KRISHNA INSTITUTE OF MEDICAL SCIENCES "DEEMED TO BE UNIVERSITY", KARAD

DEPARTMENT OF PHARMACOLOGY

Program: MBBS (1101)

Course: Pharmacology (1101-21)

UNDERGRADUATE SYLLABUS

PHARMACOLOGY

1. Goal

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

2. Educational objectives

(a) Knowledge

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

i. describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs

ii. list the indications, contraindications, interactions and adverse reactions of essential and commonly used drugs

iii. indicate the use of appropriate drug/drugs in a particular disease with consideration of its/their cost, efficacy and safety for -
   - individual needs, and
   - mass therapy under national health programmes

iv describe the pharmacokinetic basis, clinical presentation, diagnosis and management of Common poisonings.

v list the drugs of addiction and recommend the management

vi classify environmental and occupational pollutants and state the management issues.

vii explain pharmacological basis of prescribing drugs in special medical situations such as pregnancy, lactation, infancy and old age and organ failures

viii understand and inculcate the concept of rational drug therapy in clinical pharmacology

ix understand the concept of `Essential Drugs'

x evaluate the ethics and modalities involved in the development and introduction of new drugs

xi. Understand importance of pharmacovigilance

xii. Describe basic principles of alternative methods of medicine

(b) Skills

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

i. prescribe drugs for common ailments

ii. Calculate dose considering various factors

iii. Identify adverse reactions and interactions of commonly used drugs

iv. Interpret the data of experiments designed for the study of effects of drugs and bioassays which are observed during the study

v. scan information on common pharmaceutical preparations i.e. various dosage forms

vi. Critically evaluate market preparations, fixed dose drug combinations and promotional drug literature.

vii. be well-conversant with the principles of pharmacy and dispensing the medications giving proper instructions describe method of drug administration by different routes

viii. Solve hypothetical therapeutic problems

ix. Fill adverse drug reaction reporting form.

Total duration of para-clinical teaching – 3 Semesters (III, IV, V)

Total 360 teaching days

Total number of teaching hours allotted to Pharmacology: 300 hours.

Teaching /Learning Methods:

a. **Traditional Learning methods:**

Lectures, Tutorials, Demonstrations & Practical's, audiovisual aids.

b. **Newer Teaching- learning Methods:**

PBL, Students seminars, Group Discussions, Quiz, Debates, projects, Horizontal Integration & Vertical Integration

c. **Newer Evaluation Methods:**

Objectively structured practical examination

Distribution of teaching hours

Induction of course	2 hours
Didactic Lectures	100 hours
Tutorials/ Test	26 hours
Demonstrations/ Practicals	60 hours
Student seminars	6 hours
PBL/Debate/ projects	6 hours
Computer assisted learning	2 hours
Group discussion	8 hours
Integrated teaching	12 hours
Soft skill and budding professional course	8 hours
Internal assessment theory and practical exam.	70 hours
Total	**300 hours**

Sr. No.	System &Topic	No. of lectures
I	**GENERAL PHARMACOLOGY (Total 10 lectures)**	
	1) Definitions, subdivisions of Pharmacology, Nature & sources of drugs	1
	2) Pharmacokinetics: Absorption & Bioavailability	1
	3) Pharmacokinetics: Drug Distribution & Plasma protein binding	1
	4) Pharmacokinetics: Drug biotransformation	1
	5) Pharmacokinetics: Drug Excretion & Kinetics Of Elimination.	1
	6) Clinical Pharmacokinetics: Biological half-life, Therapeutic drug monitoring, Methods of Prolonging drug action.	1
	7) Pharmacodynamics: Mechanisms of Drug Action (Receptor & Non receptor), Combined effects of drug	1
	8) Factors modifying drug action/effect.	2
	9) Adverse drug reactions	1
II	**AUTONOMIC NERVOUS SYSTEM (Total 8 Lectures**)	
	1) General Consideration of ANS	1
	2) Cholinergic drugs.	1
	3) Anticholinergic drugs.	1
	4) Adrenergic drugs.	2
	5) Adrenergic receptor antagonists	2
	6) Drug treatment of Glaucoma	1
III	**PERIPHERAL NERVOUS SYSTEM (Total 2 Lectures)**	
	1) Skeletal muscle relaxants	1
	2) Local anaesthetics	1

