research Methodology	10
Demography and Population Health	10
Public Health Nutrition	10
Environment and Occupational Health including Disaster Management	15
Health Care Delivery Systems in India, Health Planning and Management Including Health Policies, International Health	25

Paper 2

Topic	Marks allotted
Health Care Delivery for Specific Population Groups: Reproductive Health, Child Health, Adolescent Health, Geriatric Health, Tribal Health, Urban Poor, Migrants, People with Disability groups including related National Health Programs,	25
Communicable Diseases including related National Health Programs	35
Non-Communicable Diseases including related National Health Programs	25
Family Medicine	15

5.2.2. Practical (Maximum marks = 200)

Sl No.	Topic	Duration	Marks
1.	Problem solving		
	a. Biostatistics exercises	45 mins	20
	b. Epidemiology exercises		20
	c. Spotters (environment, entomology, demography) / OSCE		30
	d. Health communication and health education exercises		15
	e. Health management exercises		15
2.	Short case in AIIMS Hospital (one)	20 mins	20
3.	Long case in the Community (one)	45 mins	40
4.	Grand Viva	15 min	40
Total			**200**

6. Feedback: Structured feedback for each module will be taken from students, faculty and senior residents to improve the teaching learning methods

6.1. Early community exposure

6.2. Theory teaching – module wise

6.3. Practical – module wise

6.4. Clinical community posting – for each aspect of training

MODEL QUESTION PAPER
COMMUNITY MEDICINE
PAPER I

Time: **Max marks: 100**

SECTION A

1. A health worker reported 77 cases of diarrhoea from a single village with a population of 780.All the cases had occurred within a period of 8 days. How medical officer in charge of the concerned primary health centre should conduct the investigation? Enlist and describe control measures which should be undertaken ? [6+4 = 10]

2. Answer the following . [8 questions x 5 marks=40]

   a. Write four different types of non-probability sampling. Write advantages of non-probability sampling over probability sampling

   b. Mention the ideal way of presenting following type of data with pictorial representation (1x 5)

      i) Number of cases of diarrhea in an outbreak over three weeks

      ii) Causes of under-five mortality

      iii) States of origin of MBBS students admitted in a medical college

      iv) Prevalence of hypertension in different age groups

      v) Distribution of hemoglobin level among school children

   c. Enlist the major data sources of infant mortality rate in India. Explain the best source with justification. (3+2)

   d. Define replacement level of fertility. Explain its relation to population stabilization (2+3)

   e. Represent diagrammatically the “web of causation” of hypertension in a 45 year-old desk job worker

   f. Write steps of disaster management.

   g. Illustrate schematically a health education program for prevention and control of malaria in a rural community.

   h. Describe the importance of food labelling as a public health tool

SECTION B

3. As medical officer in-charge of a Primary Health Centre, you notice that village health and sanitation committees are not functioning properly. [4+3+3 = 10]

   a. What are the functions of village health and sanitation committee. Enumerate roles of various stakeholders in this committee?
   b. Discuss common challenges in the functioning of these committees
   c. Develop a framework for monitoring and supervision by medical officer in charge

4. Write short notes on [8 questions x 5 marks=40]

   a. Food fortification. Give two examples of food fortification. Write importance of food fortification as a strategy for prevention of micronutrient deficiency. (2+1+2)
   b. Role of pre-employment medical examination for improving occupational health
   c. Enumerate the steps of behavior change communication process
   d. Discuss determinants of diseases using epidemiological wheel theory taking example of one communicable and one noncommunicable disease
   e. Mention the strategies of Entomological surveillance for dengue control in an urban area.
   f. Discuss role of ASHA in community mobilization for maternal health care services
   g. Calculate annual vaccine requirement for a PHC with the birth rate of 30/1000 population and infant mortality rate of 45/1000 live births
   h. Enlist opportunities for convergence of different stakeholders during Village Health and Nutrition Days (VHNDs).

MODEL QUESTION PAPER
COMMUNITY MEDICINE
PAPER II

Time: **Max marks: 100**

SECTION A

1. ou have been newly posted as a district tuberculosis officer in a tribal district of Odisha where the indicators related to tuberculosis control are very poor. Answer the following questions (4+4+2 = 10)

   a. Current challenges in implementation of tuberculosis control programme in remote district.
   b. Enumerate newer initiatives undertaken in the program for management of drug resistance tuberculosis.
   c. Enlist innovations related to Information technology in improving programme outcomes.

2. Answer the following [8 questions x 5 marks=40]

   a. Management of diarrhea in a 9-month-old child at the household level
   b. Enlist different types of cancer registry in India and compare their salient features (2+3)
   c. Enumerate activities undertaken at primary health centre for prevention and control of common cancer under national programme
   d. Explain with illustration different levels of prevention of non-communicable diseases
   e. Enumerate strategies adopted for polio eradication. Write reasons for success of polio eradication from India (2+3)
   f. Mention chemoprophylaxis regimen under Revised National Tuberculosis Control Program. Enumerate other important measures for prevention of transmission (2+3)
   g. Write characteristics of an ideal screening test
   h. What are the common causes of preventable blindness? Enlist strategies of National Program for Control of Blindness (NPCB). (2+3)

SECTION B

1. A 50 years old auto driver residing in a slum with three children and wife, with a monthly income of Rs 3000/- came to urban primary health centre with complains of severe headache and uneasiness for last seven days. His blood pressure was 170/100mm Hg. On examination, mild pallor was observed and other systems were found to be normal. [2+2+3+3=10]

   a. Write the plan of immediate management of the patient?

   b. Enlist the complications which may be expected in the patient

   c. Enumerate investigations required for this patient and prepare a follow up plan.

   d. Write individual and health system challenges in long term management of the patient.

2. Answer the following. [8 questions x 5 marks=40]

   a. Integrated vector management for control of dengue

   b. What are the barriers in implementation of the national mental health program?

   c. Syndromic management of Sexual Transmitted Infections (STIs)/ Reproductive Tract Infections (RTIs) and its rationale (3+2)

   d. Enlist dangers signs in a newborn under Integrated Management of Newborn and Childhood Illness (IMNCI).

   e. Enumerate different types of surveillance in Integrated Disease Surveillance Project (IDSP). Mention any four diseases under IDSP surveillance (3+2)

   f. How biomedical waste should be segregated at source?

   g. Describe three delay model of maternal mortality

   h. Enlist vaccine recommended for international traveller and its significance.

Annexure-1

Suggested integrated teaching plan

Topics	Semester	Participating Departments	Number of Hours	Content details	Assessment
Tuberculosis	6th semester	CMFM, Microbiology, Pulmonary Medicine.	8 hrs	Pathogenesis, diagnosis, treatment, prevention, RNTCP	MCQs
Malaria	5th semester	CMFM, Microbiology, Medicine, Paediatrics.	4 hrs	Pathogenesis, diagnosis, treatment, prevention, NVBDCP	QUIZ
HIV/AIDS	6thsemester	CMFM, Microbiology, Pharmacology, Skin, Medicine.	12 hrs	Pathogenesis, diagnosis, treatment, prevention, NACP	MCQs
Hypertension	6th semester	CMFM, Pharmacology, Medicine, OBG	4 hrs	Aetiology, Clinical Features, Clinical Assessment, Plan of Management	QUIZ
Diabetes Mellitus	6th semester	CMFM, Pharmacology, Medicine, OBG	4 hrs	Aetiology, Clinical Features, Clinical Assessment, Plan of Management	QUIZ
Malnutrition in children	4th semester	CMFM, Paediatrics, Biochemistry, Anatomy	8 hrs	Causes & risk factors , Clinical Assessment, Plan of Management	OSCE
Anaemia	4th semester	CMFM, Pathology, Medicine, Paediatrics, OBG, Physiology, Transfusion Medicine	15 days	Aetiology, Diagnosis, Clinical Assessment, Plan of Management, NIPI programme	SA Tests

Topics	Semester	Participating Departments	Number of Hours	Content details	Assessment
Road traffic injuries	7th semester	CMFM, Surgery, Anaesthesia, Orthopaedics	6 hrs	Epidemiology, Clinical Assessment, Plan of Management, Prevention and control	SA Tests
Breast cancer	7th semester	CMFM, Surgery, pathology, Radiology, Medical Oncology	4 hrs	Aetiology, Clinical Features, Clinical Assessment, Plan of Management	QUIZ
Cervical cancer	7th semester	CMFM, OBG, Pathology	4 hrs	Aetiology, Clinical Features, Clinical Assessment, Plan of Management	QUIZ
Oral cancer	7th semester	CMFM, Dentistry, Pathology, Oncology	4 hrs	Aetiology, Clinical Features, Clinical Assessment, Plan of Management	QUIZ
Depression	7th semester	CMFM, Psychiatry	4 hrs	Risk factors, Clinical Features, Clinical Assessment, Plan of Management	QUIZ

Annexure-2

Recommended text books (gement inPrimaryHealth Care,WHO).

1. Murtagh's General Practice by John MLatest Editions)
2. Park's textbook of preventive and social medicine by K. Park
3. Textbook of public health and community medicine by Rajiv Balwar (AFMC),WHO
4. Oxford Textbook of Public Health by R. Detels, R. Beaglehole, M.A. Lansang and M. Gulliford.
5. Basic Epidemiology by R. Beaglehole, R. Bonita and T. Kjeirstrom
6. Statistics at Square One by M J Cambell & TDV Swinscow
7. National health Programmes of India by Dr DK Taneja
8. On Being In Charge, Guide for manaurtagh AM.

OTO-RHINOLARYNGOLOGY (E.N.T.)

OTO-RHINOLARYNGOLOGY (E.N.T.)

GOAL

The undergraduate student should acquire adequate knowledge and skills to examine, diagnose and treat common ENT diseases/disorders and ENT emergencies and able to comprehend and implement the principles of rehabilitation of the persons with impaired hearing.

OBJECTIVES

Knowledge

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

1. Describe the basic pathophysiology/etiopathogenesis 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,wound dressings and removal of foreign bodies.

TOPICS FOR INTEGRATION:

Thyroid diseases

Orbital complications of sinusitis

Allergic rhinitis

Patient Safety protocol

TOPICS AND THEIR ALOTTED CLOCK HOURS

Sl. No.	Topics	Must Know	Desirable to Know	Nice to know	Hours of Teaching	Lec/Tut /Clin
Diseases Of Ear						
1.	Anatomy of Ear	✓			2	Lecture
2.	Peripheral Receptors and Physiology of Auditory and Vestibular Systems	✓			1+3	Lecture + **Tutorial**
3.	Audiology and Acoustics	✓			1+3	Lecture
4.	Assessment of Hearing	✓				Tutorial
5.	Hearing loss	✓				Lecture
6.	Assessment of vestibular function		✓		1	Lecture
7.	Disorders of the vestibular system		✓			
8.	Diseases of the External ear	✓			1	Lecture
9.	Eustachian tube and its disorders		✓			
10.	Disorders of the middle ear	✓				
11.	Cholesteatoma and Chronic otitis media	✓			2+3	Lecture + **Tutorial**
12.	Complications of Suppurative Otitis Media	✓			2+3	
13.	Otosclerosis	✓			1	Lecture
14.	Facial Nerve and its Disorders	✓			1	Lecture
15.	Meniere's Disease	✓			1	Lecture
16.	Tumours of External Ear			✓	1	Lecture
17.	Tumours of Middle Ear and Mastoid			✓		
18.	Acoustic Neuroma			✓		
19.	The deaf child	✓			1	Lecture
20.	Rehabilitation of the Hearing Impaired	✓			1	Lecture
21.	Otalgia		✓		1	Lecture
22.	Tinnitus		✓			
Diseases of Nose and Paranasal Sinuses						
23.	Anatomy of Nose & paranasal sinuses	✓			1	Lecture
24.	Physiology of Nose & paranasal sinuses	✓			1	Lecture

Sl. No.	Topics	Must Know	Desirable to Know	Nice to know	Hours of Teaching	Lec/Tut /Clin
25.	Diseases of External Nose and Nasal vestibule	✓			1	Lecture
26.	Nasal septum and its diseases	✓				
27.	Acute and chronic rhinitis	✓			3	Tutorial
28.	Granulomatous diseases of Nose		✓			
29.	Miscellaneous Disorders of Nasal Cavity			✓		
30.	Allergic Rhinitis	✓			1	Lecture
31.	Vasomotor and other forms of nonallergic rhinitis		✓			
32.	Nasal polypi	✓			1 + 3	Lecture + **Tutorial**
33.	Epistaxis	✓			1	Lecture
34.	Trauma to face		✓		1	Tutorial
35.	Acute sinusitis	✓			1	Lecture
36.	Chronic sinusitis	✓				
37.	Complications of sinusitis	✓			3	Tutorial
38.	Benign and malignant neoplasms of nasal cavity	JNA - Must Know	Rest - ✓		1 + 3	Lecture + **Integration/ Tutorial**
39.	Neoplasms of paranasal sinuses			✓		
40.	Proptosis			✓		
Diseases of the oral cavity and salivary glands						
41.	Anatomy of oral cavity	✓			1	Lecture
42.	Common disorders of the oral cavity	✓				
43.	Tumours of oral cavity	Premalignant lesion Must know		Rest - Nice to Know		
44.	Non-neoplastic disorders of salivary glands		✓		1	Lecture
45.	Neoplasms of salivary glands		✓			
Diseases of Pharynx						
46.	Anatomy and physiology of pharynx	✓			2	Lecture
47.	Adenoids and other inflammations of the nasopharynx	✓				

Sl. No.	Topics	Must Know	Desirable to Know	Nice to know	Hours of Teaching	Lec/Tut /Clin
48.	Acute and chronic pharyngitis	✓			2	Lecture
49.	Acute and chronic tonsillitis	✓				
50.	Head and Neck Space infections	✓			1	Lecture
51.	Tumours of Nasopharynx & Oropharynx			✓	1	Lecture
52.	Tumours of the Hypopharynx and Pharyngeal pouch			✓		
53.	Snoring and sleep apnoea			✓	2	Tutorial/ Integration
Diseases of larynx and trachea						
54.	Anatomy and physiology of larynx	✓			1	Lecture
55.	Laryngotracheal Trauma		✓		1	Tutorial
56.	Acute and Chronic inflammations of larynx	✓			1	Lecture
57.	Congenital Lesions of Larynx and stridor	Stridor Must Know	Rest Desirable to know		1	Lecture
58.	Laryngeal paralysis	✓				
59.	Benign tumours of Larynx	✓			1	Lecture
60.	Cancer of Larynx		✓			
61.	Voice and speech disorders		✓			
62.	Tracheostomy and other procedures for Airway management	✓			3	Tutorial
63.	Foreign bodies of air passages	✓				
Thyroid gland and its disorders						
64.	Thyroid gland and its disorders, thyroid swelling		✓		3	Tutorial/ Integration
Diseases of Oesophagus						
65.	Anatomy and physiology of oesophagus		✓		1	Lecture
66.	Disorders of oesophagus		✓			
67.	Dysphagia	✓			1	Lecture
68.	Foreign bodies of food passages	✓				

Sl. No.	Topics	Must Know	Desirable to Know	Nice to know	Hours of Teaching	Lec/Tut /Clin
Recent advances.						
69.	Laser surgery, radiofrequency surgery and hyperbaric oxygen therapy			✓	3	Tutorial
70.	Cryosurgery			✓		
71.	Chemotherapy for head and neck cancer			✓		
72.	HIV infection/AIDS and ENT manifestation		✓		1	Lecture
Operative surgery						
73.	Myringotomy		✓		1	Tutorial
74.	Mastoidectomy all types	✓			6	
75.	Tympanoplasty	✓			1	
76.	Septal Surgeries	✓			3	
77.	Diagnostic Nasal Endoscopy and Endoscopic Sinus Surgery	✓			6	
78.	Direct Laryngoscopy/ Bronchoscopy/Oesophagoscopy		✓		1	
79.	Tonsillectomy & Adenoidectomy	✓			2	
80.	Thyroid surgery		✓		2	
81.	Proof puncture/Caldwell luc/Inf nasal antrostomy			✓	1	
Radiology in ENT						
82.	Xray	✓			4	Tutorial
83.	CT Nose PNS/Mastoids			✓		
Clinical Methods in ENT and Head Neck Surgery						
84.	Clinical methods of ENT & Neck	✓			8ds- 24hrs	Clinics
85.	Neck Mass	✓			4ds-12hrs	
86.	Thyroid Swelling		✓		2ds-6hrs	
87.	Ear cases – Mucosal COM	✓			10ds-30hrs	
88.	Nose cases – DNS, Nasal Polyp	✓			9ds – 27hrs	
89.	Chronic tonsillitis	✓			6ds – 18hrs	
90.	Revision	✓			3hrs	

Sl. No.	Topics	Must Know	Desirable to Know	Nice to know	Hours of Teaching	Lec/Tut /Clin
Instruments:						
91.	OPD instruments	✓			1	**Tutorial**
92.	Tonsillectomy	✓			2	
93.	Mastoidectomy	✓			6	
94.	Septoplasty	✓			1	
95.	Tracheostomy	✓			2	
96.	DL/Bronchoscope/ oesophagoscope		✓		1	
Charts:						
97.	Audiogram		✓		1	**Tutorial**
98.	Tympanogram		✓		1	
99.	BERA		✓		1	
100.	Spotters		✓		1	

40hrs lectures, 80hrs tutorials, 120hrs clinics

ASSESSMENT

Theory - 100marks
Practical - 100marks
Total 200marks

Theory

One paper with two section A & B -100 MARKS

Section A (EAR & NOSE)-50MARKS

1. One long question-10 marks
2. Five short notes 5x8=40 marks

Section B (THROAT AND HEAD NECK)-50MARKS

1. One long question-10 marks
2. Five short notes 5x8=40 marks

Note: Long Answer Questions (LAQ) should be from must know area. Total number of SAQs is 16 of which 4 to 6 should be from desirable to know areas.