List of Didactic Lectures – Total No.100

IV	**DIURETICS & ANTIDIURETICS (Total 5 Lectures)**	
	1) Classification of Diuretics , Thiazide Diuretics	1
	2) Loop diuretics – furosemide	1
	3) Carbonic anhydrase inhibitors , Osmotic diuretics, Potassium sparing diuretics.	1
	4) Complications of diuretic therapy & uses of diuretics	1
	5) Antidiuretics & treatment of diabetes insipidus.	1
V	**CARDIOVASCULAR SYSTEM (Total 10 Lectures)**	
	1) Calcium Channel Blockers	1
	2) ACE inhibitors & Angiotensin receptor antagonists.	1
	3) Drug therapy of Hypertension.	3
	4) Antianginal drugs & treatment of MI	2
	5) Cardiac glycosides & treatment of CCF	2
	6) Antiarrhythmic drugs	1
VI	**HAEMOPOIETIC SYSTEM (Total 5 Lectures)**	
	1) Coagulants	1
	2) Anticoagulants	1
	3) Fibrinolytics, Antiplatelets	1
	4) Hypolipidemics, Plasma expanders	1
	5) Haematinics	1

VII	**ENDOCRINE SYSTEM (Total 12 Lectures)**	
	1) Anterior Pituitary Hormones.	1
	2) Thyroid hormone & Antithyroid drugs.	2
	3) Drug treatment of Diabetes Mellitus	2
	4) Glucocorticoids.	2
	5) Sex hormones & contraceptive drugs	3
	6) Uterine Pharmacology	1
	7) Drugs modifying calcium balance	1
VIII	**AUTACOIDS & RELATED DRUGS (Total 2 Lectures)**	
	1) Histamine & H 1 blockers.	1
	2) 5-HT agonists & antagonists, treatment of Migraine	2
IX	**RESPIRATORY SYSTEM (Total 2 Lectures)**	
	1) Drug therapy of Cough.	1
	2) Treatment of Bronchial Asthma	1
X	**GASTROINTESTINAL SYSTEM (Total 4 Lectures)**	
	1) Drug therapy of Peptic Ulcer.	1
	2) Emetics, Antiemetics & Prokinetics.	1
	3) Drug therapy of Constipation.	1
	4) Drug treatment of diarrhea	1
XI	**CENTRAL NERVOUS SYSTEM (Total 16 Lectures)**	
	1) Sedative & Hypnotics	2
	2) Antiepileptic drugs	2
	3) Psychopharmacology	4

	4) AntiParkinsonism & Drugs in other neurodegenerative Disorders	2
	5) Opioid Analgesics	2
	6) Non steroidal Antiinflammatory Drugs	2
	7) Drug treatment of Rheumatoid Arthritis	1
	8) Drug treatment of Gout	1
XII	**CHEMOTHERAPY (Total 20 Lectures)**	
	1) General considerations of chemotherapy	1
	2) Rational use of antimicrobial drugs	1
	3) Sulfonamides & Cotrimoxazole.	1
	4) Quinolones.	1
	5) Penicillins	1
	6) Cephalosporins.	1
	7) Tetracyclines,	1
	8) Chloramphenicol.	1
	9) Aminoglycoside antibiotics.	1
	10) Macrolides.	1
	11) Chemotherapy of tuberculosis	2
	12) Chemotherapy of Leprosy	1
	13) Antiviral drugs (including antiretroviral drugs).	1
	14) Antifungal drugs.	1
	15) Antimalarial drugs	2
	16) Chemotherapy of amoebiasis & other Protozoal diseases.	1

	17) Anthelmintics.	1
	18) Chemotherapy of Malignancy.	1
XIII	**IMMUNOPHARMACOLOGY (Total Lectures 1)**	
	1) Immunosuppressants & Immunostimulants	1
XIV	**MISCELLANEOUS TOPICS (Total 3 Lectures)**	
	1) Heavy metal antagonists.	1
	2) Drugs acting on skin & Ectoparasiticides, Disinfectants, Antiseptics	1
	3) Vitamins, antioxidants,	1

Term wise distribution of topics

TERM	**TOPICS**	**LECTURES**
III Term (II/I)	General Pharmacology Autonomic Nervous System Skeletal muscle relaxants Diuretics Cardiovascular system	35
IV Term (II/II)	Haemopoietic system Endocrine system Autacoids Respiratory system Gastrointestinal system Central Nervous system	41
V Term (II/III)	Chemotherapy Immune pharmacology Miscellaneous Topics	24

Practical's and demonstrations: Total hours: 60

I Term Practical's (III Semester) (N = 13):

1. Introduction to Practical Pharmacology
2. Oral route and oral dosage forms (**Practice of drug administration techniques)**
3. Parenteral route and dosage forms **(Practice of injection techniques)**
4. Practice of drug administration**: Infusion**
5. Topical route and dosage forms **(Practice of drug administration techniques)**
6. Newer drug delivery systems

7. Pharmacokinetics I: Disintegration & dissolution apparatus- Demonstration Exercises & Graph Reading on bioequivalence, bioavailability
8. Pharmacokinetics II: Exercises on Volume of distribution, Steady state concentration, Loading dose, Half-life.
9. Pharmacodynamics I: Graph reading- Dose response curves
10. Pharmacodynamics II: Graph reading- Antagonism, Potentiation, and tachyphylaxis.
11. Preclinical screening of drugs: Intact animal and isolated tissue experiments (**Computer assisted demonstration)**
12. Dose calculation exercises
13. Clinical trial and ethics in human research
14. Effects of drugs acting on Autonomic Nervous System: Graphs Reading, Demonstration by using software

II Term Practical's (IV Semester) (N= 11)

15. .Adverse drug reactions: Photographs, ADR reporting exercises, causality assessment exercises
16. Sources of drug information
17. Prescription writing
18. Interaction with the patient: Role plays & Group activity
19. Concept of Essential drugs, P drug, rational pharmacotherapy.
20. Selection of P Drug: Group Dynamics
21. Critical appraisal of promotional drug literature & Pharmaco economics Exercises
22. Rational use of FDCs &FDC criticism exercises **(online display then discussion)**
23. Prescription writing on ANS, CVS, RS, GIT, Haemopoietic, Endocrine, CNS **(Online display then discussion)**
24. Solving Therapeutic Problems **(online display then discussion)**
25. Prescription Criticism and rewriting prescription **(online display then discussion)**

III Term Practical's (V Semester) (N = 5)

26. Case studies

27. Case studies
28. FDC criticism exercises **(online display then discussion)**
29. Prescription Criticism and rewriting prescription **(online display then discussion)**
30. Solving Therapeutic Problems **(online display then discussion)**

TUTORIALS / TEST: (N= 13, Time = 26 h)

I Semester: (N=4, Time = 8 h)

1. General Pharmacology
2. Cholinergic system
3. Adrenergic system
4. Cardiovascular system

II Semester: (N= 5, Time= 10 h)

5. Haemopoietic system
6. Endocrine system
7. Respiratory system
8. Gastrointestinal system
9. Central nervous system

III Semester (N= 4, Time= 8 h)

10. Peripheral Nervous System
11. Chemotherapy
12. Chemotherapy
13**. Management of new viral infections**

Computer Assisted Learning:

Banned Drugs

Problem based learning:

Frequency of PBL will be one per term

To be conducted during practical hours.

PBL will be done in three to four sessions for small groups.

Teacher will act as only facilitator.

Trigger: Initially a created problem or a real case can be given to the students.

They will try to collect information by using internet, library etc.

Session 1: They will try to find differential diagnosis, etiopathology

Session 2: Investigations required, treatment modalities

Session 3: drugs which can be used, socio economic aspects etc.

This will encourage self-learning, rational approach for treatment, decision making and also good teamwork in students.

Examples:

- Problem in ANS
- Problem in CVS
- Problem in Haemopoietic system.
- Problem in CNS

Group discussion:

1) Generic drugs

2) Antibiotic resistance

3) **Self medication**

4) **Emergency tray management**

Integrated Teaching:

Vertical Integration with preclinical and clinical subjects

Horizontal integration with para clinical subjects.

Frequency of Horizontal Integration will be two modules per term. Thus one Batch will Have total 6 modules in 1 ½ year.

Term	**Topic**	**Departments Involved**
III (II/I)	Sterilization	Microbiology, Pharmacology
III (II/I)	Common Poisonings	Pharmacology, FMT, Pathology
IV (II/II)	Peptic Ulcer	Pathology, Microbiology, Pharmacology
IV (II/II)	Tuberculosis/Enteric Fever	Microbiology, Pathology, Pharmacology
V (II/III)	HIV- AIDS	Microbiology, Pathology, Pharmacology
V (II/III)	Malaria	Microbiology, Pathology, Pharmacology

Student Seminars:

It helps to encourage self-learning, presentation skill etc. Fast learners should be encouraged to take seminars. They should use AV aids. Frequency will be 1 per semester.