Practical

Total 100 MARKS
Cases: 70 marks- One long case-40marks, two short case -15x2=30
Radiology (X-rays)-10 marks

Charts & clinical photography-10 marks

Viva voce & Instruments-10 marks

MODEL THEORY PAPER
OTO-RHINOLARYNGOLOGY

Time: 3 hours Max. **Total: 100 marks**

Answer all the questions
Illustrate your answer with suitable diagrams whenever necessary

Section A (Ear & Nose)

1. A 35 year old female gives history of decreased hearing in both ears without any history of ear discharge. She also gives history of worsening of hearing during her last pregnancy. On Rianne's test, she hears better when the 512Hz tuning fork placed over the mastoid process for the both the ears and Weber test is lateralized to left ear. What is the most probable diagnosis of her ear condition? Discuss the management of this case. Enumerate six causes for sensory neural hearing loss. (2 + 5 + 3 = 10)

2. Short notes (8 x 5 = 40)
   a. Etiopathogenesis and management of serous otitis media
   b. Bell's palsy
   c. Management of allergic rhinitis
   d. Rhinosporidiosis
   e. Management of Meniere's disease
   f. Management of septal hematoma
   g. Prevention and management of ototoxicity
   h. Kieselbach's plexus

SECTION B (throat & head neck)

1. A case of carcinoma of larynx presents to emergency department with respiratory distress and noisy breathing. What immediate surgical procedure is required to relief his symptoms. Describe the indications, operative procedure, and immediate post-operative complications of the above required surgical procedure. (2 + 3 + 3 + 2= 10)

2. Write short note on: (8 X 5 = 40)
   a. Clinical features and management of peritonsillar abscess
   b. Indications and complications tonsillectomy
   c. Vocal Nodule
   d. Evaluation of dysphagia
   e. Ludwig's angina
   f. Indications and complication of rigid Oesophagoscopy
   g. Laryngomalacia
   h. Puberphonia

OPHTHALMOLOGY

OPHTHALMOLOGY

GOAL:

The broad goal of the teaching of students in ophthalmology will be 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

A. 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 minimize 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

B. 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, tonometry, staining for corneal pathology, confrontation perimetry, subjective refraction including correction of presbyopia and aphakia, direct ophthalmoscopy, 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, nasolacrimal duct syringing and dacryocystectomy
6. Provide first aid in major ophthalmic emergencies
7. Assist to organize community surveys for a visual check-up
8. Assist to organize 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, Otorhinolaryngology, and General Medicine.

CURRICULUM CONTENT

Basic Plan for undergraduate teaching:

The teaching of undergraduate students is done through Theory lectures, Seminars and demonstrations

In addition, problem-based exercise is given to the students. Common problems like acute red eye, progressive & sudden loss of vision are discussed with the active participation of students.

LIST OF THEORY LECTURES:

Sr. No.	Topics
1.	Anatomy of the eye
2.	Physiology of the eye
3.	Visual acuity and refractive errors
4.	Diseases of conjunctiva
5.	Diseases of cornea
6.	Lens and cataract
7.	Glaucoma
8.	Optic nerve and neuro-ophthalmology
9.	Strabismus
10.	Diseases of lids
11.	Retina
12.	Sclera
13.	Uvea and diseases affecting uveal tissue
14.	Injuries to eye
15.	Lacrimal apparatus and diseases affecting it
16.	Community Ophthalmology
17.	Lasers and ophthalmology
18.	Orbit and its diseases
19.	Ocular pharmacology
20.	Surgical instruments in Ophthalmology

LIST OF SEMINARS (from following topics):

Sl. No.	Topics
1.	Extraocular muscles and ocular motility
2.	Physiology of vision
3.	Systemic diseases affecting the eye
4.	Recent advances in ophthalmology
5.	Common ocular diseases
6.	Community Ophthalmology
7.	National Blindness Control Programmes and Eye Banking

CURRICULUM CONTENT (Theory)

TOPICS	MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
LIDS AND OCULAR ADENEXA	-Anatomy and physiology -Hordeolum(external and internal) -Blepharitis -Chalazion -Trichiasis -Distichiasis -Entropion -Ectropion -Pre-septal cellulitis	-Ptosis -Blepharospasm -Lagophthalmos -Cryptophthalmos -Coloboma	-Symblepharon -Ankyloblepharon -Benign and malignant tumours and surgical management
CONJUNCTIVA	-Anatomy and physiology -Conjunctivitis -Concretions -Pterygium -Pinguecula	-Naevus -Xerophthalmia	-Sjogren's syndrome -Keratoconjunctivitis sicca
CORNEA	-Anatomy and physiology -Inflammations -Corneal ulcer -VitA deficiency -Exposure keratitis - zCorneal blindness	-Neurotropic Keratopathy -Superior limbic keratoconjunctivitis -Vernal keratopathy -Aphakic and pseudophakic bullous keratopathy -Eye banking	-Corneal dystrophies -Corneal degenerative changes -Refractive surgeries -Keratoprosthesis -Tumours of cornea
SCLERA	-Episcleritis -Scleritis	-Staphyloma	-Congenital abnormalities -Tumours

TOPICS	MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
UVEAL TRACT	-Anatomy, physiology and classification -Anterior uveitis -Intermediate uveitis -Posterior uveitis -Endophthalmitis -Panophthalmitis	-Vogt-Koyanagi Harada syndrome -Sympathetic ophthalmitis -Central serous choroi-dopathy	-Fuchs heterochromic iridocyclitis - Albinism -Masquerade Syndrome -Tumours -Uveal effusion syndrome
LENS	-Anatomy and physiology -Age-related Cataract and its management -Cataract Surgery and its complications -Optical rehabilitation -Diabetic cataract	-Developmental cataract -Complicated cataract -Congenital cataract	-Recent advances in cataract surgery
VITREOUS	-Vitreous haemorrhage	-Vitreous degeneration	-Vitrectomy -Vitreous substitutes
GLAUCOMA	-Anatomy of angle structures -Physiology of aqueous production and drainage -Classification of glaucoma -Open and closed angle glaucoma and management -Anti-glaucoma drugs	-Secondary glaucomas -Congenital glaucoma -Trabeculectomy -Lasers in glaucoma	-Glaucoma drainage devices -OCT and HRT -Neovascular glaucoma -Perimetry

TOPICS	MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
RETINA	-Anatomy and physiology -Retinal detachment -Diabetic retinopathy -Hypertensive retinopathy -Occlusive arterial and venous disorder -Retinoblastoma	-Retinopathy of prematurity - Age-related macular degeneration -Myopic degeneration -Retinitis pigmentosa	-Medullated nerve fibre -Coloboma of choroid and retina -Phakomatosis -Hereditary dystrophies of the retina -Macular hole
OPTIC NERVE	-Papilloedema -Optic neuritis	-Traumatic optic neuropathy -Optic atrophy	-Congenital abnormalities of the optic disc -Tumours of the optic nerve
LACRIMAL SYSTEM	-Anatomy of Lacrimal drainage pathway -Dacryocystitis	-Dacryocystorhinostomy - Tear film layers and abnormalities	-Mikulicz Syndrome
SQUINT	-Esotropia -Exotropia -Amblyopia and BSV	-Vertical deviations	-Squint surgeries
ORBIT	-Anatomy of orbit -Orbital cellulitis	-Proptosis -Thyroid ophthalmopathy	-Orbitotomy - Orbital fractures
REFRACTIVE ERRORS	-Myopia -Hypermetropia -Astigmatism -Retinoscopy	-Anisometropia	-LASIK
INJURIES	-Non –Penetrating injuries and management -Chemical injuries and management -Clinical features of open globe injuries -Superficial foreign bodies	-Sympathetic ophthalmitis	-Intraocular foreign body and management

TOPICS	MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
COMMUNITY OPHTHALMOLOGY	-Definition and types of blindness -NPCB -Vision 2020 -Screening eye camps	-Medico-legal aspects of ophthalmology	Promotion of eye donations
MISCELLANEOUS	Symptomatic disturbances of vision	-Lasers in ophthalmology	-Recent advances in ophthalmology

Curriculum (PRACTICAL)

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
1-To diagnose common ophthalmic conditions 2-Management of acute conjunctivitis, allergic conjunctivitis, xerosis, corneal ulcer 3-Primary treatment of ocular trauma 4-Assessment of vision-Recording of visual acuity, Retinoscopy 5-To perform investigative procedures such as Tonometry, Syringing, Direct and indirect ophthalmoscopy, Fluorescein staining of the cornea 6-Observation of procedures like Ocular bandaging, Removal of concretions, Epilation, Corneal foreign body removal, Chalazion incision and curettage	1-Observation of -Procedures for cataract surgery -Lid surgery -Pterygium surgery -Sac surgery	1-Observation of -Squint surgery -Glaucoma surgery

Teaching and Learning Methods

The theory classes will be imparted via powerpoint presentations (must know topics and overall comprehension of the subject); Group discussion on topics, PBL and debates on clinical cases.

Clinical Teaching:

- Theory classes and clinical teaching will be imparted to the students as per the days allotted.
- Students will elicit detailed history and perform a clinical examination of the patient. They will be required to write case history which will be evaluated.
- Problem-based learning will be introduced in the clinical teaching-learning methodology.
- Students will be evaluated at the end of their clinical posting.

ASSESSMENT

This will consist of formative assessment and summative assessment.

The formative assessment will be the clinical end posting examinations.There will be a practical case-based examination and multiple choice questions.

Summative assessment: Scheme of practical and viva examination: Total marks 100

Practical – 80 marks

1. Each candidate examines 3 cases. One long case and two short cases. A candidate should record the visual acuity, history, clinical features, provisional diagnosis & management of the long case. The total mark is 50 marks (long case-30 marks: 2 short cases10 x2= 20 marks).
2. A set of examiners (comprising one internal and one external), examines the candidate for two cases. Duration of the clinical examination will be 20 minutes for the long case and 10 minutes for each of the two short cases. ii) A candidate has to secure a minimum of 15 marks out of 30 marks in the long case for passing the clinical examination.
3. Instruments – 10 marks (5x2)
4. X-ray and Charts – 10 marks (5x2).
5. Spotters – 10 marks (5x2)

Viva – 20 marks

Viva or Orals shall be conducted out of 20 marks.Oral examinations shall be conducted by two sets of examiners (internal and External) and each set will carry 10 marks.

Theory Examination: one theory paper of 100 marks

The ophthalmologytheory paper shall consist of two sections. Section A and Section B (should contain one question on pre-clinical and para-clinical aspects, clinical and recent advances).

The Section A shall contain questions from Refraction, Lids, Conjunctiva, Cornea, Sclera, Uvea Glaucoma and lens.

The Section B shall contain questions from, Retina.Squint, Optic nerve, Orbit, Ocular injuries, Ocular surgeries, National Programmes, Eye Banking and Miscellaneous.

Each Section consists of 50 marks each. One structured long question: 10 marks; short notes type questions 8 x5 = 40 marks;and.Total marks for each section = 50 marks (50x2=100 marks)

Question and Answers must be written as per the order on the answer sheet.

MODEL QUESTION PAPER
OPHTHALMOLOGY
PAPER I

100 marks

SECTION A

1. A 75-year male presents with gradual diminution of vision in both eyes. Visual acuity in the right eye is 6/60 and left eye is 5/60. Slitlamp examination reveals grade IV nuclear sclerosis in both eyes. Fundus examination is normal.
   a. What are the causes of progressive, gradual loss of vision? (5x2=10)
   b. What are the stages of maturation in adult cataract?
   c. What other investigations are advised in this case?
   d. What are the different methods of cataract surgery?
   e. What are the intraoperative complications of cataract surgery?

   Write short notes on /answer the following **(8x5=40)**

2. Discuss the clinical features and management of Acute Congestive Glaucoma (5)
3. A 19-year-old student complains of recurrent swelling in both the lids.
   a. What are the probable causes? (2.5)
   b. How will you manage this case? (2.5)
4. A 9-year male complains of itching, redness and ropy discharge from both eyes. On examination, there is papillary hyperplasia.
   a. What is the probable diagnosis? (1+2+2)
   b. What corneal signs are present in this case?
   c. What is the treatment?
5. Draw and Explain (2.5+2.5)
   a. Sturms conoid
   b. Light reflex pathway
6. A 40-years-old female presented with watering and discharge from the right eye of 6 months duration. On examination, she had a swelling near the medial canthus of the eye. Answer the following:
   a. What is the probable diagnosis (1+2+2)
   b. How do you manage the patient
   c. Enumerate the complications if not treated

7. What are the microbiological investigations advised forbacteralcornealer and the complications that occur if left untreated ? (2.5+2.5)

8. Write the differences between (2.5+2.5)
   a. Acute conjunctivitis vs acute anterior uveitis
   b. Episcleritis and scleritis

SECTION B

1. A 62 year Type II diabetic mellitus patient presents with sudden diminution of vision in the right eye.Visual acuity is 6/60 in RE and 6/12 in the left eye
   c. What are the probable causes of vision loss
   d. Discuss the ETDRS classification of Diabetic Retinopathy (DR)
   e. Discuss the complications of diabetic retinopathy
   f. Describe the treatment of DR
   g. Follow-up schedule of DR (1+3+3+2+1=10)

Write short notes on **(8X5=40)**

2. What is Binocular Single Vision? (5)
3. What is the fundus finding in hypertensive retinopathy? Draw and explain. (5)
4. Draw and write the difference between (5)
   a. Tractional retinal detachment and exudative retinal detachment
   b. Primary optic atrophy and secondary optic atrophy
5. Discuss these topics in the context with the National programme for control of blindness
   a. VISION 2020
6. Ethical issues in Eye Banking (2.5+2.5)
7. Discuss the following (2.5+2.5)
   a. Systemic association of Retinitis pigmentosa
   b. The pathological picture in Retinoblastoma
8. Describe briefly on the following
   a. Comment on Optical coherence tomography (2.5)
   b. Differentiate between papilloedema and papillitis (2.5)
9. Write the aetiology and management of paralytic strabismus (2.5+2.5)

GENERAL MEDICINE

GENERAL MEDICINE

GOAL

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

OBJECTIVES

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

1. Elicit a detailed clinical history, perform thorough physical examination, elicit physical signs, correlate the clinical symptoms and physical signs to make a provisional anatomical, physiological, etiopathological diagnosis, 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. Discuss and outline the principles involved in the management of the patient 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. Acquire the skills and competencies to perform minor procedures under supervision like – IV cannulation, insertion of nasogastric tube, urinary bladder catheterisation, doing an ECG etc.
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 empathy and interest in the care for all types of patients.
11. Learn patient safety and related topics.(like Medication safety and Injection safety)
12. Understand the hopes and fears of patients and know how to handle these emotions, both in himself / herself and others.
13. Demonstrate skills in documentation of case details
14. Understand 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. Understand the ethical and legal implications of his/her medical decisions.
20. Should be able to work in a team and acquire knowledge through team work.

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 and principles of prevention of disease

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

Common symptoms of disease:

- Pain: pathophysiology, clinical types, assessment and management.
- Fever: clinical assessment and management.
- Cough, wheezing, chest pain, dyspnea, 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, malena 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.
- Medical disorders and pregnancy.
- Medical disorders and surgery,
- Oral and cutaneous manifestations of diseases

Nutrition and nutritional disorders:

- Nutritional assessment and needs.
- Protein energy malnutrition& Obesity.
- Vitamin deficiency & excess.
- Mineral deficiency and excess.
- Diet therapy including parenteral and enteral nutrition therapy

Fluid, electrolyte and acid base imbalance:

- Fluid and electrolyte balance; acidosis and alkalosis
- Acid-base disorders

Poisoning, stings and bites:

- General approach to the poisoned patient.
- Poisoning by specific pharmaceutical agents-organophosphorus compounds, methyl alcohol, narcotics, aluminium phosphide, sedatives / hypnotics, plant poisons .
- Drugs of misuse.
- Snake bite and Envenomation.
- Other bites and stings -scorpion and spider.

Specific environmental and occupational hazards:

- Heat stroke and hypothermia.
- Chemicals and pesticides.
- Drowning and near drowning.
- Heavy metal poisoning.

Immune response:

- 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.

Infections:

- The febrie 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.
- 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.
- Common helminthic infections; Filariasis, Hookworm, roundworm,
- Bacterial infections:
- Common gram positive infections
- (Pneumococcus/ Staphylococcus/Streptococcus/Tetanus).
- Common gram-negative infections.
- Enteric fever, Cholera, ShigellosisL eptospirosis. Helicobacter pylori, Meningococcus, Gonococcus .
- Infections due to pseudomonas & other gram-negative bacteria.
- Anerobic infections.
- Mycobacterial infections: Tuberculosis (Typical and Atypical), Leprosy. Viral infections:
- Common exanthemata e.g. Measles, mumps, rubella, chickungunya 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.

Cardiovascular system:

- Clinical examination of the cardiovascular system.
- Functional anatomy, physiology and investigations- ECG, X ray chest.

- 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.
- Acute and chronic congestive cardiac failure, Corpulmonale.
- Rheumatic fever and rheumatic heart disease.
- Valvular heart disease.
- Coronary artery disease.
- Common congenital heart disease in the adults: ASD, VSD, and PDA, TOF and Coarctation of aorta.
- Hypertension and hypertensive heart disease.
- Common cardiac arrhythmias.
- Deep vein thrombosis, Atherosclerosis and peripheral vascular disease.
- Pericardial disease: pericardial effusion and cardiac tamponade. Cardiomyopathy

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, 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.
- Tropical eosinophilia

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 malabsorption.
- 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, tumors
- 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, 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, ascites and Fatty liver and non alcoholic steatohepatitis
- Liver abscess- amoebic & pyogenic.
- Acute and chronic hepatitis-viral and toxic.
- Alcoholic liver disease.
- Cirrhosis of liver and chronic liver disease and complications-
- Portal hypertension and porto-systemic encephalopathy,
- Acute and chronic cholecystitis, and cholelithiasis.

Endocrine and metabolic diseases:

- Diabetes mellitus: including acute and chronic complications (micro and macrovascular), and management including complications.
- 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.
- Metabolic syndrome
- Wilson's disease

Hematological disorders

- Definition, prevalence, etiological factor, pathophysiology, pathology, recognition,
- Investigations and principles of treatment of:
- Anemias: iron deficiency, megaloblastic
- Common haemolytic anemias (thalassemia, sickle cell and acquired hemolytic).
- Common bleeding disorders (thombocytopenia and hemophilia).
- Agranulocytosis and aplastic anemia.
- Leukemias (acute and chronic): Recognition, diagnosis, differential diagnosis and management.
- Lymphomas: Recognition, diagnosis, differential diagnosis and management.
- Plasma cell disorders
- 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.
- Vasculitides.Ankylosing spondylitis,
- Systemic connective tissue diseases – systemic lupus erythematosus, rheumatoid arthritis, progressive systemic sclerosis.Sarcoidosis.
- 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, EMG and NCV
- 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, aphasias, 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.
- Acute and chronic meningitis.
- Viral encephalitis.
- Parkinson's disease and other extrapyramidal disorders.
- Diseases of cranial nerves.
- Diseases of spinal cord - transverse myelitis and cord compression.
- Multiple sclerosis and other demyelinating diseases.
- Dementias including Alzheimer's disease.
- Motor neuron disease
- Cerebellar disorders.
- Peripheral neuropathy including GBS.
- Neurological manifestations of systemic diseases.
- Nutritional and metabolic diseases of the nervous system.
- Myasthenia gravis and other diseases of neuromuscular junction
- 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
- 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, Medical Council of India Code of Ethics.
- Ethics of the individual: Confidentiality, physician-patient relationship, patient autonomy, organ donation. Death and dying, and Euthanasia.
- Professional ethics: Code of conduct, fee charging and splitting, and allocation of resources in health care.
- 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.