Sr. No.	**Topic**	**Term**
1	New drug delivery systems	III
2	Treatment of Bronchial asthma	III
3	Treatment of Peptic ulcer	IV
4	Treatment of Myocardial infarction	IV
5	Treatment of Epilepsy	V
6	Treatment of Enteric fever	V

Quiz:

It is recommended that one quiz including all four para clinical subjects will be conducted once in the 1 ½ year period of one batch, preferably after completion of syllabus i.e. for V term (II/III) students.

Debate, Student Projects, Poster Competitions:

These activities will be optional and are meant for encouraging good/extra ordinary students to show their abilities and to encourage self-learning, out of box thinking and team work these will be conducted during II term.

For all these active learning methods participating students will be given certificates only and no additional marks in examinations or internal assessment.

Course for Budding Professional

Medicine is changing and so is the process of learning medicine. The objectives and patterns of medical education are progressively changing all over the world. The demands of patients and community for quality medical care are ever increasing and also are the advances and revolutions in treatments and concepts of medicine.

Currently the goals of the MBBS training programme are to create doctors with requisite knowledge, skills, attitudes, values and responsiveness, so that they may function appropriately and effectively as a Basic Doctor, Physician of first contact for the community in the primary care setting both in urban as well as rural areas of our country. They should at least get introduction to recent advances and recent techniques to keep pace with ever advancing modern medicine.To accomplish these aspects, paramedical curriculum at Phase 2 of MBBS also needed to be reformed. A basic doctor needs to be a good

- Clinician
- Communicator
- Leader and member of health care units
- Lifelong learner

- Professional who is committed to excellence, ethical, responsive and accountable to patients, community and the profession.

To achieve this, following special skills are incorporated in Phase 2 of MBBS course. This programme will be during first two terms of II M.B.B.S. and will be organized and conducted by all four para clinical subjects together.

Special skills for Budding Medical Professionals

1. To be completed during I and II Phase of MBBS (i.e. 2.5 years duration)
2. Attendance required: Minimum 80%
3. Minimum criteria is satisfactory completion of course.

4**. Programme objectives: (for Phase 2)**

(Ethics, values and use of information technology and library are covered in Phase I i.e.

During I M.B.B.S.).

- To make budding medical professional as sympathetic, effective communicator.
- To inculcate the ability of introspection for self development
- To make the budding medical professional well aware of moral values and patients' safety
- To make the budding medical professional aware of traditional and alternative systems of medicine in our country.
- To make the budding medical professional inculcate art of good time management and making quick and effective decision.

A budding medical professional is expected to acquire following skills:

- Communication skill
- Decision making skill
- Positive attitude

- Skill to maintain safety measures in clinical practice.

Following topics will be covered during one week module in Phase 2

Objective 1: Introspection and self-development

Topics covered

1. ASWOPT analysis of self by observing inner self

A – Achievements

S - Strengths

W – Weaknesses

O – Opportunities

P – Problems

T – Threats

2. Meditation – Simple methods and its importance
3. Modifying thought process for positive attitude

Objective 2: To develop good communication skill

Topics covered

1. Essentials of effective communication
2. Do's and Don'ts of effective communication
3. Methods and pedagogy of effective communication

With Patients and their attendants

With Near relatives of patients

With Patients of dignified status

The Steps involved in disclosure of unpleasant happening/news

With Organizations involved if any like NGOs, Government, Society, Employers, Superiors, juniors and Para medical staff and other employees of own/employer's clinic.

Importance of knowing vernacular / local language

Objective3: To develop skill of time management and decision making

Topics covered

1. Art of efficient and effective management of time
2. Art of effective decision making

Objective 4: To introduce aspects related to safety in clinical practice

Topics Covered:

1. Universal safety precautions
2. Bio waste disposal
3. Ethics in human research
4. Pharmaco vigilance and safe use of drugs
5. Medical laws

Objective 5: To have introduction to traditional and alternative systems of medicine in India

Topics Covered:

1. Introduction to Ayurveda
2. Introduction to Homeopathy
3. Benefits and risks in combining different systems

Evaluation

a. Methods

Theory, Practical & Viva

Pattern of University Examination.

Theory – (Two Papers of 50 marks)	= 100 marks
Oral (Viva)	= 20 marks
• Practical	= 50 marks
• Internal Assessment	= 30 marks
(Theory – 15, Practical's – 15)	
TOTAL	**= 200 marks**

b. Eligibility: A Students must secure at least 35 % marks of the Total Marks fixed for Internal Assessment in Pharmacology subject in order to be eligible to appear for Final University Examination in Pharmacology subject.

c. Passing: The candidate must obtain minimum 50 % in Theory including Oral and Minimum 50 % in Practical.

The candidate will be declared passed in the subject of Pharmacology only when he/ she Obtains minimum 50% of aggregate marks. (Theory + Practical + Internal Assessment)

Pattern of University Theory Examination (Distribution of Marks, Questions &Time.)

i) Total duration – Two papers each of 2 and 1/2 hours duration.

ii) Each paper will have 2 sections (A & B)

Pattern and Marking Scheme for each Theory Paper of 50 marks.

(Two Term Ending Exams. & two papers of Preliminary & University Examination)

Sections	Nature of Questions	Total No. of Questions	Marks per Question	Total Marks
A Q. 1	Multiple Choice Questions (MCQs) SBR	28	½	14
B Q. 2	Long Answer Questions (LAQs)	2 out of 3	8	16
B Q. 3	Short Answer Questions (SAQs)	2 out of 3	5	10
B Q. 4	Brief Answer Questions (BAQs)	5	2	10
			Total	**50**

Time allotted for the Sections:

For Section A (MCQs) = 30 minutes

For Section B (LAQ, SAQ, BAQ) = 2 hour

Total = 2 hour 30 minutes.

c. Topic distribution

A) PHARMACOLOGY PAPER I includes:

1. General Pharmacology.
2. Autonomic Nervous System & Skeletal Muscle Relaxants.
3. Cardiovascular System.
4. Diuretics & Antidiuretics.
5. Haemopoietic System.
6. Gastrointestinal System.
7. Ocular Pharmacology.
8. Drug use at extremes of age, in pregnancy & organ dysfunction.
9. Heavy metal antagonists.
10. Environmental & Occupational Pollutants & Insecticides.
11. Vitamins, antioxidants, Hyperbaric Oxygen.

B) PHARMACOLOGY PAPER II includes:

1. Central Nervous System.
2. Chemotherapy.
3. Endocrines including Drugs acting on Uterus.
4. Respiratory System.
5. Autacoids and Related Drugs.
6. Immunopharmacology.
7. Local anesthetics.
8. Drug therapy of gout.
9. Drugs acting on skin & Ectoparasiticides.
10. Nitric oxide.

d. Pattern of University Practical Examination and Duration.

Practical Heads	**Marks**
i. Prescription writing	**10 Marks**
• Long (Multidrug)	7
• Short (Single drug)	3
ii. Criticism	**10 Marks**
• Prescription & rewriting	5
• Fixed dose formulation	5
iii. Therapeutic problem	**5 marks**
iv. Clinical Pharmacy viva	**5 Marks**
v. 10 Spots	**10 Marks**
vi. Practical record book	**10 marks.**
Total	50 marks
Time distribution:	**Spots: 20 min**

Table work :(Time 45 min): For prescription writing, criticism and therapeutic problem

Clinical Pharmacy viva (5 min): The students may be asked to write labels and instructions to be given to the patients or describe steps in administration of various dosage forms and state the precautions to be taken / explained to the patients while using them, describe/ identify dosage forms in tray.

e. Viva: duration and topic distribution (**Marks added to theory.)**

Viva I: 10 Marks (minimum 5 min)

Viva II: 10 Marks (minimum 5 min)

Total Viva Marks: 20 Marks

Thus the total time for the practical & viva examination will be 1 hour30 minute.

f. Plan for Internal Assessment.

The time-table for internal assessment will be as follows:

III Term Ending (II/I) Examination

At the end of III semester

Theory: (One paper of 50 marks)

Practicals: 50 marks (OSPE 30 Marks + Viva 20 Marks)

IV Term Ending (II/II) Examination

At the end of the term IV semester

Theory: One paper of 50 marks

Practicals: 50 marks (Spots, Table work, Clinical Pharmacy viva + Theory viva 10 marks)

V Term (II/III) (Preliminary examination)

During V semester.