DESIRABLE TO KNOW CATEGORY

Immune response and infections:

- Immunodeficiency disorders- congenital.
- Bacterial infections: Pertussis and diphtheria, Legionella infections, Botulism, Gas gangrene and clostridial infections, Brucellosis, Plague, Donovanosis (Granuloma inguinale). Syphilis
- Viral infections: Infectious mononucleosis,.
- Parasitic infections: Schistosomiasis, Cestodes

Cardiovascular system

- Aortic aneurysm, Aortitis
- Myocarditis

Respiratory system:

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

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.
- Polycystic kidney disease.

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
- Tumors of gall bladder and bile ducts.

Endocrine and metabolic diseases:

- Pituitary disorders: Acromegaly and Sheehan's syndrome.
- Hypogonadism. Hypopituitarism and hyperpituitarism.
- Hypothalamic disorders.Gout, haemochromatosis, porphyria

Disorders of the immune system, connective tissue and joints:

- Primary immune deficiency diseases.
- Inflammatory muscle disease.
- Osteoarthritis.
- Amyloidosis.
- Reactive arthritis and undifferentiated spondyloarthropathy.

Neurological diseases:

- Intracranial tumours.
- Diseases of muscle.

Critical care medicine:

- Scoring systems of critical care.
- Outcome and costs of intensive care.
- Electrical injuries. Radiation injury

HUMAN GENETICS

Patient safety curriculum (Must Know)

Injection Safety:

Key areas to be covered:

1. Explaining the need for injection safety
2. Standard precautions: hand hygiene, the wearing of personal protective equipment (gloves, glasses, shoes, etc) and safe injection practices
3. Transmission based precautions
4. Sensitization regarding the safe use and disposal of sharps

5. Immunisation to prevent the injection related infections
6. Prophylaxis in needle stick injury
7. Encouraging good clinical practices

Medication safety:

Key areas to be covered:

1. Explaining the need for medication safety
2. Explaining terminologies like side-effect, adverse reaction, adverse drug event, and adverse drug reaction
3. Prescription safety & errors
4. Medication errors
5. Measures to ensure medication safety
6. Prescription audit of ten prescriptions written by students
7. Reporting medication errors observed during posting

DISTRIBUTION OF MARKS

<table>
<tr><th colspan="6">Theory (200 Marks)</th></tr>
<tr><th colspan="3">Paper I (100 marks)</th><th colspan="3">Paper II (100 marks)</th></tr>
<tr><th>Sec A
40 marks</th><th>Sec B
40 marks</th><th>Sec C
20 marks</th><th>Sec A
40 marks</th><th>Sec B
40 marks</th><th>Sec C
20 marks</th></tr>
<tr><td>Q1. 10 marks (structured long question)</td><td>Q1. 10 marks (structured long question)</td><td rowspan="3">Dermatology</td><td>Q1. 10 marks (structured long question)</td><td>Q1. 10 marks (structured long question)</td><td rowspan="3">Psychiatry</td></tr>
<tr><td>Q2. 15 marks (3 short questions of 5 marks each)</td><td>Q2. 15 marks (3 short questions of 5 marks each)</td><td>Q2. 15 marks (3 short questions of 5 marks each)</td><td>Q2. 15 marks (3 short questions of 5 marks each)</td></tr>
<tr><td>Q3. 15 marks (3 short questions of 5 marks each)</td><td>Q3. 15 marks (3 short questions of 5 marks each)</td><td>Q3. 15 marks (3 short questions of 5 marks each)</td><td>Q3. 15 marks (3 short questions of 5 marks each)</td></tr>
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Practical (200 marks)					
Medicine (160 marks)					
Long case 60 marks	**Short case 60 marks**	**Spotters 20 marks**			
1 case 60 marks	2 cases 30 marks each	10 spotters of 2 marks each (Xrays, ECG, Instruments, Clinical case scenarios, Common OPD problems, Prescription for common diseases)	**Viva 20 marks**	**Dermatology (20 marks)** 4 spotters (with related questions by the examiner) Each 5 marks	**Psychiatry (20 marks)** Viva only

PAPERWISE DISTRIBUTION OF TOPICS IN GENERAL MEDICINE

PAPER I	PAPER II
Cardiology	Infectious Diseases
Neurology	Endocrinology & Diabetes
Respiratory & TB	Hematology
Gastroenterology & Liver diseases	Immunology & Musculoskeletal
Nephrology & Fluid and electrolyte	Critical care
Cardinal symptoms	Geriatrics
Patient Safety and related topics	Poisonings & Bites
Environmental Medicine	Nutrition
Genetics	Medical Ethics

LONG CASE

1. The long case can be taken from any system- CNS, Cardiovascular, Respiratory, and 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 present a good history, demonstrate clinical findings properly, and present a rational provisional and differential diagnosis, along with 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 (hemiplegia) & Paraplegia/paresis and quadriplegia/ paresis
- Cardiovascular system- Valvular heart disease (mitral/aortic) with or without atrial fibrillation, Infective endocarditis, Right heart failure, VSD
- Respiratory system- Pneumonia/consolidation, COPD, Bronchiectasis, Fibrocavitary disease (Tuberculosis), Pleural effusion (Infective/non infective), Hydropneumothorax
- Abdomen/ Lymphoreticular - Anemia with hepatosplenomegaly, Fever with hepatosplenomegaly, Generalised lymphadenopathy, Lymphadenopathy with hepatosplenomegaly, Ascites
- Weightage and marks will be given for assessing communication skills eg. breaking bad news / declaring death / informed consent for procedures, etc

SHORT CASE

1. Candidates should examine the system or part that they are assigned. They are allowed to take only a very short succinct history to justify the diagnosis. 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, Dengue fever, Scrub typhus-eschar with fever.
- Cardiovascular – General examination (emphasis on vitals and JVP), Single valve disease (MS/MR/AS/AR), Rheumatic fever, Coronary artery disease (stable angina), Peripheral artery disease, VSD, Pulmonary hypertension.

- Hematological/Lymphoreticular- Localised lymphadenopathy, Anemia-IDA/ Megaloblastic/ Hemolytic, Massive splenomegaly.
- Musculoskeletal (optional long case) - Rheumatoid arthritis, SLE, Systemic Sclerosis
- Nervous system - Cranial nerve examination, Radial nerve palsy, Claw/ape hand, Small muscle wasting (hand), Foot drop, Peripheral neuropathy, Motor system examination, Cerebellar system examination, Seizure disorder, Parkinsonism.
- Skin in Dermatology assessment
- Endocrinology – Hypothyroidism, Hyperthyroidism, Diabetes mellitus (DM), DM with trophic ulcer/neuropathic pain, DM with claudication, Obesity/acanthosis, skin changes in other endocrinological diseases
- Respiratory– Pneumonia/consolidation, COPD, Bronchiectasis, Fibrocavitary disease (Tuberculosis), Pleural effusion, Hydropneumothorax.

SAMPLE QUESTION PAPER
GENERAL MEDICINE
(PAPER – I)

Total mark-100 **Time-3 hours**

SECTION - A

1. A 55 year obese male, known smoker, presented to the casualty with severe chest pain, profuse sweating and hypotension. Write the differential diagnosis, diagnostic approach and management of the case. (3+3+4)
2. Discuss the management of, (5X3= 15)
   a. Hepatic encephalopathy
   b. Hyponatremia
   c. Acute severe asthma
3. Write short notes on, (5X3= 15)
   a. Approach to headache
   b. Approach to acute confusional state
   c. Hypertrophic cardiomyopathy

SECTION - B

1. Write the clinical feature, diagnosis and management of tubercular meningitis. (3 + 3+4)
2. Discus the clinical features of, (5X3=15)
   a. AIDP
   b. Acute kidney injury
   c. Bronchiectasis
3. Write short notes on, (5x3=15)
   a. Dressler's syndrome
   b. Principles of Medication safety
   c. Down's Syndrome

SECTION - C

Dermatology (20 marks)

SAMPLE QUESTION PAPER
GENERAL MEDICINE
PAPER – II

Total mark-100 **Time-3 hours**

SECTION - A

1. Define AIDS. Name 3 important CNS opportunistic infections associated with AIDS and write their clinical features and management. (2+ 2 + 2 + 4)
2. How will you investigate (5 x 3 = 15)
   a. Iron Deficiency Anemia
   b. Pulmonary Tuberculosis
   c. Hypothyroidism
3. Write short notes on : (5 x 3 = 15)
   a. Diagnostic criteria of SLE
   b. Hypersplenism
   c. Fat soluble vitamin deficiency disorders

SECTION - B

1. Enumerate the etiopathogenesis, clinical features and management of Diabetic Ketoacidosis. (3 + 3 + 4)
2. Discuss the treatment of : (5 x 3 =15)
   a. Complicated Falciparum Malaria
   b. Sickle cell Anemia
   c. Rheumatoid Arthritis
3. Short notes on : (5 x 3 = 15)
   a. Mixed connective tissue disease
   b. Death Declaration
   c. Management of Neurotoxic snake bite

SECTION - C:

Psychiatry (20 marks)

DERMATOLOGY & VENEREOLOGY

DERMATOLOGY & VENEREOLOGY

GOAL

The goals of the following curriculum is to make the medical students competent in diagnosing common skin illnesses like infections, infestations and diseases of National importance like leprosy and sexually transmitted infections and prescribe treatment after passing MBBS.

OBJECTIVE OF DERMATOLOGY TEACHING FOR UG MEDICAL STUDENTS

Dermatological illnesses are frequent in tropical countries and constitute major patient load in any health set up. Some diseases like leprosy and sexually transmitted infections are of national importance. The objective of undergraduate dermatology teaching is to make the medical students aware of common skin illnesses in day to day medical practice.

Course contents:

Must know topics	Structure and functions of skin Bacterial infections Fungal infections Viral infections Skin infestations Leprosy Syphilis Genital ulcers other than syphilis Urethral / vaginal discharge Urticaria & Angioedema
Desirable to know topics	Psoriasis and other papulosquamous disorders Eczema Acne Adverse cutaneous drug reactions
Nice to know topics	Auto-immune bullous disorders Hair disorders Nail disorders

Lecture: 30 hours (1 hour / day X 30 classes)

List of lecture classes

1.	Structure and functions of skin
2.	Common bacterial skin infections
3.	Superficial fungal infections of skin
4.	Parasitic infestations of skin
5.	Viral infections of skin
7.	Endogenous eczema & Contact dermatitis
8.	Acne
9.	Dermatological formulations and commonly used drugs
10.	Psoriasis & other Papulosquamous disorders
11.	Urticaria & Angioedema
12.	Adverse cutaneous drug reactions
13.	Leprosy -1 (Introduction, Classification, Clinical features)
14.	Leprosy- 2 (Diagnosis & Management)
15.	Leprosy -3 (Reactions in leprosy)
16.	Sexually transmitted infections -1 (Introduction, History taking, Patient examination)
17.	Syphilis (Introduction, classification & Clinical features)
18.	Syphilis (Diagnosis & Management)
19.	Congenital Syphilis
20.	Genital ulcer diseases other than syphilis
21.	Urethral discharge syndromes
22.	Vaginal discharge syndromes
23.	Syndromic management of sexually transmitted infections
24	Human immunodeficiency virus infection
25.	Auto-immune bullous disorders
26.	Collagen vascular disorders (Introduction and classification)
27.	Lupus erythematosus
28.	Systemic sclerosis
29.	Common hair disorders
30.	Common nail disorders

Clinics 120 hours (3 hours / day X 40 classes)

1. Bed side clinical teaching in ward
2. Short case discussion in OPD
3. Introduction to common procedures done in dermatology practice
4. Introduction to dermatological instruments

Probable topics for integration:

1. Collagen vascular disorders & Vasculitis (with Dept. of Medicine)
2. Severe cutaneous drug reactions (with Dept. of Medicine)
3. Leprosy (with Dept. of Neurology)
4. Leg Ulcer (with Dept. of Surgery)

Model Question Paper
Dermatology & Venereology

Use diagrams wherever necessary

Write short notes on: 5X4= 20

1. Borderline Tuberculoid (BT) Leprosy
2. Norweigian scabies
3. Infantile Atopic Dermatitis
4. Bullous impetigo

PSYCHIATRY

PSYCHIATRY

OBJECTIVES

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

1. Understand human behaviour and its application in patient care. Recognise differences between normal and abnormal behaviour.
2. Understand the concept of motivation, its impact on human behaviour and illness related behaviour.
3. Understand different types of emotions and their impact on health of the individual.
4. Define learning, comprehend different types of learning and conditioning. State methods of effective learning and demonstrate application of learning in treatment.
5. Understand different cognitive processes, comprehend memory process, describe short term memory and differentiate with long term memory., list causes of forgetting, and illustrate methods of improving memory.
6. Comprehend concept of thinking and its application to health care.
7. Understand nature of intelligence, explain growth of intelligence, compare role of heredity and environment in intellectual development. Method of assessment of intelligence.
8. Define personality, list determinants of personality, understand different theories of personality and learn methods of personality assessment.
9. Establish harmonious doctor-patient relationship.
10. Communicate effectively with patient, his family and community.

COURSE CONTENTS

Behavioural Sciences – II Semester

1. Introduction: General introduction to Behavioural Psychology

   What is behavioural psychology, components, individual differences and applications of behavioural sciences in patient care and medical education.

2. Motivation

   Definition of motivation, theories, types –physiological and social motives, Maslow's hierarchy of motives, clinical application

3. Emotion and its application to health

   Theories of emotions, type and impact on health.

4. Learning and conditioning

   Components of learning, classical conditioning, operant conditioning, cognitive, social, biological and observational learning. Methods of effective learning, behaviour and cognitive therapy.

5. Cognitive process and memory

   Sensation, perception, illusion, memory process, short term and long term memory, causes of forgetting and methods to improve memory.

6. Thinking and problem solving

   Definition of thinking, components of thinking-imagery recollection, language, steps in problem solving, abnormalities in thinking, decision making.

7. Intelligence: General concepts and techniques for assessment

   Theory of intelligence, growth of intelligence, stability of intelligence, determinants of intelligence, assessment of intelligence, extremes of intelligence.

8. Personality (Principles of Personality development) and objective testing of Personality

   Definition of personality, trait, factors influencing personality development, theories of personality and personality assessment.

9. Doctor Patient relationship: Importance, types and skills
10. Communication skills: types, need, specific communication skills in clinical practice.

    Method Teaching Lectures & Discussion

Assessment – Nil

PSYCHIATRY (VI SEMESTER)

OBJECTIVES

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

1. Introducing concept of psychiatric disorders and their classification
2. Awareness of general issues about etiology of psychiatric disorders and methodology used to study etiology of these disorders.
3. Ability to diagnose and treat common psychiatric disorders like depression, anxiety disorders including phobias and OCD, conversion and dissociative disorders and severe mental disorders like schizophrenia mania, catatonia.
4. To be able to diagnose severe/suicidal cases of depression and to refer them.
5. Understand the concept of personality disorders.
6. Ability to diagnosis and treat alcohol and drug dependence and withdrawal states.

7. Ability to diagnose common psychiatric disorders in children.
8. To know the role of counselling and psychological therapies in treatment of psychiatric disorders.
9. Demonstrate role of psychological testing in assessment of psychiatric disorders.

COURSE CONTENT

1. Introduction and classification of Psychiatric disorders

   Concept of psychiatric disorders; need for classification; types of classification e.g. atheoretical, symptom – based; introducing the International Classification of Diseases ((ICD) and the Diagnostic and Statistical Manual (DSM); major categories of psychiatric disorders; diagnosis of organic disorders.

2. Aetiology of Psychiatric disorders

   Overview of contribution of different scientific disciplines to psychiatric aetiology – clinical descriptive studies, epidemiology, social sciences e.g. role of life events, stress; genetics; biochemical studies; pharmacology; endocrinology; physiology; neuropathology; psychology.

3. Depression

   Epidemiology, clinical features, diagnosis, overview of aetiology, co-morbidity with organic disorders, course, treatment – pharmacological.

4. Anxiety neurosis, phobia and OCD

   Types of anxiety disorders; phobia, OCD, clinical features and epidemiology; diagnosis, differential diagnosis; overview of aetiology; course; treatment – pharmacological and non-pharmacological.

5. Hysterical neurosis (Conversion and Dissociative disorders)

   Epidemiology, clinical picture, diagnosis, differential diagnosis, aetiology, prognosis, treatment.

6. Schizophrenia

   Epidemiology, clinical features, subtypes, diagnosis, overview of aetiology, course, treatment – pharmacological, role of ECT.

7. Bipolar disorders

   Epidemiology, clinical features, diagnosis, overview of aetiology, course, treatment – pharmacological.

8. Personality disorders

   Concept of personality disorders, epidemiology, classification, assessment, overview of clinical features, aetiology, prognosis.

9. Drug and Alcohol dependence

   Concept of abuse and dependence, epidemiology of alcohol and opiate dependence; clinical features, withdrawal symptoms including complicated withdrawal, psychosocial complications, aetiology, outcome, treatment.

10. Psychiatric disorders of childhood and adolescence,

    Classification of childhood psychiatric disorders, epidemiology, clinical features, aetiology, assessment.

11. Counselling and psychological therapies

    Counselling process, skills, different counseling approaches, behaviour therapy, cognitive therapy and its applications.

12. Psychological testing

    What are psychological tests, standardization, reliability, validity, intelligence test, personality test, application.

MUST KNOW CATEGORY

Introduction to human emotions, thinking, behaviour, personality. Application of psychology to medicine. 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. Personality development: types of personality and premorbid 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: 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 patient, doctor; physical trauma; Psychological trauma; ‘psychological support and first aid-psychological support during disasters.

DESIRABLE TO KNOW CATEGORY

Attitudes : Nature and development of attitudes. 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

Perform independently –

Must know: Psychiatric history taking, mental status examination, higher mental functioning. Counselling, crisis intervention**.** Behavioural and psychological analysis of self destructive behaviour. Primary care for the children and adolescents and then refer to the psychiatrist/ child & adolescent psychiatrist. Demonstrating empathy, compassion and establishing and maintaining rapport. Ability to recognise symptoms of anxiety; unhappiness, depression, psychosis., alcohol and opioid withdrawal and intoxication. Meaning of Bio-psycho-social in causation and in Interventional Approaches.

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.

Dealing with PTSD. Developmental delay assessment. Geriatric Mental status examination (Primary and higher mental functions).

Desirable to know – Behavioural Analysis; Understanding normal and abnormal behaviour, 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.

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.

Nice to know- Unconscious, Subconscious, Conscious mind; Id, Ego, Superego (Psychoanalytic Approaches).

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

TEACHING AND LEARNING METHODOLOGY

Lectures and discussions with patients

TEXT-BOOK RECOMMENDED

1. Niraj Ahuja's Text-book on Psychiatry
2. Oxford Psychiatry

MODEL QUESTION PAPER
MEDICINE
SEC C

(4x5=20 marks)

1. State the various somatic symptoms of depression. what are the pharmacological treatment options for depression.
2. What is modified ECT. Write down the various indications and contraindications for use of ECT.
3. Enumerate the various catatonic signs. What are the common causes of catatonia.
4. A 20 years female presents to OPD with 1 year history of suspiciousness, muttering to self, hearing voices from outside, with disorganized occupational functions. There's family history of Psychosis in grandfather, without any history of substance use.

   What is the probable diagnosis and state the different treatment options for the condition.

GENERAL SURGERY

GENERAL SURGERY

NATIONAL GOALS

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

- 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.
- Learn every aspect of national policies on health and devote himself / herself to its practical implementation.
- Achieve competence in practice of holistic medicine, encompassing promotive, preventive, curative and rehabilitative aspects of common diseases.
- Develop scientific temper, acquire educational experience for proficiency in profession and promote healthy living.
- Become exemplary citizen by observation of medical ethics and fulfilling social and professional obligations, so as to respond to national aspirations.

INSTITUTIONAL GOALS

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

- 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.
- be competent to practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems.
- appreciate rationale for different therapeutic modalities, be familiar with the administration of the “essential drugs” and their common side effects.
- 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.
- possess the attitude for continued self learning and to seek further expertise or to pursue research in any chosen area of medicine.
- acquire basic management skills in the area of human resources, materials and resource management related to health care delivery.
- 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.

- be able to work as a leading partner in health care teams and acquire proficiency in communication skills.
- be competent to work in a variety of health care settings.
- 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.

OBJECTIVES

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

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

KNOWLEDGE

System Based

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
Metabolic response to injury					
1.	Basic concepts in homeostasis	Avoidable factors that compound the response to injury	Changes in body composition following injury	2 Hours	Two lectures
2.	Mediators of metabolic response to injury				
3.	Metabolic stress response to injury				
4.	SIRS				
Shock and blood transfusion					
1.	Shock- definition and types	Consequences		Two integrated seminars of two Hours each	Integrated Lecture with Physiology, Surgery, Medicine, TEM/ Anaesthesia
2.	Ischemia reperfusion syndrome	Multiorgan failure			
3.	Severity of shock				
4.	Resuscitation				
5.	Haemorrhage- pathophysiology, degree and Classification				
6.	Transfusion- blood and blood products, transfusion reaction				

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
Wounds tissue repair and scars					
1.	Abnormal healing	Normal wound healing	Normal healing in specific tissues	6 hours	Lecture, ward round dressing room
2.	Types of wound				
3.	Compartment syndrome				
4.	Vaccum assisted closure				
5.	Hypertrophic scars, Keloid and contractures				
6.	Venous ulcer				
7.	Pressure ulcer				
8.	Burn			3 hours	
Surgical infection					
1.	Causes of decreased host response	Koch's postulates		6 hours	Integrated seminar with Microbiology and TEM.
2.	Risk factors of wound infection	Types of localized infection			
3.	Surgical site infection	Specific wound infection			
4.	SIRS and MODS	Treatment of surgical infection			
5.	Necrotising soft tissue infection				
6.	Prophylactic antibiotic				
7.	Universal precaution				

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
Pediatric surgery					
1.	Undescended testis	Inguinal hernia		12 hours	Lecture
2.	Acute scrotum	Infantile pyloric stenosis			
3.	Abnormalities of penis	Non specific abdominal pain			
4.	Intussusception				
5.	Swallowed and inhaled foreign body	Esophageal atresia			
6.	Anorectal malformation	Congenital diaphragmatic hernia			
7.	Hirschsprung disease				
8.	Necrotizing enterocolitis				
VASCULAR (Arterial Disorders)					
1.	Arterial Stenosis and Occlusion Features, Investigations, Nonsurgical management		Surgical management	6 hours	Lecture
2.	Gangrene, Bedsores				
3.	Acute Arterial Occlusion, Compartment syndrome, Acute mesenteric ischemia				

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
4.	Aneurysm, Abdominal aortic aneurysm, Arteriovenous fistula		Peripheral aneurysm	2 hours	Lecture
5.	Thromboangitis Obliterans, Raynaud's disease				
VASCULAR (Venous Disorders)					
1.	Anatomy of venous system of limbs, Venous pathophysiology			4 hours	Integrated Lecture with Anatomy
2.	Varicose veins, CEAP				
3.	Venous thrombosis- diagnosis, Investigations				
VASCULAR (Lymphatic Disorders)					
1.	Anatomy and Physiology of the lymphatic system			4 hours	Lecture
2.	Lymphoedema- Classification, pathophysiology, clinical features, investigations and management		Different surgical procedures		
Abdomen (Abdominal wall, hernia and umbilicus)					
1.	Anatomy of the abdominal wall			6 hour	Lecture

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
2.	Abdominal hernia- anatomical causes, pathophysiology, types, investigations, management	Specific hernia types	Surgery, types of mesh	6 hour	Lecture
3.	Umbilical conditions in the adult				
4.		Abdominal compartment syndrome	Neoplasms of the abdominal wall		
Abdomen (The peritoneum, omentum, mesentery and retroperitoneal space)					
1.	Anatomy and Physiology			4 hours	Lecture
2.	Peritonitis- Causes, Microbiology, types, Clinical features, diagnosis, management		Special forms of peritonitis		
3.	Intraperitoneal abscess- Pelvic abscess, Subphrenic abscess				
4.			Retroperitoneal tumors		
5.	Mesenteric cysts- Types, pathology, clinical features, investigations and treatment				
Abdomen (The esophagus)					
1.	Surgical anatomy and physiology			3 hours	Lecture
2.		Corrosive injury	Perforation		
3.	GERD, Hiatus hernia				

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
4.	Oesophageal motility disordersAchalasia cardia, Diffuse esophageal spasm and nutcracker esophagus			1 hours	Lecture
5.		Malignant Neoplasm		2 hours	Integrated Seminar with Radiation Oncology
GI Bleed					
1.	Upper GI Bleed			2 hours	Integrated Seminar with Gastroenterology
2.	Lower GI Bleed			2 hours	Integrated Seminar with Gastroenterology
Abdomen (Stomach and duodenum)					
1.	Anatomy and Physiology of the stomach and duodenum			3 hours	Integrated seminar with Medicine
2.	Gastritis and Peptic ulcer- pathophysiology, clinical features, investigations and treatment Complications of peptic ulcer				
3.	Gastric Outlet Obstruction, Gastric cancer		Surgical treatment for gastric cancer, Postoperative complications of gastrectomy	3 hours	Integrated seminar with Radiation oncology

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
4.		Gastrointestinal stromal tumor, Gastric lymphoma	Duodenal tumours	3 hours	Integrated seminar with Radiation oncology
The Liver					
1.	Anatomy			4 hours	Integrated seminar with Microbiology
2.	Amoebic liver abscess Hydatid liver disease				
3.			Neoplasms of the Liver		
The Spleen					
1.		Anatomy, Physiology and Functions of the Spleen		3 hours	Surgical part can be integrated with the medical seminars.
2.	Splenomegaly and Hypersplenism				
3.			Splenectomy and its complications		
The Gall bladder and bile ducts					
1.	Surgical Anatomy and Physiology		Radiological investigations of the biliary tract	4 hours	Lecture
2.	Cholelithiasis, choledocholithiasis and its complications, management				

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
The Pancreas					
1.		Anatomy and Physiology		3 hours	Integrated seminar with Medicine
2.	Acute Pancreatitis				
3.	Chronic Pancreatitis			1 hours	Lecture
4.	Obstructive Jaundice, Periampullary carcinoma including Carcinoma Head of Pancreas			3 hours	Clinical Case Conference
The Small and Large intestines					
1.	Intestinal tuberculosis	Diverticular disease of the small and large intestine		1hours	Lecture
2.		Mesenteric ischemia			
3.		Inflammatory Bowel disease			
4.	Colorectal Malignancy			3 hours	Integrated lecture with pathology
5.	Stomas	Enterocutaneous fistulas			Ward Teaching
Intestinal Obstruction					
1.	Classification, Pathophysiology, Clinical features, treatment	Acute intussusception, Volvulus	Adynamic obstruction	2 hours	Lecture

M.B.B.S CURRICULUM

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
The vermiform appendix					
1.	Acute Appendicitis	Anatomy	Neoplasms of the appendix	2 hours	Lecture
The Rectum and Anal canal					
1.	Surgical anatomy			3 hours	Lecture
2.	Anal Fissure, Haemorrhoids, Anorectal abscesses, Fistula in ano				
3.	Rectal Prolapse		Solitary rectal ulcer		
4.	Rectal carcinoma- spread, stages, clinical features, investigations, management			2 hours	Integrated seminar with Radiation oncology
5.	Malignant lesions of the anus and anal canal- management				
Skin & Subcutaneous Tissue					
1.		Vascular lesions: Common vascular birthmarks	Vascular lesions: Congenital - haemangiomata and vascular malformations Acquired		
2.		Wounds: Acquired	Wounds: Congenital		

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
3.	Malignant lesions: Basal Cell Carcinoma, Cutaneous Squamous Cell Carcinoma, Cutaneous malignant melanoma			2 hours	Lecture
Head and Neck					
1.	Cleft lip & palate			1hour	Lecture
2.	Pharynx, Larynx & Neck: <u>Lump in the Neck;</u> Branchial Cyst, Branchial fistula, Cystic Hygroma, Thyroglossal cyst			1 hour	Lecture
3.	Disorders of Salivary glands: a)Sublingual glands b)Submandibular glands c) Parotid glands	Disorders of Salivary glands: a)Minor Salivary glands		2 hours	Lecture
Cardiothoracic Surgery					
1.	Empyema			1hour	Lecture
2.	Diaphragmatic Hernia			1hour	Lecture
3.		Aortic Aneurysm		1hour	Lecture
4.		Aortic Dissection			

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
Perioperative Care					
1.	Organise preoperative care and operating list			1hour	Lecture
2.	Understand surgical, medical and anesthetic aspects of assessment			2 hour Integrated lecture with anesthesia	
3.	Optimization of patient condition				
4.	Take proper consent			1hour	Role play
5.	History taking				Ward teaching
6.	Diagnose special preoperative problems, referrals and management			1hour	Integrated lecture with anesthesia
7.	Acute pain management			1hour	Integrated lecture with pharmacology
8.	Chronic pain management			1hour	Integrated lecture with anesthesia
9.	Prepare a patient for theatre			2 hour	Workshop
10.	Importance of Surgical Safety Checklist			1hour	Small group,Seminar, Role play
11.	Reduce intraoperative risks of positioning, venous thromboembolism, inf ection and hypothermia, by using appropriate monitoring and equipment			1hour	Can be taken by anesthesia department

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
12.	Operation theatre etiquettes			1hour	
13.	Scrubbing up, assistance role and writing an operation note			1hour	
14.	Metabolic Response to starvation			1hour	Workshop
15.	Nutritional Assessment				
16.	Types of Fluids			2 hours	
17.	Electrolyte imbalance				
18.	Nutritional Requirement			1hour	
19.	Artificial Nutritional Support				
20.	Enteral Nutrition and Parenteral nutrition				
21.	General management of postoperative patient			2 hours	Lecture and ward teaching
22.	System specific postoperative complications				
23.	Management of postoperative complications				
24.	Discharge advice				Ward teaching
25.		Techniques of General anesthesia and airway maintenance			To be taken by anesthetist

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
26.		Local and Regional anesthesia techniques			To be taken by anesthetist
27.			Enhanced Recovery	1hour	Lecture
28.			Concept of day surgery pathway		
29.	Principles of oncology			2 hours	
30.	Surgical audit & Research			1 hours	
31.	Bariatric and Metabolic surgery			1 hours	
32.	MAS & Robotic Surgery			2 hours	
33.	Tissue & Molecular diagnosis			1 hours	
34.	Career in Surgery			1 hours	
Transplantation					
1.	Types of rejection			2 hour (for surgical aspect discussion)	Lecture
2.	Indications for organ transplantation	Graft Rejection Immunology	Surgical principals of organ implantation		
3.	Brain death	HLA matching			
4.		Immunosuppressive Therapy			

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
Breast					
1.	Anatomy, Investigations, Triple assessment			2 hours	Lecture
2.		Nipple, diseases, discharges,& Treatment		2 hours Lecture	Lecture
3.	Benign breast diseases Ac & Ch Infections Treatment				
4.	ANDI,Mastalgia,Fibroadenoma, Phylloides,Galactocele				
5.	Carcinoma ,Risk factors, pathophysiology, Staging			3 hours	Integrated seminar with oncology
6.	Carcinoma, Management				
Thyroid					
1.	Anatomy, Physiologv,Investigations,			2 hours	Lecture
2.		Hypothyroidism & Hyperthyroidism			
3.	Goitre		Thyroiditis		
4.	Thyroid Malignancies			2 hours	Integrated lecture with pathology and nuclear medicine
Parathyroid					
1.		Hyperparathyroidism, Primary, Secondary		1hour	Lecture

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
Adrenal Glands					
1.		Anatomy & Physiology		1hour	Lecture
2.	Phaeochromocytoma & Paraganglionoma			1hour	Lecture
3.			Adrenal Insufficiency,Congenital Adrenal Hyperplasia, Ad renocortical carcinoma		
4.	MEN				
Trauma					
1.	ABCDE of trauma			16 hours	Trauma Workshop
2.	Primary & Secondary survey				
3.	Blunt Abdominal Trauma & Penetrating Abdominal Trauma				
4.	Thoracic Trauma, Massive Haemothorax, Cardiac Tamponade,				
5.	Musculoskeletal Trauma, Compartment syndrome				
6.	Head injury, EDH, SDH				

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
7.	Thoracic Trauma, Massive Haemothorax, Cardiac Tamponade,				
8.	Mass casualties, Disaster Management, Triage				
9.	Genitourinary Trauma				
Urinary symptoms					
1.	Hematuria			1hour	Essentials to clinical Practice in 3rd sem
2.	Pain				
3.	LUTS				
4.	Approach to a patient with LUTS			2 hours	CCC 8th sem
5.	Anuria and Urinary retention	Acute neuropathic bladder		2 hours	Integrated seminar (Surgery and Medicine)
6.	Causes of incontinence of urine	Management of incontinence	Types and diagnosis of urinary fistulae	2 hours	Integrated seminar (Surgery and O&G, Neurology)
Genito urinary					
Urinary Investigations					
1.	Urine			2 hours	Integrated seminar (pathology, biochemistry , radiology)
2.	Renal function test				
3.	Imaging- X-ray KUB, IVU, RGU, USG, CT, Cystoscopy	Retrograde ureteropyelography, Urethrography, TRUS, Radioisotope scan, Urodynamic study	Antegrade pyelography, DSA, MRI PET		

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
Congenital anomalies of the kidney , ureters and bladder					
1.		Congenital cystic kidney, Ureterocele,	Solitary kidney, Renal ectopia, Horseshoe kidney. Unilateral fusion of kidney, Congenital megaureter. Bladder exstrophy	1hour	Lecture, ppt
Hydronephrosis					
1.	Causes of unilateral and bilateral hydronephrosis, clinical features and management			1hour	Lecture, ppt
Urolithiasis					
1.	Types, etiology, Clinical presentation, investigation, Management of renal stones as per the location of the stones.			2 hours	Integrated seminar (pathology, surgery)
Renal infection					
1.	Acute pyelonephritis, Chronic Pyelonephritis, Pyonephrosis, Perinephric abscess, Renal tuberculosis, Lower urinary tract infection		Renal carbuncle	2 hours	Integrated seminar (pathology, medicine)
Benign prostatic hyperplasia					
1.	Aetiology Pathophysiology Clinical features Management		Methods of prostatectomy	2 hours	Lecture, ppt

S. No.	Must Know	Desirable to Know	Nice to know	Hour of Teaching	TL Method
Cancer of prostate					
1.		Screening Pathophysiology Clinical features Management		1hour	Lecture, ppt
Anomalies of the urethra and testis					
1.	Epispadias, Hypospadias			1hour	Lecture ppt
2.	Maldescent of testis, Phimosis, Torsion				
3.	Varicocele, Epididymoorchitis				
Malignancy of the urogenital system					
1.	Wilm's tumor Renal cell carcinoma	Papillary transitional cell tumor		1hour	Lecture, ppt
2.		Urinary bladder Carcinoma		1hour	Lecture, ppt
3.	Testicular tumors			1hour	Lecture, ppt
4.	Penile Carcinoma			1hour	Lecture, ppt
Clinical case conference					
1.	5th semester			20 hours	
2.	8th semester			30 hours	
3.	9th semester			10 hours	

Approach to the patient with

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

Skill Based Objectives

Skills	Perform independently	Perform under Supervision	Assist the expert
Obtain a proper relevant history, and perform a humane and thorough clinical examination including internal examinations (per-rectal and per vaginal) and examinations of all organs/systems in adults and children	Yes		
Arrive at a logical working diagnosis after clinical examination	Yes		
Order appropriate investigations keeping in mind their relevance (need based) and cost effectiveness .	Yes		
Write a complete case record with all necessary details. Write a proper discharge summary with all relevant information	Yes		
Obtain informed consent for any examination/procedure	Yes		
Start IV lines and monitor infusions, start and monitor blood transfusion .	Yes		
Conduct CPR (Cardiopulmonary resuscitation) Basic life support	Yes		
Pass nasogastric tube	Yes		
Perform digital rectal examination and proctoscopy	Yes		
Urethral catheterisation	Yes		
Dressing of the wounds	Yes		
Suturing of the simple wounds	Yes		
Remove small subcutaneous swelling & perform various types of biopsies	Yes		
Relieve pneumothorax	Yes		
Infiltration, surface and digital Nerve blocks Incise and drain superficial abscesses Manage Lacerated wounds	Yes		

Skill

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

Teaching learning methods:

Structured interactive sessions Small group discussions Self learning tools like

a. Assignments

b. Problem based learning

c. Written case scenarios

d. Simulated patient management problems,

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

- Bailey and love's short practice of Surgery
- A manual of clinical Surgery by S Das
- Hamilton Bailey's demonstration of clinical signs
- Pye's Surgical Handicraft

3RD PROFESSIONAL EXAMINATION 20__
SURGERY
Paper-I
Answer each question in a separate answer booklet
Attempt all questions
Duration- 3 hours

SECTION A

1. A 30 years old man weighing 60 kgs presented to the accident and emergency with burn injury over approximately 40% body surface area.

   i) Outline the fluid management schedule and other supportive management during the first 24 hours after admission (4 marks)

   ii) What are different options of covering the burn wound (4 marks)

   iii) Enumerate the different delayed complication of burn and their management. (2 marks)

2. Short answer questions (6x5=30 marks)

   a. Clinical features and management of Extradural hematoma

   b. Branchial cyst

   c. Treatment options in malignant melanoma

   d. Diagnosis and management Tension pneumothorax

   e. Difference in clinical feature and management of hypertrophic scar and keloids

   f. Management of hyperkalemia.