Minimum 30 days gap mandatory between Preliminary and University examination)

Theory Two papers of 50 marks each.

Practical

I. Table work Exercises: Duration

i. Prescription writing **10 Marks**

Multidrug Prescription 7

Single drug Prescription 3

ii. Criticism Exercises **10 Marks**

Criticize Prescription & rewriting 5

Fixed dose formulation 5

iii. Therapeutic problem **5 Marks**

II. Clinical Pharmacy viva **5 Marks**

(Viva pertaining to dosage forms, routes of administration, label information and instructions about storage, parts of prescription)

III. 10 Spots **10 Marks**

IIII. Theory Viva **10 Marks.**

Total **50 Marks.**

<u>Pattern for Computation of Internal Assessment Marks.</u>

<u>Theory</u>:

Internal assessment marks shall be computed on the basis of three term ending examinations (two terminals and one preliminary examination taken before the University examination).

EXAMINATION	**No. of Papers**	**Total Marks**
1st TERMINAL	One -50 Marks	50
2nd TERMINAL	One -50 Marks	50
PRELIMINARY (As per final University pattern)	Two-50marks each	100
	Total	**200**

Internal assessment marks in Theory shall be computed on the basis of total theory marks obtained by the student out of 200 in three internal examinations, reduced to marks out of 15.

PRACTICALS:

Internal assessment marks in Practical shall be computed on the basis of total marks obtained by the student in the three term ending practical examinations, reduced to marks out of 15.

TEXT BOOKS & REFERENCE BOOKS (Latest Editions)

1. Essentials of Medical Pharmacology, Tripathi K D, Jaypee Brothers Medical Publishers (P) Ltd. New Delhi.

2. Pharmacology and Pharmacotherapeutics, Satoskar RS, Bhandarkar SD,Rege NN Eds), Popular Prakashan Pvt. Ltd., Mumbai.

3. Basic & Clinical Pharmacology, Katzung BG (Ed), International Edition Lange Medical books/ McGraw – Hill Medical Publishing Division, New York.

4. Principles of Pharmacology, H L Sharma, K K Sharma, Paras Publications

Reference books:

1. Goodman & Gilman's The Pharmacological Basis of Therapeutics, Hardman JG, Limbird LE (Eds) Mc Graw – Hill Medical Publishing Division, New York.
2. Clinical Pharmacology, Laurence DR, Bennett PN, Brown MJ (Eds) Churchill Livingstone, London.

KRISHNA INSTITUTE OF MEDICAL SCIENCES, KARAD

Programme Name & Code **II M.B.B.S. - 1101**

Subject Name & Code **PATHOLOGY – 1101-22**

1. Goal

The goal of teaching pathology is to provide undergraduate students comprehensive knowledge of the causes and mechanisms of disease, in order to enable them to achieve complete understanding of the natural history and clinical manifestations of the disease.

2. Educational objectives

(a) Knowledge

At the end of one and half years, the student shall be able to -

i) Describe the structure and ultra-structure of a sick cell, the mechanisms of the cell degradation, cell death and repair.

ii) Correlate structural and functional alterations in the sick cell.

iii) Explain the Pathophysiological processes which governs the maintenance of homeostasis, mechanism of their disturbances and the morphological and clinical manifestations associated with it.

iv) Describe the mechanisms and patterns of tissue response to injury to appreciate the Pathophysiology of disease processes and their clinical manifestations.

v) Correlate the gross and microscopic alterations of different organ systems in common diseases to the extent needed to understand disease processes and their clinical significance.

vi) Develop an understanding of neoplastic change in the body in order to appreciate need for early

diagnosis and further management of neoplasia.

vii) Understand mechanisms of common haematological disorders and develop a logical approach in their diagnosis and management.

(b) Skills

At the end of one and half years, the student shall be able to -

i. Describe the rationale and principles of technical procedures of diagnostic laboratory tests.

ii. Interprete diagnostic laboratory tests and correlate with clinical and morphological features of diseases.

iii. Perform simple bedside tests on blood, urine and other biological fluid samples.

iv. Draw a rational scheme of investigations aimed at diagnosing and managing common disorders.

v. Recognize morbid anatomical and histopathological changes for the diagnosis of common disorders.

(c) Integration

At the end of one and half years, the student shall be able to integrate the causes and mechanisms of disease most prevalent in India & globally with their natural history for the understanding of clinical course and management.