SECTION-B

3. A 55 year old man presents to the outpatient department with a swelling on the left side of the neck for six months duration. (2+4+4=10marks)

   i) Enumerate the causes that could lead to this presentation.

   ii) How will you investigate this patient?

   iii) Briefly discuss the management of pleomorphic adenoma of the parotid gland.

4. Short answer questions : (6x5 marks)

   i) Triple assessment

   ii) Claudication pain and its significance

   iii) Methods of performing sentinel lymph node biopsy and its significance

   iv) Management of venous ulcer

   v) Ankle brachial index

   vi) How would you differentiate cellulitis of the leg from deep vein thrombosis

3RD PROFESSIONAL EXAMINATION 20__
SURGERY
Paper-I
Answer each question in a separate answer booklet
Attempt all questions
Duration- 3 hours

SECTION A

1. A 50 year old lady presented with chief complaint of yellow discolouration of skin and eyes for 25 days. She had intense itching all over the body. On examination of the abdomen her gall bladder was not palpable. Her total bilirubin was 12 mg/dl. The direct bilirubin was 10 mg/dl and the indirect 2 mg/dl. (10)
   a. List the possible differential diagnosis with justification of each (4 marks)
   b. Outline the preoperative management in patients specific to obstructive (2 marks)
   c. Briefly outline the investigations protocol in patients of obstructive jaundice with justification for each (4marks)
2. Short answer questions (6x5)
   a. Fistula in ano
   b. Management of patient with lower GI bleed
   c. Options in the Investigation and surgical treatment of GERD
   d. Differential diagnosis of a right iliac fossa lump and investigations to reach a diagnosis
   e. Management option in pseudocyst of pancreas
   f. Toxic megacolon

SECTION –B

1. A 26 years old male complains of intermittent pain in the loin with associated hematuria
   a. Enumerate with justification the differential diagnosis (2marks)
   b. Outline the investigations that can be done to arrive at the diagnosis (2 marks)
   c. Enumerate the various treatment options of upper urinary tract calculi and justification of choosing each.
2. Short answer question (6x5 marks)
   a. Cause of hydronephrosis
   b. Hematuria
   c. Hypospadias
   d. Management of acute retention of urine in a 50 years old male
   e. PUJ obstruction
   f. Intravenous urography

ORTHOPAEDICS

ORTHOPAEDICS

GOALS

A medical graduate should diagnose basic Orthopaedic ailments and provide primary care till the patient is shifted to a higher center. He/ she should understand the principles of fractures, dislocations and soft tissue injury and manage as per the guidelines to prevent further damage to the patient. He/she should also understand the Orthopaedic emergencies and golden hour principle in Orthopaedics.

OBJECTIVES

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

1. Enumerate the principles of Fracture management.
2. Diagnose common Orthopaedic ailments.
3. Differentiate Orthopaedic emergency
4. Put splint and different plasters.
5. Perform intra-articular injections procedure.
6. Understand the importance compound fractures.
7. Reduce shoulder, elbow and small joint dislocations.
8. Know different implants used in Orthopaedics.
9. Diagnose different fractures and understand basic management.
10. Diagnose from clinical and radiological investigation different bone tumors.
11. Understand congenital bone diseases.
12. Diagnose and manage bone and joint infection.
13. Understand bone and spine tuberculosis.
14. Know the role of physiotherapy in Orthopaedics.
15. Know different walking aids and supports.

Sl. No	Topic	Domain		Class	Clinical Posting
		Must Know	Nice to Know		
1.	1. History of Orthopaedics 2. Anatomy of Bone	1. History of Orthopaedics and terminologies used in Orthopaedics. 2. Anatomy, Vascular Supply and ossification of Bone.		1 Hours	
2.	Fracture Classification and fracture Healing	1. Fracture Classification 2. Fracture Healing		1Hour	
3.	Fracture of Upper limb	1. Humerus Fracture 2. Colle's Fracture 3. Forearm Fracture 4. Olecranon Fracture 5. Shoulder Dislocation	1. Fracture Radial Head 2. Elbow Dislocation	2 Hours	5 Hours
4.	Fracture around Hip	1. Fracture Neck of Femur 2. Fracture Trochanter		2 Hours	5 Hours
5.	Fracture of lower limb	1. Fracture Femur 2. Fracture Tibia 3. Fracture Patella 4. Fracture Pott's	1.Fracture of Phalanges	2 Hours	5 Hours
6.	Compound Fracture	1. Compound Fracture		1 Hour	2 Hours
7.	Bone and joint Infection	1. Osteomyelitis 2. Tuberculosis of bone. 3. Septic Arthritis		2 Hours	5 Hours
8.	Bone Tumors	1. Benign Bone tumor 2. Malignant Bone Tumor	1. Limb Salvage Surgery 2. Prosthesis after amputation	1 Hours	5 Hours
9.	Arthritis	1. Osteoarthritis 2. Gouty Osteoarthritis 3. Joint Replacement		1 Hour	5 Hours
10	Spine	1. Back Pain 2. Spinal Trauma 3. PIVD	1. Cervical Spondylosis 2. Cervical Rib 3. Whiplash injury	1 Hour	5 Hours
11.	Miscellaneous	1. Tennis Elbow 2. Dequervan's disease 3. Plantar Fascitis 4. Trigger finger 5. Frozen Shoulder		1 Hour	3 hours

MODEL QUESTION PAPER
SURGERY
SEC C

(4X5=20 marks)

1. Osteomyelitis.
   a. Define and classify Osteomyelitis. 1 mark
   b. Clinical feature and diagnosis of Osteomyelitis. 2 marks
   c. Management of chronic Osteomyelitis 2 marks
2. Fracture.
   a. Define fracture and classify fracture of long Bone. 2 marks
   b. Enumerate the steps of fracture healing. 3 marks
3. Tension band wiring
   a. What is Tension Band wiring? 2 marks
   b. Write the principle of Tension Band wiring. 2 marks
   c. Use of Tension band Wiring 1 mark
4. Long Bone.
   a. Draw a labeled diagram of long bone with its blood supply. 3 marks
   b. Write the causes of Nonunion in relation to blood supply of bone. 2 marks

ANAESTHESIOLOGY

ANAESTHESIOLOGY

GOALS:

The student who completes the anesthesia training is expected to acquire confidence in airway management skills, approach to emergency resuscitation and perioperative care in addition to pain management.

OBJECTIVES:

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

1. Enumerate the principles of anesthesia management in emergencies.
2. Outline the management of patient in the perioperative period.
3. Describe the Pharmacology of anaesthetics drugs
4. Outline the management of perioperative fluid, and electrolyte disturbances
5. Perform skills in cardiopulmonary resuscitation
6. Discuss the management of acute and chronic pain patients
7. Discuss the basics of obstetric anaesthesia
8. Describe the care of the unconscious patient

INTEGRATION:

Management of Difficult Airway (TEM, Anesthesia, ENT)

Polytrauma (TEM, Surgery, Anesthesia, Medicine)

Cardiac arrest (TEM, Anesthesia, Medicine)

Fluid & electrolytes management (Medicine, Surgery, Anaesthesia)

Management of critically ill (TEM, Anesthesia, Medicine)

Acute and chronic pain management (Anaesthesia, Medicine, surgery)

Neonatal resuscitation (Paediatrics, Anaesthesia)

Management of obstetric emergencies (OG, Medicine, Anesthesia)

S. No	Topic	Domain	Class	Clinical Posting
1.	Introduction to Anesthesia (Orientation)	**Must know** 1. Introduction to Anaesthesia	1Hour	1 day
2.	History of Anaesthesia	**Desirable to know** 1. .History & Evolution of anaesthesia	1Hour	
3.	Pre-anaesthesia assessment & preparation	**Must Know** 1. Pre operative preparation 2. Nil Per Oral protocol 3. Pre-anaesthesia assessment	2 Hour	1 day
4.	Pre-medication	**Must Know** 1. What is premedication and drugs used 2. Uses of Premedication	1Hour	
5.	Anaesthesia machine & devices	**must know** 1. Introduction to anaesthesia machine and work station **Desirable to Know** 2. Introduction to various anaesthesia circuits & modes of ventilation, vaporizers	2 Hour	2 day
6.	Oxygen therapy and devices	**Must Know** 1. Goals of oxygen therapy. 2. Evaluation of patients receiving oxygen therapy 3. Devices used for Oxygen Therapy	2 Hour	2 day
7.	Spinal and epidural Anaesthesia	**Must Know** 1. Spinal and epidural anaesthesia 2. Effects and complications of neuraxial anesthesia 3. Monitoring and management of patient during neuraxial anaesthesia **Nice to Know** 1. Techniques of spinal anaesthesia	1Hour	2 day

8.	Local Anaesthesia	**Must know** 1. Drugs used for local anesthesia, indications and contraindications 2. Complications of Local Anesthetic drugs & management	1 Hour	2 day
9.	General anaesthesia	**Must Know** 1. Introduction of general anaesthesia & phases **Desirable to know** 1. a)How it is given and reversed 2. b) Associated complications	2 Hour	3 day
10.	Critical care medicine	**Must Know** 1. Assessment of critically ill 2. Basics of Resuscitation	2 Hour	2 day
11.	Obstetric Anaesthesia	**Must Know** 1. Anaesthetic implications in Obstetrics 2. Labour Analgesia	2 Hour	2 day
12.	Mechanical Ventilation	**Desirable to know** 1. Introduction to Artificial ventilation 2. Ventilators and their uses 3. General care of patient on Ventilator	2 Hour	2 day
13.	Care of unconscious patient	**Must Know** 1. Assessment & Management	2 Hour	2 day
14.	Basic & Advanced life support	**Must know** 1. Assessment and steps 2. Defibrillation	2 Hour	2 day
15.	Pain management	**Must know** 1. Acute pain management 2. Analgesics and uses **Nice to know** 1. Chronic & Cancer pain and their management	1Hour	2 day

MODEL QUESTION PAPER
SURGERY
SEC C

Each question carries 5 marks. Answer all questions. 5 x 4 = 20

1. With regards to resuscitation:
   a. Define basic life support? 1 mark
   b. Enumerate 4 ECG rhythms of cardiac arrest? 2 marks
   c. Mention 5H and 5Ts of cardiac resuscitation? 2 marks
2. With regards to blood transfusion
   a. Define massive blood transfusion 1 mark
   b. Enumerate 4 major complications of blood transfusion 2 marks
   c. Name various tests of coagulation 2 marks
3. Acid base disorder
   a. Enumerate 4 causes of metabolic acidosis 2 marks
   b. What is anion gap ? 1 mark
   c. Management algorithm of DKA 2 marks
4. Trauma
   a. What is FAST 1 mark
   b. Classify Shock 2 marks
   c. Management algorithm of hemorrhagic shock 2 marks

TEXT BOOKS RECOMMENDED

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

REFERENCE BOOKS

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

OBSTETRICS AND GYNAECOLOGY

OBSTETRICS AND GYNAECOLOGY

GOAL

The goal of this curriculum is to enable the undergraduate students to acquire the knowledge, skills and attitudes in the discipline of Obstetrics & Gynaecology as essential for a general practitioner.

OBJECTIVES

I. KNOWLEDGE:

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

a. Outline the anatomy, physiology and pathophysiology of the reproductive system and the common conditions affecting it.

b. Detect normal pregnancy, labour, puerperium and manage the problems he/she is likely to encounter therein.

c. List the leading causes of maternal & perinatal morbidity and mortality.

d. Understand the principles of contraception and various techniques employed, methods of medical termination of pregnancy, sterilization and their complications.

e. Identify the use, abuse and side effects of drugs in pregnancy, pre-menopausal and postmenopausal periods.

f. Describe the national programme of maternal and child health and family welfare and their implementation at various levels.

g. Identify common gynaecological diseases and describe principles of their management.

h. State the indications, techniques and complications of surgeries like Caesarean section, laparotomy, abdominal and vaginal hysterectomy, Fothergill's operation and vacuum aspiration for Medical Termination of Pregnancy (MTP).

II. SKILLS:

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

a. Take proper history and do detailed clinical examination.

b. Examine a pregnant woman; recognize high-risk pregnancies and make appropriate referrals.

c. Conduct a normal delivery, recognize complications and provide postnatal care.

d. Resuscitate the newborn and recognize the congenital anomalies

e. Advise a couple on the use of various available contraceptive methods and assist in insertion and removal of intra-uterine contraceptive devices.

f. Perform pelvic examination, diagnose and manage common gynaecological problems including early detection of genital malignancies.

g. Make a cervical cytological smear and wet vaginal smear examination for Trichomonas vaginalis; Moniliasis and gram stain for gonorrhoea.

h. Interpretation of data of investigations like biochemical, histopathological, radiological ultrasound etc.

i. Acquire communication, decision making, patient safety and managerial skills.

III. INTEGRATION:

The student shall be able to integrate clinical skills with other disciplines and bring about coordination of family welfare programme for the national goal of population control.

COURSE CONTENTS

General considerations: The curriculum/course content shall include the topics in following categories: up to 70% of the content from must know category, 25% from desirable to know category and remainder 5% from nice to know category. Accordingly, the theory lectures and final(summative) assessment should be as per the above.

The CHAPTER WISE course contents as per the category are as follows:

Serial No.	Topic	Must know	Desirable to know	Nice to know
BASIC SCIENCES:				
1.	Normal & abnormal development, structure and function of female & male urogenital systems and the female breast.	Basic embryology, Anatomy of internal reproductive organs, Anatomy of external genitalia, relationship to other pelvic organs. Uterine anomalies Classification and diagnosis and reproductive outcome and indications for surgical management	Surgical procedures for specific anomalies	Recent advances
2.	Applied anatomy of the genito-urinary system, abdomen, pelvis, pelvic floor, anterior abdominal wall, upper thigh (inguinal ligament, inguinal canal, vulva, rectum and anal canal).	Applied anatomy as related to Obstetrics and Gynaecology.	Uterine appendages	Paraovarian cyst, Gartner's duct cyst
3.	Physiology of spermatogenesis	WHO normal semen parameters	Diagrammatic representation of spermatogenesis	Methods of inhibiting spermatogenes is
4.	Endocrinology related to male and female reproduction.	Gametogenesis, ovulation, menstruation, fertilisation and implantation	Assisted reproductive techniques	Implanataion failure

Serial No.	Topic	Must know	Desirable to know	Nice to know
BASIC SCIENCES:				
5.	Anatomy & Physiology of urinary & lower GI (Rectum / anal canal), tract.	Relationship to female internal genitalia, genital fistulae, stress urinary incontinence	Iatrogenic injuries during gynaecological/ obstetric surgeries and its prevention	Recto-vaginal fistula
6.	Development, structure & function of placenta, umbilical cord & amniotic fluid.	Development and structure and functions of placenta. Amniotic fluid- volume, constituents, importance	Assessment of placenta and amniotic fluid by ultrasonography	Amniocentesis
7.	Anatomical & physiological changes in female genital tract during pregnancy .	Changes in genital tract, haematological changes, weight changes, metabolic changes, systemic changes	Role of hCG	Role of other hormones
8.	Anatomy of fetus, fetal growth & development, fetal physiology & fetal circulation.	Basic embryology. Fetal development and growth at various gestational ages. Teratogenic agents and drugs to be avoided / contraindicated in early pregnancy Fetal circulation	Evaluation of fetal growth gross congenital fetal anomalies	Other systems
9.	Physiological & neuro-endocrinal changes during puberty disorders, adolescence, menstruation, ovulation, & menopause.	Tanner staging, Puberty menorrhagia, Abnormal uterine bleeding-causes and management, diagrammatic representation, ovulation, fertilization, menopause, Problems of menopause	Newer drugs for medical management of AUB, MHT	Side effects of newer drugs and MHT

Serial No.	Topic	Must know	Desirable to know	Nice to know
BASIC SCIENCES:				
10.	Gametogenesis, fertilization, implantation & early development of embryo.	Gametogenesis, fertilization, implantation & early development of embryo, physiology of conception	Fetal anomalies	Genetics in molar pregnancy
11.	Normal pregnancy, physiological changes during pregnancy, labour & puerperium.	The physiological changes in blood, cardiovascular, respiratory, renal, hepatic, urinary tract, systemic and gastrointestinal tract during pregnancy, labour and puerperium	Subinvolution, retracted nipples and management, breast engorgement	Pseudocyesis
12.	Immunology of pregnancy	Immunology of pregnancy, humoral and cellular immunology	Immunological diseases	Role in RPL
13.	Lactation	Physiology of lactation, Techniques and advantages of breast feeding	Lactation suppres-sion	Breast milk banking and storage
14.	Biophysical and biochemical changes in uterus and cervix during pregnancy & labour.	Physiology of parturition cervical ripening agents, dosage, Bishop score	Clinical significance of physiology of Parturition	Molecular mechanisms
15.	Pharmacology of identified drugs used during pregnancy, labour, post partum period	mechanism of action, absorption, distribution, excretion, metabolism, transfer of the drugs across the placenta, effect of the drugs on the fetus, their excretion through breast milk, drug dosages, indications and contra indications	Teratogenicity	Historical examples of teratogenic drugs

Serial No.	Topic	Must know	Desirable to know	Nice to know
BASIC SCIENCES:				
16.	Pharmacology of identified drugs used in Gynaecology, including chemotherapeutic drugs.	Mechanism of action, excretion, metabolism and dosages of identified drugs used, side effects indications and contraindications of the drugs, including chemotherapeutic drugs	Newer drugs in O & G	Newer chemotherapeutic agents
17.	Role of hormones in Obstetrics & Gynaecology.	Commonly used hormonal therapy, indications and contraindications, dosages, mechanism of action, metabolism, excretion, side effects	Hormonal levels	History of these drugs, newer advances
18.	Markers in Obstetrics & Gynaecology – non neoplastic and neoplastic Diseases.	Commonly used markers and tumour markers-indications, normal levels,uses.	Role in different pathological states	Newer advances
19.	Pathophysiology of ovaries, fallopian tubes, uterus, cervix, vagina and external genitalia in healthy and diseased conditions.	Benign ovarian tumours, fibroid uterus, adenomyosis, endometriosis, intersex, diseases of vulva and vagina, carcinoma cervix, carcinoma endometrium, ovarian carcinoma, carcinoma vulva, pelvic organ prolapse, abnormal uterine bleeding	Fallopian tube carcinoma, uterine sarcomas, surgeries for carcinoma vulva	Newer advances and agents of management
20.	Normal and abnormal pathology of placenta, umbilical cord, amniotic fluid and fetus.	Normal and abnormal pathology of placenta, umbilical cord, amniotic fluid and fetus.	Fetal malformations and anomalies	Embryology and histology

Serial No.	Topic	Must know	Desirable to know	Nice to know
BASIC SCIENCES:				
21.	Normal and abnormal microbiology of the genital tract – bacterial, viral & parasitic infections responsible for maternal, fetal and gynaecological disorders.	Pelvic inflammatory diseases, genital tuberculosis, sexually transmitted infections (STI), STI in pregnancy including HIV - signs and symptoms, diagnosis, management. CDC guidelines for management of STIs	Structure of causative organisms	Newer diagnostic modalities,
OBSTETRICS:				
22.	Physiology of normal pregnancy, diagnosis of pregnancy, routine antenatal care, management of common symptoms in pregnancy, investigations to be carried out in pregnancy.	Clinical symptoms and signs of early pregnancy. Dating in early pregnancy including USG, various tests to diagnose pregnancy. Antenatal care: Objectives of antenatal care, clinical diagnosis of pregnancy and differential diagnosis, Monitoring of fetal growth by gravidogram, investigations , nutritional requirements, drug prescription, Immunisation during pregnancy, diagnosis of malpresentation, antenatal fetal surveillance, pelvic assessment	Congenital anomalies that can be diagnosed in early pregnancy. Diagnosis and management of fetal congenital anomalies PC PNDT Act	Recent advances

Serial No.	Topic	Must know	Desirable to know	Nice to know
OBSTETRICS:				
23.	Complications of early pregnancy	Various types of abortions, definitions, causes, investigations and management. Diagnosis of ectopic pregnancy and management	Rarer varieties of ectopic pregnancy	Recent advances
24.	Hyperemesis Gravidarum	Aetiopathogenesis, investigations and management	Unusual complications of hyperemesis and management	Recent advances
25.	Hypertensive disorders in pregnancy	Classification, diagnosis, investigations and management of hypertensive disorders in pregnancy and their complications. Predictive tests & prevention of preeclampsia and eclampsia	Management of complications of hypertensive disorders and chronic hypertension and renal disease. Differential diagnosis of convulsions in a pregnant woman	Recent advances, Doppler assessment
26.	Anaemia in Pregnancy	Causes, classification of various types of anaemias and their diagnosis, Nutritional anaemias and their management. Prevention of anaemia	Management of nonnutritional anaemias in pregnancy	Recent advances
27.	Heart disease in pregnancy	Classification, evaluation, complications during pregnancy and labour Contraception	Surgical management during pregnancy	Recent advances
28.	Diabetes mellitus and pregnancy	Classification, diagnosis, screening for GDM and management of diabetes during pregnancy and labour Management of neonate of diabetic mother	Complications of diabetes and their management	Recent advances

Serial No.	Topic	Must know	Desirable to know	Nice to know
OBSTETRICS:				
29.	Infections during pregnancy	UTI, malaria, syphilis, tuberculosis, hepatitis and HIV during pregnancy and their management	TORCH infections during pregnancy	Recent advances
30.	Preterm labour and Post-dated pregnancy	Causes, diagnosis and principles of management of preterm labour and delivery evaluation and management of postdated pregnancy neonatal problems of preterm and post-term babies Prevention of preterm labour, various tocolytics	Newer tocolytic drugs	Recent advances
31.	Hydramnios and oligohydramnios	Causes, diagnosis, investigations and management	Recent trends in management	MRI in oligoamnios
32.	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 Trial of labour after Caesarean (TOLAC), Vaginal Birth after Caesarean (VBAC).	ACOG guidelines for conditions to be met	Caesarean scar pregnancy
33.	Antepartum haemorrhage	Classification, clinical features, differential diagnosis, investigation including USG features, management and complications	Management of complications like DIC	Component therapy

Serial No.	Topic	Must know	Desirable to know	Nice to know
OBSTETRICS:				
34.	Fetal growth restriction (FGR) and Intrauterine fetal death (IUFD)	Causes, diagnosis and management	Recent advances in management	Stillbirth surveillance
35.	Antenatal fetal surveillance	Procedures of antenatal assessment, early pregnancy assessment, assessment in late pregnancy, NST, Doppler, Biophysical profile,	Modified biophysical profile	Recent advances
36.	Rhesus negative pregnancy	Diagnosis, evaluation and management Prevention of Rh isoimmunisation Management of haemolytic disease of new born	In-utero management of Rh iso-immunised fetus	Recent advances
37.	Disorders of liver, kidneys in pregnancy	Common types, diagnosis and management	Newer drugs	Recent advances
38.	Multiple pregnancy	Causes, diagnosis, differential diagnosis, complications in pregnancy and labour and management	Mechanism of twin to twin transfusion (TTTS) and management Management of single fetal demise	TRAP sequence, recent advances
39.	Malpresentations and malpositions and CPD	Causes, clinical findings, definitive diagnosis of malpresentations and malpositions and mechanism of labour in such cases.	Various types of pelvis	Role of ultrasonography and MRI

Serial No.	Topic	Must know	Desirable to know	Nice to know
OBSTETRICS:				
40.	Malpresentations and malpositions and CPD	Causes of contracted pelvis and diagnosis and management. Diagnosis of CPD and trial of labour Definitions of obstructed labour and rupture uterus, causes, clinical features and management. Prevention of rupture uterus		
41.	Normal labour	Physiology,definition, 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 3rd stage, partograph	Newer modalities of labour analgesia	Recent trends
42.	Induction and augmentation of labour	Pre-requisites for induction. Various methods of cervical ripening successful induction and failed induction Complications and contra-indications for inductions. Various methods /drugs for augmentation of labour	WHO recommendations	Recent advances, newer drugs

Serial No.	Topic	Must know	Desirable to know	Nice to know
OBSTETRICS:				
43.	Postpartum haemorrhage	Definition, types, diagnosis and management of PPH. Retained placenta, manual removal of placenta	Surgical management of PPH	Management of inversion of uterus, newer drugs, recent guidelines
44.	Puerperium, and its complications	Course of normal puerperium, complications of puerperium like puerperal sepsis and its diagnosis and management and prevention. Breastfeeding and common problems like lactational failure Care of neonate and infant Immunisation schedule	Breast abscess and management	Management of puerperal psychosis, breast milk banking and storage
45.	Operative obstetrics	Indications, technique & complications of episiotomy Indications, technique and complications of Caesarean section, Forceps and vacuum deliveries Assisted breech delivery and breech extraction Methods of tubectomy complications and failure rates, cervical cerclage	ACOG guidelines, consent	Destructive operations in Obstetrics
46.	Perinatal and maternal mortality in India	Definition of PNMR & MMR, causes and prevention of perinatal and maternal mortality.	PNMR & MMR in our country, state and institute	Recent Government programmes

Serial No.	Topic	Must know	Desirable to know	Nice to know
GYNAECOLOGY:				
47.	Anatomy of fetal genital tract, and its variations, supports of uterus, developmental anomalies of uterus.	Anatomy of fetal genital tract, and its variations, supports of uterus, developmental anomalies of uterus.	Applied aspects	Surgeries for Mullerian anomalies, recent advances like uterine transplantation
48.	Ectopic pregnancy; epidemiology, early diagnosis and management.	Ectopic pregnancy-Definition, risk factors, epidemiology, diagnosis and management-medical, surgical, ultrasound guided.	Rarer varieties of ectopic pregnancycaesarean scar ectopic, cervical ectopic	Primary and secondary abdominal pregnancies
49.	Physiology of menstruation, common menstrual problem.	Physiology of menstruation, common menstrual problems-classification , diagnosis, management	Role of hormones	Recent advances
50.	Abnormal uterine bleeding	Normal menstrual pattern and physiology of menstrual cycle, terminologies for Various bleeding patterns, causes, investigations, diagnosis, classification of AUB and management	Transvaginal sonography and sonosalpingography	Recent advances in management
51.	Disorders of growth, amenorrhoea	Classification of primary and secondary amenorrhoea, investigations and principles of management.	Details of management	Recent advances

Serial No.	Topic	Must know	Desirable to know	Nice to know
GYNAECOLOGY:				
52.	Fibroid uterus	Causes, types, complications, investigations, and management – medical, surgical, minimally invasive	Conservative surgery, leiomyosarcoma	Recent advances in management
53.	Pelvic organ prolapse	Classification, causes, diagnosis. investigations and management in relation to age and parity. Preventive aspects of pelvic organ prolapse	Nulliparous prolapse	Recent advances, POP-Q classification
54.	Vaginal discharge, sexually transmitted diseases	Physiological and pathological causes of vaginal discharge Clinical characteristics, investigations for diagnosis, predisposing conditions and management including NACO guidelines for HIV	CDC guidelines for mangement of STIs	Recent advances
55.	Precancerous lesions of female genital tract (cervix, vagina, vulva)	Etiology and pathology, classification, diagnosis of pre-malignant and malignant lesions of vulva, vagina, cervix, uterus and ovary Screening for carcinoma cervix.	HPV DNA testingprimary testing and co-testing, HPV vaccination	Recent Indian and ACS guidelines and recommenda-tions

Serial No.	Topic	Must know	Desirable to know	Nice to know
GYNAECOLOGY:				
56.	Carcinoma cervix, epidemiology, staging diagnostic procedure, treatment.	Aetiology, epidiomology, risk factors, role of HPV, clinical staging of cancer cervix, stage based management of cancer cervix	Chemotherapy and radiotherapy (chemoradiation) of carcinoma cervix, side effects	Recent advances, genetics
57.	Carcinoma endometrium	Risk factors, types, diagnosis, FIGO staging, management	Adjuvant therapy, screening	Recent advances, genetics
58.	Carcinoma ovary	Types, classification, grading, FIGO Staging, Management-surgical staging, chemotherapy and radiotherapy	Prophylactic and opportunistic oophorectomy, Screening for ovarian malignancies, adverse effects of chemotherapy of ovarian cancer	Recent advances, genetics
59.	Carcinoma vulva	Diagnosis, FIGO staging	Principles of management	Recent advances, genetics
60.	Gestational trophoblastic disease	Hydatidiform molein cidence, morbid anatomy, complications, investigations, management, followup. Invasive mole, PSTT, choriocarcinoma	WHO prognostic scoring of GTN and management chemotharapy and indications for surgery	Recent advances, genetics
61.	Pelvic inflammatory disease	Definition, causes, sequelae and management of PID Sexually transmitted infections and their prevention Genital tuberculosis diagnosis and management Prevention of PID CDC guidelines and management	Newer diagnostic modalities of PID and genital tuberculosis	Recent advances

Serial No.	Topic	Must know	Desirable to know	Nice to know
GYNAECOLOGY:				
62.	Infertility	Definition of infertility and sterility, causes and investigation of a couple with infertility; semen analysis	ART and their success	Recent advances, history of ART
62.	Infertility	Causes of anovulation and induction of ovulation, tests for ovulation & tubal patency, Management of tubal factors of infertility including recanalisation, Counselling for ART		
63.	Menopause and related problems	Menopausal symptoms and management of menopause, MHT causes and investigations of postmenopausal bleeding (PMB)	Protocol for management of PMB	Recent advances and guidelines for MHT
64.	Endometriosis	Aetiology, sites, pathology, classification, clinical features, physical findings, differential diagnosis, investigations, prophylaxis, management	Endometriosis of recto-vaginal septum, scar endometriosis	Recent advances in management
65.	Genital tract fistulae and injuries	Post-coital injuries, and operative injuries especially to urinary tract Causes, clinical features and diagnosis of genital fistulae and their management Classification, differential diagnosis, investigations and management of stress urinary incontinence	Operative techniques and complications Prevention of genital tract fistulae and injuries	Recent advances

Serial No.	Topic	Must know	Desirable to know	Nice to know
GYNAECOLOGY:				
66.	Adolescence, pubertal changes, disorders of puberty	Adolescence, pubertal changes, disorders of puberty, Tanner staging	Precocious puberty causes and investigation	Management of precocious puberty
67.	Operative gynaecology	Indications, technique and complications of dilatation and curettage and vaginal hysterectomy, Ward Mayo's operation, Manchester repair, abdominal hysterectomy, myomectomy, oophorectomy, tubal recanalisation and diagnostic laparoscopy Staging laparotomy for endometrial and ovarian malignancy, diagnosis and principles of management of postoperative complications	Indications and techniques of Colposcopy, Hysteroscopy and operative laparoscopy Detailed management of various postoperative complications	Recent advances and guidelines
CONTRACEPTION, NEONATOLOGY AND RECENT ADVANCES:				
68.	Contraception (Male & Female)	Cafetaria approach, various methods of contraception, advantages and side effects, and failure rates, Selection of patients and counselling IUCD insertion and removal, temporary and permanent methods of contraception, emergency contraception	WHO medical eligibility criteria	Recent advances

Serial No.	Topic	Must know	Desirable to know	Nice to know
CONTRACEPTION, NEONATOLOGY AND RECENT ADVANCES:				
69.	Medical termination of pregnancy – safe abortion – selection of cases, technique & management of complications of medical and surgical procedures, MTP law	MTP Act, indications, contraindications, various methods of first trimester and second trimester termination and their complications, concurrent contraception	Management of complications of various methods of MTP	Recent acts and amendments
70.	National health programmes.	Current national health programmes	State programmes	Past national health programmes
71.	Social obstetrics and vital statistics	Safe motherhood programmes, MMR and its causes, perinatal mortality and its causes, maternal and perinatal morbidity, stillbirths, neonatal deaths	Prevention of maternal and perinatal mortality and morbidity	Newer programmes
72.	Care of new born, neonatal resuscitation, detection of neonatal malformation.	Resuscitation and examination of newborn, feeding of newborn, immunization	Neonatal anomalies	Recent advances and guidelines
73.	Neonatal sepsis – prevention, detection & management.	Neonatal sepsis – prevention, detection & management.	Antibiotic policy, dosage and rationale	Recent advances and guidelines
74.	Neonatal hyperbilirubinemia – investigation & management including NICU care.	Neonatal hyperbilirubinemia – investigation & management	NICU care	Recent advances and guidelines

Serial No.	Topic	Must know	Desirable to know	Nice to know
CONTRACEPTION, NEONATOLOGY AND RECENT ADVANCES:				
75.	Management of common neonatal problems	Management of common neonatal problems	National guidelines	Recent advances
76.	Ethics and medical jurisprudence	Ethical management, medical jurisprudence	Prevetion of medical errors and the human factor	Recently enacted laws

DRAFT OF REVISED LIST OF SEMESTER WISE TOPICS

3rd Semester (20 hours)

Sl. No.	Topic
1	Applied anatomy of female external genitalia
2	Applied anatomy of female internal genitalia
3	Applied anatomy of extra-genital pelvic structures including supports of uterus
4	Development and anomalies of female external genitalia
5	Development and anomalies of female internal genitalia
6	Neuroendocrinology of reproduction – female hormones and steroidogenesis
7	Physiology of menstruation
8	Physiology of conception – gametogenesis, fertilisation and implantation
9	Placenta - Structure, development, functions, placental circulation
10	Fetal physiology and growth
11	Physiology of pregnancy – Changes in genital organs, breasts, skin and metabolism
12	Systemic adaptations in pregnancy – CVS, respiratory, haematological, renal, GI, hepatic
13	Immunology and endocrinology of pregnancy
14	History taking in Obstetrics
15	History taking in Gynaecology
16	Examination in Obstetrics
17	Examination in Gynaecology
18	Investigations in Obstetrics & Gynecology
19	Revision
20	Revision

4th Semester (20 hours)

Sl. No.	Topic
1	Diagnosis of pregnancy
2	Antenatal care – Preconceptional care, antenatal visits, nutrition, lifestyle advice
3	Antenatal care – Screening, immunisation, medications, treatment of minor ailments
4	Maternal pelvis, fetal skull, fetus in utero
5	Physiology and phases of parturition
6	Normal labour – Definition, stages, mechanism of labour
7	Clinical course and management of normal labour – 1st stage
8	Clinical course and management of normal labour – 2nd stage
9	Clinical course and management of normal labour – 3rd stage
10	Normal puerperium and breast-feeding
11	Examination and care of newborn
12	Physiology of puberty and menopause
13	Disorders of puberty – precocious and delayed
14	Adolescent gynaecological problems – abnormal menses, dysmenorrhoea, hirsutism, neoplasms
15	Menopausal problems & MHT
16	Infections of individual genital and pelvic organs
17	Sexually transmitted infections
18	Hyperemesis gravidarum
19	Revision
20	Revision

5th semester (18 hours)

Sl. No.	Topic
1	Miscarriage
2	Ectopic pregnancy
3	Molar pregnancy
4	Anomalies of placenta and cord
5	Pelvic inflammatory disease
6	Female genital tuberculosis
7	Contraception – introduction, basic principles, barrier and natural methods
8	Hormonal contraceptives
9	IUCD and emergency contraception
10	Permanent contraception and newer contraceptive methods

11	MTP – Methods and MTP Act
12	Disorders of sexual differentiation
13	Primary amenorrhoea
14	Secondary amenorrhoea
15	Infections in pregnancy – Malaria, TB, TORCH
16	STIs in pregnancy – syphilis, HIV, hepatitis B
17	Revision
18	Revision

6th semester (22 hours)

Sl. No.	Topic
1	Fibroid uterus – Classification, etiology, clinical features
2	Fibroid uterus – Complications and management
3	Benign tumors of ovary
4	Benign lesions of vulva, vagina and cervix
5	Disorders of menstruation – Terminologies, etiology, evaluation
6	Management of abnormal uterine bleeding in different age groups
7	Postmenopausal bleeding
8	Urinary disorders in gynaecology – incontinence, retention, PBS, OAB
9	Genital tract injuries - perineal tears, genital fistulae
10	High risk pregnancy – Detection, antenatal, intranatal and postnatal care
11	Nutritional anaemia in pregnancy – Iron deficiency, megaloblastic
12	Non-nutritional anemia in pregnancy – hemoglobinopathy, hemolytic, aplastic
13	Pregnancy with heart disease
14	Thyroid disorders in pregnancy
15	Hypertensive disorders of pregnancy – Gestational hypertension, pre-eclampsia
16	Hypertensive disorders of pregnancy – Eclampsia, HELLP, chronic hypertension
17	Pregnancy with gestational diabetes
18	Pregnancy with overt diabetes
19	Shock in pregnancy
20	Blood and blood products in pregnancy – indications, transfusion safety
21	Revision
22	Revision

7th Semester (22 hours)

Sl. No.	Topic
1	Prenatal diagnosis and fetal therapy
2	Antepartum fetal assessment
3	Intrapartum fetal assessment
4	Induction and augmentation of labour
5	Abruptio placentae
6	Placenta praevia
7	Polyhydramnios
8	Oligohydramnios
9	Multifetal gestation
10	Post-Caesarean pregnancy
11	Jaundice in pregnancy
12	Pulmonary diseases in pregnancy
13	Urinary tract diseases in pregnancy
14	Pregnancy with fibroid
15	Pregnancy with ovarian tumours
16	Acute abdomen in pregnancy
17	Pregnancy with genital prolapse
18	PCOS
19	Social and preventive obstetrics
20	National health programmes related to MCH and RCH
21	Revision
22	Revision

8th & 9th Semester (80 hours)

Sl. No.	Topic
1	PROM & PPROM
2	Preterm labour
3	Post-term pregnancy
4	Fetal growth restriction
5	Intra-uterine fetal death
6	Recurrent pregnancy loss
7	Rh incompatibility and NIHF
8	Occipito-posterior position
9	Breech presentation
10	Transverse and oblique lie
11	Face and brow presentation

12	Compound presentation, cord prolapse
13	Abnormal uterine action
14	Contracted pelvis and CPD
15	Prolonged and obstructed labour
16	Injuries to birth canal - Rupture uterus
17	Injuries to birth canal – Cervix, vagina, perineum, pelvic hematomas
18	Third stage complications – Atonic PPH & traumatic PPH
19	Third stage complications – Retained placenta, PAS, secondary PPH
20	Complications in puerperium
21	Coagulation disorders in pregnancy
22	Breast problems in Obstetrics and Gynecology – breast problems in puerperium, mastalgia, fibrocystic breast disease, fibroadenoma, breast cancer, galactorrhoea
23	Critical care in pregnancy
24	Examination and care of LBW babies
25	Neonatal resuscitation and birth asphyxia
26	Diagnosis of early neonatal problems
27	Birth injuries, jaundice and infections of newborn
28	Congenital anomalies of fetus – CNS, face, neck, thorax and CVS
29	Congenital anomalies of fetus – Abdominal wall, genito-urinary tract, GI tract, skeleton
30	Endometriosis
31	Adenomyosis
32	Male infertility
33	Female infertility
34	Genital displacements – Retroversion, chronic inversion
35	Pelvic organ prolapse – Risk factors, pathophysiology, types
36	Genital displacements – Clinical features and management of POP
37	Preventive oncology
38	Premalignant lesions of genital tract – cervix
39	Premalignant lesions of genital tract – vulva, vagina, uterus
40	Malignant tumors of cervix – risk factors, histological types, clinical features
41	Malignant tumors of cervix – FIGO staging, management
42	Malignant tumors of endometrium – risk factors, histological types, clinical features
43	Malignant tumors of endometrium - – FIGO staging, management
44	Malignant tumors of ovary – classification, risk factors, clinical features, FIGO staging
45	Management of epithelial ovarian malignancy
46	Management of non-epithelial ovarian malignancy
47	Malignant lesions of vulva and vagina
48	GTN – invasive mole, choriocarcinoma, PSTT

49	Radiotherapy in Gynaecology
50	Chemotherapy in Gynaecology
51	Pre- and post-operative care in gynecological surgeries
52	Operative gynecology – abdominal and vaginal hysterectomy, radical hysterectomy, myomectomy, dilatation and curettage, endometrial biopsy, cervical biopsy
53	Operative gynecology – urogynecological surgeries, staging laparotomy, sterilization, ovarian cystectomy, others
54	Operative obstetrics – Episiotomy, Caesarean section
55	Operative obstetrics - Forceps delivery
56	Operative obstetrics - Ventouse delivery
57	Operative obstetrics –Version, MROP, D&E, S&E, cerclage, surgical management of PPH
58	Pharmacotherapy in Obstetrics – Teratogeneic drugs, anti-hypertensives, anti-convulsants, anti-diabetic drugs, anti-coagulants, anti-platelet
59	Pharmacotherapy in Obstetrics – Uterotonins, tocolytics, anti-D, corticosteroids, hematinics, others
60	Drugs and hormones in Gynaecology – GnRH analogues, gonadotropins, androgens, anti-androgens, vasopressin, anti-firbinolytics, methotrexate
61	Drugs and hormones in Gynaecology – Estrogen, progestogens, aromatase inhibitors, anti-estrogens/SERM/STEAR, anti-progestin/SPRM, dopamine agonists
62	Ultrasonography and Radiology in Obstetrics
63	Ultrasonography and Radiology in Gynaecology
64	Laparoscopy in Gynaecology
65	Hysteroscopy in Gynaecology
66	Audit in Obstetrics and Gynaecology.
67	Evidence based medicine (EBM) in Obstetrics and Gynaecology
68	Research in Obstetrics and Gynaecology
69	Interesting cases in O&G
70	Interesting cases in O&G
71	Revision
72	Revision
73	Revision
74	Revision
75	Revision
76	Revision
77	Revision
78	Revision
79	Revision
80	Revision

Integrated teaching in 8th & 9th sem (2 hrs each = 50 hours)

Sl. No.	Topic of integrated teaching	Dept(s) for integration
1	Development of genital tract - any malformations	Anatomy, Plastic surgery
2	Fetal physiology-fetal circulation	Physiology, Neonatology
3	Fetal malformations - genesis	Embryology, Radiology, Neonatology, Pediatric Surgery
4	CIN	Pathology
5	ARF	Physiology, Nephrology
6	Coagulation failure	Pathology, General Medicine
7	Diabetes in pregnancy	Endocrinology
8	Heart disease in pregnancy	Cardiology
9	USG in Obstetrics & Gynecology	Radiology
10	Infections in pregnancy	Microbiology, General Medicine
11	Medico-legal aspects	Forensic Medicine
12	Nutrition in pregnancy and lactation	CM & FM
13	Evidence based obstetrics	CM & FM
14	Drugs in pregnancy & prescribing in pregnancy	Pharmacology
15	Social obstetrics	CM & FM
16	Thyroid disorders in pregnancy	Endocrinology
17	Acute abdomen in pregnancy	Surgery
18	Low birth weight	Neonatology
19	Anaemia in pregnancy	Pathology, Hematology
20	Birth asphyxia	Neonatology
21	Jaundice in pregnancy	Gastroenterology
22	Ovarian malignancy	Surgical oncology, Radiotherapy
23	Cervical malignancy	Surgical oncology, Radiotherapy
24	Endometrial malignancy	Surgical oncology, Radiotherapy
25	Obstetric analgesia and anesthesia	Anaesthesia

Tutorials in 8th & 9th sem (2 hrs each = 20 hours)

Sl. No.	Topic of tutorials
1	Female pelvis and fetal skull
2	Fetus in utero & mechanism of normal labour
3	Occipito-posterior position

4	Breech presentation
5	Face & brow presentation, transverse lie
6	Instruments including forceps and ventouse
7	Drugs
8	Specimen
9	Contraception
10	NST, partograph, USG, HSG

Operatives/Radiology/Model question paper & answer in 8th & 9th sem (2 hrs each = 10 hours)

Sl. No.	Topic of tutorials
1	Videos of obstetric procedures
2	Videos of gynaecological procedures
3	Atlas - USG & endoscopic images, neonatal birth defects, abnormal placenta and cord
4	Model question paper – 2 papers of O& G
5	Model question paper – 2 papers of O& G

Students' seminars in 8th & 9th sem (2 hrs each = 40 hours)

Sl. No.	Topic of seminars
1	Congenital anomalies of genital tract
2	Physiology of menstruation
3	Normal labour
4	Antepartum and intrapartum fetal assessment
5	Anemia in pregnancy
6	Hypertension in pregnancy
7	Bleeding in early pregnancy
8	Bleeding in late pregnancy
9	Fibroid uterus
10	Abnormal uterine bleeding
11	Amenorrhoea
12	Infections in pregnancy
13	Fundal height not corresponding to period of amenoorhoea
14	Malpresentations and malpositions
15	PPH
16	Infertility
17	Pelvic organ prolapse
18	Cervical cancer
19	Ovarian cancer
20	Endometrial cancer

Total clock hours for theory = 20+20+18+22+22+80+50+20+10+40 = 302 hrs

TUTORIALS AND REVISION:

Practical skills to be imparted during ward posting

Obstetrics

a. History taking and examination of a pregnant woman.
b. Monitoring progress of labour and conduct of a normal labour.
c. Management of third stage of labour, prevention and treatment of post partum haemorrhage.
d. Witness caesarean section, breech delivery, forceps and vacuum delivery.
e. Essential care of a newborn.
f. Non-stress testing of fetus; biophysical scoring of fetus.

Gynaecology

a. How to take history and perform examination of female pelvic organs.
b. Preparation of Pap smear, wet smear preparation of vaginal discharge.
c. Minor gynaecologic procedures: cervical biopsy, endometrial biopsy, dilatation & curettage; fractional curettage.
d. Medical termination of pregnancy (MTP): in first & second trimesters.
e. Insertion and removal of intrauterine contraceptive device.

Operative Skills

a. Conduct of normal delivery
b. Making and repair of episiotomy
c. Insertion and removal of intrauterine device
d. Making of Pap smear
e. Performing minilap tubectomy (under supervision)

Record Note Books: Every student must maintain a record of the practical / clinical work assigned to him / her in the record note books. These shall be submitted periodically to the respective Professors. At the end of the course, the practical / clinical case record note books shall be submitted to the heads of the departments who shall evaluate and include the marks in the Internal Assessment. Records need not be submitted at the professional practical examination. In respect of failed candidates, the marks awarded for records at the first attempt may be carried over to the next examination attempt.
If a candidate desires, he/ she may be permitted to improve on the performance by submission of fresh record note books.

Summative assessment

Evaluation Methods - Theory, Practical and Viva

Pattern of theory examination including distribution of marks, questions and time

There shall be two theory papers - Paper I and II, carrying 100 marks each.

1. Each paper will have two sections, A and B.
2. Each paper will be of 03 hours duration.

PAPER I: (Total marks=100)

Topics - Obstetrics including social obstetrics and newborn care

Section A=50 marks

Section B=50 marks

PAPER II: (Total marks=100)

Topics: Gynaecology, Family Welfare and Demography

Section A=50 marks

Section B=50 marks

Each section will have:

- One modified structured essay question of 10 marks = 10 marks
- Eight short answer questions of 5 marks each: 40 marks

Scheme of Practical & Oral Examination for Obstetrics & Gynaecology

PRACTICAL: Total – 200 Marks

OBSTETRIC ORAL AND PRACTICALS=100 MARKS

1. Obstetric Long case- : 50 marks
   a. History : 10 marks
   b. Clinical examination : 10 marks
   c. Diagnosis and investigations : 10 marks
   d. Discussion : 10 marks
   e. Student attitude : 10 marks
2. Dummy pelvis and fetal skull : 10 marks
3. Drugs : 10 marks
4. Ultrasound (USG) & specimen : 10 marks
5. NST/CTG, instruments and partograph: 10 marks
6. Record : 10 marks

GYNAECOLOGY ORAL AND PRACTICALS=100 MARKS

1. Gynaecology Long case : 50 marks
   a. History : 10 marks
   b. Clinical examination : 10 marks
   c. Diagnosis and investigations : 10 marks
   d. Discussion : 10 marks
   e. Student attitude : 10 marks
2. Contraception : 10 marks
3. Instruments : 10 marks
4. Specimen : 10 marks
5. Ultrasound (USG) & HSG : 10 marks
6. Record : 10 marks

Teaching Aids in the department

Doll and Dummy

Female Pelvis

Gross specimens

X-ray/ USG films/ CTG tracings / partograph

View box

VCR

Overhead Projector

Slide Projector

Set of instruments/forceps etc.

Library for current books, e- journals and e-books of Obstetrics and Gynaecology

FOGSI (The Federation of **Obstetric and Gynaecological** Societies of **India) Newsletter**

FOGSI website http://www.fogsi.org

Other Sources of knowledge:

Books:

Standard Textbooks:

1. Mudaliar and Menon's Clinical Obstetrics- Orient Longman
2. Manual of Obstetrics (Updated Holland and Brew's)-Daftary
3. Howkins & Bourne-Shaw's Textbook of Gynaecology

Reference Books:

1. William's Obstetrics-Mc Graw Hill
2. William's Gynaecology-Mc Graw Hill
3. Shaw's Textbook of operative Gynaecology
4. Practical gynaecology and Obstetrics - Parulekar

Newsletters:

FOGSI Newsletters

Internet:

RCOG Greentop Guidelines

Journals:

1. Indian Journal of Obstetrics and Gynaecology
2. British Journal of Obstetrics and Gynaecology
3. American Journal of Obstetrics and Gynaecology

Mechanisms for feedback and improvement

Format for feedback

1. Name: (You can choose to leave this column blank too)
2. Semester:
3. Date:
4. Please respond to the following:
   a. Not satisfied at all/ Somewhat satisfied/ Satisfied/ Very Satisfied/ Extremely satisfied.
   b. Your overall assessment of posting in this semester.
   c. Curriculum.
   d. Knowledge gained.
   e. Skills gained.
5. What did you like about your posting?
6. What you did not like about your posting?
7. How do you rate the teachers (faculty/senior residents/postgraduates) ?
8. Suggestions for improvement.
9. Any other comments.

MODEL QUESTION PAPER
OBSTETRICS AND GYNAECOLOGY
PAPER I

Full Marks=100

SECTION A

Answer all questions:

1. A 21 year old unbooked primigravida is referred at term with generalised tonic-clonic convulsions. On examination, there is bilateral pitting pedal edema, BP is 200/120mm Hg, uterus corresponds to term size, cephalic presentation, FHR is 120 bpm. (1+4+2+3)

   a. What is the most probable diagnosis?

   b. How will you manage her further?

   c. What are the risk factors for this condition?

   d. Enumerate changes in:

      i) liver

      ii) kidneys

      iii) haematological system in this condition?

2. Short Notes (8X5)

   a. i) Screening for GDM in India

      ii) Principles of medical nutritional therapy for gestational diabetes mellitus

   b. i) Degrees of placenta praevia

      ii) Classification of accidental haemorrhage

   c. i) Uterine involution

      ii) Lochia

   d. Reactive non -stress test

   e. Active management of third stage of labour (AMTSL)

   f. Diagnosis and management of missed abortion

   g. Define:

      i) Severe anaemia complicating pregnancy

      ii) Engagement

      iii) Puerperal sepsis

      iv) Induction of labour

      v) Normal labour

   h. Follow up of vesicular mole

SECTION B

1. A 31 year old primigravida presents at 24 weeks of gestation with a VCCTC report of being HIV positive. (2+3+3+2)

   a. What antiretroviral drugs would you like to start?

   b. What investigations would you like to do?

   c. Management and precautions in labour

   d. Plan of management for neonate

2. Short Notes (8X5)

   a. Advantages of breastfeeding

   b. Functions of placenta

   c. Define maternal death and list the common causes of maternal mortality in India

   d. Define:

      i) Caput succedaneum

      ii) Cephalohaematoma

      iii) Subgaleal haemorrhage

      iv) Molding

      iv) Illustrate BPD with diagram

   e. MTP Act

   f. List the complications in preterm neonates

   g. i) Twin to twin transfusion syndrome

      ii) Causes of hydrops fetalis

   h. Classify heart diseases in pregnancy

MODEL QUESTION PAPER
OBSTETRICS AND GYNAECOLOGY
PAPER II

Full Marks=100

SECTION A

Answer all questions:

1. A 29 year old multigravida presents with amenorrhoea of 6 weeks, vaginal bleeding and history of loss of consciousness. On examination, there is pallor, PR is 110 bpm, BP is 90/60mm Hg, abdomen is distended, and her urine pregnancy test is positive. (1+4+2+3)

   a. What is the most probable diagnosis?
   b. How will you manage her?
   c. What are the risk factors for this condition?
   d. Enumerate the non-surgical management of this condition?

2. Short Notes (8X5)

   a. i) Common causes of abnormal vaginal discharge
      ii) Management of bacterial vaginosis
   b. Chemotherapy for GTN
   c. i) Screening for cancer cervix
      ii) Management of CIN III
   d. Menopausal hormone therapy
   e. i) Degrees of pelvic organ prolapse
      ii) Management of nulliparous prolapse
   f. Assessment of tubal function in infertility
   g. Define: Rotterdam criteria of PCOS
   h. Represent diagrammatically Anatomy of female external genitalia.

SECTION B

1. 45 year old multipara presented with heavy menstrual bleeding of several months duration. On examination, there is pallor. Vitals are stable. Per abdominal and per vaginum examination revealed an irregularly enlarged, firm uterus corresponding to 24 weeks of gestation with bilateral fornices being free. (1+3+4+2)

   a. What is the most likely diagnosis?
   b. List 3 common differential diagnosis with points in favour and against.
   c. Outline your plan of management for her
   d. Enumerate i) drugs for medical management ii) minimally invasive methods of management of this condition

2. Short Notes 8X5

   a. Dermoid cyst
   b. Treatment of:
      i) Imperforate hymen
      ii) Bartholin's cyst
   c. Methods of first trimester MTP
   d. Risk factors for endometrial carcinoma
   e. Enumerate barrier methods of contraception
   f. FIGO staging of cancer cervix
   g. Non-contraceptive benefits of OCPs
   h. Clomiphene citrate

PEDIATRICS

PEDIATRICS

KNOWLEDGE

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

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

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

c. State age related requirement of calories, nutrients, fluids, drugs, etc, in health and disease;

d. Describe preventive strategies for common infectious disorders, malnutrition, genetic & metabolic disorders, poisonings, accidents and child abuse;

e. Outline national programs relating to child health including immunization programs.

SKILLS

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

a. Take a detailed pediatric history, conduct an appropriate physical examination of children including neonates, make clinical diagnosis, conduct common bedside investigative procedures, interpret common laboratory investigations and plan as well as institute therapy;

b. Take anthropometric measurement, resuscitate newborn infants with bag and mask at birth, prepare oral rehydration solution, perform tuberculin test, administer vaccines available under current national programs, start an intravenous line and provide nasogastric feeding observe venesection and intraosseous infusion, if possible;

c. Conduct diagnostic procedures such as lumbar puncture, bone marrow aspiration, pleural tap and ascitic tap; assist liver and kidney biopsy;

d. Distinguish between normal newborn babies and those requiring special care and institute early care to all newborn babies including care of preterm and low birth weight babies, provide correct guidance and counseling in breastfeeding;

e. Provide ambulatory care to sick children, identify indications for specialized/in-patient care and ensure timely referral of those who require hospitalization.

INTEGRATION

The training in Pediatrics would be done in an integrated manner with other disciplines, such as Anatomy, Physiology, Biochemistry, Pathology, Microbiology Forensic Medicine, Community Medicine, Obstetrics, Physical Medicine and Rehabilitation etc 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.

SUGGESTED TEACHING SCHEDULES

3rd and 4th Semester

Learning Objectives

At the end of these two semesters, the learner should be able to :

1. Take a detailed Pediatric history.
2. Understand normal growth and development.
3. Know about medical conduct during patient examination.
4. Conduct physical examination of children.
5. Perform anthropometry and interpret growth.
6. Perform developmental assessment in children.

Lectures

1. Introduction to Pediatrics.
2. History taking and its schema in Pediatrics
3. General examination including anthropometry.
4. Normal growth.
5. Normal development.
6. Immunization including cold chain
7. Introduction to newborns and the normal newborn baby.
8. Temperature regulation in newborn, hypothermia, cold stress and Kangaroo Mother Care (KMC).
9. Breastfeeding and lactation management.
10. Infant and child feeding (include complementary feeding).

Clinical Training

Tutorials cum demonstration (during first one week).

Topics for demonstration:

1. Scope of Pediatrics, learning objective and familiarization with the teaching schedule.
2. History - I (Schema and reasons for history taking - including present, past and family).
3. History taking -II (Antenatal, natal, postnatal, development, immunization and nutrition).
4. Normal development.
5. General physical examination including anthropometry and head to toe examination.

Case discussion in ward with emphasis on history, general physical and systemic examination and demonstration of anthropometric techniques, during next one week.

Assessment (End of Posting): Pediatric history taking and examination skills especially anthropometry.

TOPICS AND THEIR ALLOCATED CLOCK HOURS

6th and 7th Semester

Sl. No	Topics	Hours of Teaching	Mode of teaching
1.	Abnormal growth including short stature	1 hr	Lecture
2.	Abnormal development including PDD	1 hr	Lecture
3.	Vitamin deficiency (A&D)	1 hr	Lecture
4.	Micronutrient deficiency	1 hr	Lecture
5.	PEM - 1(Defination & Classification & Epidemiology	1 hr	Lecture
6.	PEM - 2 (Mangement)	1 hr	Lecture
7.	Acute diarrhea	1 hr	Lecture
8.	Chronic diarrhea	1 hr	Lecture
9.	Malaria	1 hr	Lecture
10	Enteric fever & Scrub Typhus	1 hr	Lecture
11.	Dengue	1 hr	Lecture
12.	Common bacterial infection in children	1 hr	Lecture
13	Diphtheria and Pertussis	1 hr	Lecture
14.	Tetanus	1 hr	Lecture
15.	Pneumonia	1 hr	Lecture
16.	Empyema Thoracis	1 hr	Lecture
17.	Wheezing disorders in children	1 hr	Lecture
18.	Nephrotic Syndrome	1 hr	Lecture
19.	Nephritis - AGN.	1 hr	Lecture
20.	Approach to anemia in infancy & childhood	1 hr	Lecture
21.	Approach to URTI & Bronchiolitis.	1 hr	Lecture
22.	IMNCI Programme	1 hr	Lecture

Clinical Training in 6th and 7th Semesters

At the end of these two semesters, the learner should be able to :

1. Take a detailed pediatric history.
2. Conduct physical examination of children (General and Systemic) in detail.
3. Perform anthropometry and interpret growth of the child in detail.
4. Perform developmental assessment of a child in detail.
5. Distinguish between normal newborn babies and those requiring special care (including low birth weight and preterm). Care of newborn at birth and those admitted to neonatal care ward.
6. Counseling for breastfeeding/infant feeding.

Clinical Posting

Clinical demonstration - newborn (for 1 week)

1. Neonatal history taking.
2. Newborn - Nomenclature and assessment of gestational age.
3. Care of normal newborn at birth.
4. Examination of newborn.
5. Breastfeeding.
6. Identification of sick newborn (common danger signs).
7. Low birth weight including temperature regulation and asepsis.

- One day of the posting should be for immunization related services
- Pediatrics Case discussion - History taking and examination for 3 weeks in wards.
- Assessment (End of Posting): Emphasis on detailed history, physical examination, interpretation and correlation of abnormal physical findings and normal newborn to establish a clinical diagnosis or differential diagnosis.

TOPICS AND THEIR ALLOCATED CLOCK HOURS

8th and 9th Semester

Sl. No	Topics	Hours of teaching	Mode of teaching
1.	Low birth weight babies & Prematurity	1 hr	Lecture
2.	Respiratory Distress Syndrome	1 hr	Lecture
3.	Meconeum aspiration Syndrome	1 hr	Lecture
4.	Approach to neonatal respiratory distress	1 hr	Lecture
5.	Birth asphyxia including Birth injuries & its management	1 hr	Lecture
6.	Jaundice in the newborn	1 hr	Lecture
7.	Neonatal infections including sepsis	1 hr	Lecture
8.	Neonatal convulsions	1 hr	Lecture
9.	Neonatal hypoglycemia and hypocalcemia	1 hr	Lecture
10.	Approach to intrauterine infections	1 hr	Lecture
11.	Congenital hypothyroidism and newborn screening	1 hr	Lecture
12.	Acute liver failure including viral hepatitis	1 hr	Lecture
13.	Chronic liver disease	1 hr	Lecture
14.	Leukemia & Lymphoma	1 hr	Lecture
15.	Bleeding and coagulation disorder with special focus on hemophilia	1 hr	Lecture
16.	Immune Thrombocytopenic Purpura	1 hr	Lecture
17.	PALS – followed by shock management in Integrated class	1 hr	Lecture
18.	Approach to Congenital Acyanotic Heart Disease	1 hr	Lecture
19.	Approach to Congenital Cyanotic Heart Disease	1 hr	Lecture
20.	Approach to Rheumatic Heart Disease	1 hr	Lecture
21.	Congestive Cardiac Failure	1 hr	Lecture
22.	Urinary Tract Infection	1 hr	Lecture
23.	Acute Bacterial Meningitis	1 hr	Lecture
24.	Tubercular Meningitis	1 hr	Lecture
25.	Febrile Seizure & Status Epilepticus	1 hr	Lecture
26.	Acute Encephalitis Syndrome	1 hr	Lecture

27.	Neurodegenerative disease & Neurocutaneous syndromes	1 hr	Lecture
28.	Common genetic disorders - Down and Turners syndrome	1 hr	Lecture
29.	Approach to IEM(Inborn Errors of Motabolism)	1 hr	Lecture
30.	Common poisonings in children and its management	1 hr	Lecture
31.	Approach to Polyarthritis	1 hr	Lecture
32.	Approach to child with fever	1 hr	Lecture
33.	Approach to child with shock	1 hr	Lecture
34.	Approach to child with exanthematous fever	1 hr	Lecture
35.	Approach to abdominal symptoms	1 hr	Lecture
36.	Approach to rickets	1 hr	Lecture
37.	Pediatric drug, dosage and rational drug therapy	1 hr	Lecture
38.	Approach to pubertal disorder	1 hr	Lecture
39.	Obesity - the new epidemic in children	1 hr	Lecture

Clinical Training in 8th and 9th Semesters

At the end of these two semesters, the learner should be able to:

1. Take detailed pediatric history, conduct an appropriate physical and developmental examination of children including neonates, make clinical diagnosis, conduct common bedside examinations, interpret common laboratory investigations and plan and institute therapy.
2. Recognize emergencies including neonatal resuscitation and CPR and care to be instituted and relevant procedures performed.
3. Prepare oral rehydration solution, perform tuberculin test and administer vaccines.
4. Describe methods of diagnostic and therapeutic procedures such as intravenous access, nasogastric feeding, venesection, pleural tap, ascitic tap, bone marrow aspiration, lumbar puncture, liver and kidney biopsy, with understanding on the preparatory and post procedures measures if any.

Clinical posting (4 weeks)

1. Bedside Demonstration (9.00 AM to 12.00 Noon) (at least 1 week of the 4 week posting to be in newborn wards) in wards and Outpatient department from 9.00 AM to 12.00 Noon.
2. Outpatient department visit at least once a week.
3. Case discussion.
4. Clinical tutorials (12-1 PM) - Nutrition tray, demonstration of Instruments, X-ray films and Neonatal Resuscitation, Drugs commonly used in Pediatrics, Vaccines in Pediatrics. Respiratory devices and their uses.

Assessment (End of Posting)

- Pediatric long case discussion - 50%.
- Viva on instruments - X-ray / OSCE - 25%.
- Newborn - 25%.

TOPICS FOR INTEGRATED SEMINARS / TUTORIALS

8th and 9th Semester

Sl. No	Topics	Hours of Teaching	Integrating Departments	Mode of teaching
1.	Fluid & Electrolyte balance - Common dyselectrolytemia and its management	2 hours	Nephrology	Seminar
2.	Cerebral Palsy	2 hours	OBG, Neonatology, PMR, Eye, ENT	Integrated session
3.	Convulsions including status epilepticus & its management including AED	2 hours	Neurology, Psychiatry	Integrated session
4.	Approach to cholestatic jaundice	2 hours	Pediatric Surgery, Pathology	Integrated session
5.	Shock and anaphylaxis	2 hours	Physiology, Pharmacology	Integrated session
6.	Hypertension (Pediatric and Adult)	2 hours	Medicine, Pharmacology	Integrated session
7.	Diabetes Mellitus (Pediatric & Adult)	2 hours	Medicine, Pharmacology	Integrated session
8.	Hypothyroidism (Pediatric & Adult)	2 hours	Medicine, Pharmacology	Integrated session
9.	Acute Renal failure (Pediatric & Adult)	2 hours	Medicine, Nephrology	Integrated session
10.	Chronic Renal failure (Pediatric & Adult)	2 hours	Medicine, Nephrology	Integrated session
11.	Tuberculosis (Pediatric & Adult)	2 hours	Pulmonary Medicine	Integrated session
12.	HIV infection	2 hours	Medicine	Integrated session
13.	Poliomyelitis and AFP surveillance	2 hours	CMFM	Integrated session
14.	Vital Statistics including National programs in Pediatrics	2 hours	CMFM	Integrated session
15.	PDD and Learning Disability	2 hours	Psychiatry	Integrated session

16.	Puberty, adolescent health issues and its management including adolescent vaccines	2 hours	Endocrinology, Psychiatry, Gynaecology	Integrated session
17.	Common surgical problems in the newborn & children	2 hours	Pediatric Surgery	Integrated session
18.	Approach to hemolytic anemia including Thalassemia and SCD	2 hours	Hematology	Integrated session
19.	Pediatric dermatoses	2 hours	Dermatology	Integrated session
20.	Disorders of Sexual Development	2 hours	Pediatric Surgery, Endocrinology	Integrated session

LIST OF CLINICAL CASE TO BE DISCUSSED

1. Normal newborn.
2. Normal development in child
3. Low birth weight babies.
4. Temperature regulation in newborn.
5. Neonatal infections.
6. Neonatal respiratory distress.
7. Jaundice in newborn.
8. Malaria and typhoid fever.
9. Adolescent growth and disorders of puberty.
10. Common exanthematous illness.
11. Xerophthalmia and Rickets.
12. Protein energy malnutrition.
13. Fluid and electrolyte imbalance.
14. Acute diarrhea.
15. Persistent diarrhea.
16. Chronic liver disease.
17. Seizure disorders.
18. Acute flaccid paralysis.
19. Cerebral palsy and mental retardation.
20. Leukemias and Lymphomas.
21. Hemolytic anemias and Thalassemia.
22. Bleeding and coagulation disorders.
23. Approach to anemia especially nutritional.
24. Acute glomerulonephritis and hematuria.
25. Nephrotic syndrome.

26. Rheumatic fever and heart disease.
27. Acute respiratory infections including pneumonia and Empyema.
28. Congenital heart disease.
29. Congestive cardiac failure.
30. Meningitis.
31. Bronchial asthma.
32. Behavioral disorders.
33. Childhood Tuberculosis.

LIST OF TUTORIALS (12 – 1 PM after bed side clinics)

1. Anthropometry, Growth Charts and its significance
2. Nutrition tray and its significance
3. Malnutrition and nutritional rehabilitation
4. Immunization – Schedule and introduction to Vaccines – I
5. Immunization – Vaccines – II
6. Emergency Drugs and Medications including IV Fluids, ORS
7. Instruments
8. Neonatal Resuscitation
9. X rays – Chest
10. X rays – Limbs, Abdomen, Skull
11. Respiratory devices and it method of use.
12. Basic Pediatric ECG interpretation

TOPICS THAT THE STUDENT MUST BE FAMILIAR WITH

List of Instruments

Lumbar puncture needle, liver biopsy needle, bone marrow aspiration, intravenous cannula, Ryle's tube, suction catheter, Foley's catheter, face mask, nasal prongs, IV drip set, BT set, self-inflating resuscitation bag with face mask and reservoir, tongue depressor, tuberculin syringe, endotracheal tube, laryngoscope.

X-ray films

Pneumonia, Tuberculosis, hilar and parahilar lymphadenopathy, miliary tuberculosis, Congenital Lobar Emphysema, Pleural effusion, Pneumothorax, Normal thymus, congenital heart disease with increased and decreased pulmonary vascularity, cardiomegaly, rickets, scurvy, hemolytic anemia, Skull: sutural separation, enlarged sella and raised intracranial tension, intestinal obstruction, intestinal perforation.

Miscellaneous

Emergency medications, Intravenous fluids, Oral Rehydration Solution (ORS) preparations, Vaccines, ECG tracings.

MODEL QUESTION PAPER
PAEDIATRICS

Time: 3 Hrs **Max. Marks: 100**

Instructions

Answer all the questions. Draw diagram wherever necessary. Use separate answer sheets for both Section-A & B.

SECTION – A

1. Kareena, an 18-month-old girl, is brought with complaints of patchy hyperpigmentation, flaking of skin, apathy and weakness. The parents had given history of recurrent illnesses over the past 8-9 months. They were not sure about her weight gain but feel that the child is chubby. On examination she is pale, with sparse hairs over her temples which are lustreless, with bilateral pitting pedal oedema. Her mid arm circumference is 11cm. The other systemic examinations are normal.
   a. What is your most likely diagnosis and write two differential diagnosis. (1.5)
   b. Write an approach to evaluate this patient. (2.5)
   c. How you will manage this child. (4)
   d. Enumerate some new problems you may encounter once you start therapy (2)
2. Discuss briefly the complications you will assess in a child with Down syndrome on regular follow up with you. (5)
3. Define steroid resistant nephrotic syndrome. Write the management plan for a four-year-old child diagnosed to have the 1st episode of Nephrotic Syndrome. (1+4)
4. Write short note on clinical picture and management of congenital hypothyroidism (5)
5. Discuss the management of a child with complicated or severe malaria. (5)
6. Write a short note on Rastriya Bal Surekhya Karyakaram (RBSK). (5)
7. What is Hypernatremic dehydration? Enumerate the etiology. How will you manage it? (1+ 2+2)
8. Enumerate the causes of stridor in a 2-year-old child. How will you manage a child with moderate croup? (2.5 +2.5)
9. Discuss the dietary management of persistent diarrhoea. (5)

SECTION – B

1. Classify Acyanotic congenital heart diseases. Describe about the clinical manifestation and management of Ventricular Septal defect (VSD). (2+4+4)
2. Short note on Japanese B Encephalitis vaccine. (5)
3. A five year male child presented with convulsion of one hour duration. Outline the management plan in this child. (5)
4. Short note on Kangaroo Mother Care (KMC).
5. What are the principles or laws of growth & development? (5)
6. What are the ECG findings of Hyperkalaemia ? Outline the management of Hyperkalaemia. (2+3)
7. Short note on Idiopathic thrombocytopenic purpura. (5)
8. Classify neonatal Hypothermia. How you will manage a case of severe neonatal hypothermia? (2+3)
9. Enumerate the complication of Measles. How you will manage these complications? (2+3)

This curriculum draws its inspiration from:

Undergraduate MBBS Curriculum, AIIMS New Delhi

Undergraduate MBBS Curriculum, Pondicherry University

MCI Curriculum

Curriculum for Under-Graduate Medical Education in Bangladesh

MSc Medical Humanities Course - Manchester University