Course Outcome

At the end of one & haff yrs the student shall be able to: -

1.	To achieve complete understandining of the natural history and clinical manifestations of the disease.
2.	To achieve competencry in diagnosis and management of common health problems of the individual and the community, as a members of the health team at the various levels, using his/her skills based on relevant investigations.
3.	To demonstrate ability to choose the appropriate diagnostic tests & interpret these tests based on scientific knowledge, cost effectiveness & clinical context.
4.	To describe the structure and ultra structure of a sick cell, the mechanisms of the cell degradation, cell death and repair.
5.	To correlate structural and functional alterations in the sick cell.
6.	To correlate the gross and microscopic alterations of different organ systems in common diseases to the extent needed to understand disease processes and their clinical significance.
7.	To understand mechanisms of common haematological disorders and develop a logical approach in their diagnosis and management.
8.	To describe the rationale and principles of technical procedures of diagnostic laboratory tests.
9.	To interpret diagnostic laboratory tests and correlate with clinical and morphological features of diseases.
10.	To perform simple bedside tests on blood, urine and other biological fluid samples.
11.	To recognize morbid anatomical and histopathological changes for the diagnosis of common disorders.

3. Total duration of teaching 3 Semesters (III, IV and V)

Minimum 315 working days.

Total number of teaching hours allotted to the discipline 300 hrs.

Total duration of para-clinical teaching – 3 Semesters (III, IV, V)

Total 315 teaching days

Teaching - Learning Methods:

c. Traditional Learning methods:

Lectures, Tutorials, Demonstrations, Horizontal Integration & Practicals.

d. Newer Teaching- learning Methods:

Problem Based Learning, Students seminars, Group Discussions, Quiz, Debates, Projects, Case based learning.

4. Curriculum:

Distribution of teaching hours

- Induction of course ---------- 02
- Lectures ---------- 99
- Tutorials with Internal Assessment (Theory & Practicals exams) ---------- 70
- Demonstrations & Practicals with revision---------- 102
- Students Seminars/ Group discussion/ Debate/ Project & such activities---------- 10
- Problem based learning & Case based learning ------- 10
- Soft skill and budding professional course ---------- 07

300

THEORY LECTURES LIST (99) –

1. General Pathology (Total lecture 28)

1. Definitions and causes of diseases,
2. Modes of cell injury,
3. Necrosis & Gangrene, Apoptosis,
4. Intracellular accumulations, Hyaline & Mucoid change,
5. Acute inflammation,
6. Chemical mediators of Inflammation,
7. Chronic inflammation (including granulomatous),
8. Regeneration and repair (general & specialized tissues),
9. Oedema,
10. Shock,
11. Thrombosis,
12. Embolism & Hyperemia & Hemorrhage,
13. Disturbances of pigment metabolism,
14. Pathological calcification
15. Genetic disorders,
16. Hypersensitivity reactions,
17. Autoimmune diseases,
18. Amyloidosis,
19. Cellular Adaptations/ Growth disturbances,
20. Deficiency disorders,
21. Tuberculosis,
22. Leprosy
23. HIV – AIDS

NEOPLASIA (Total 7 Lectures)

1. Neoplasia - Nomenclature and classification,
2. Neoplasia – Carcinogenesis - I
3. Neoplasia -- Carcinogenesis - II
4,5. Neoplasia - Biology and Lab diagnosis,
6,7. Neoplasia - Spread, Grading and Staging.

Cardiovascular System (Total Lecture 6)

1. Atherosclerosis,
2. Vasculitis & Aneurysm,
3. Ischaemic heart disease with Laboratory Diagnosis of M.I.
4,
5 .Rheumatic heart disease & Congenital Heart Disease.
6. Endocardial and pericardial diseases.

Gastrointestinal system with Hepatobiliary system (Total Lecture 11)

1. Gastritis and Peptic Ulcer,
2. Ulcers of Intestines, appendicitis, haemorrhoids,
3. Idiopathic inflammatory bowel disease,
4. Tumours of upper GIT,
5. Tumours of lower GIT,
6. Viral Hepatitis,
7,
8. Alcoholic liver disease & Cirrhosis,
9,
10. Tumors of liver. Diseases & Tumors of Pancreas,
11. Cholecystitis, Gall stones & Tumors of Gall bladder.

Renal system (Total Lecture 7)

1, 2. Acute nephritis, rapidly progressive GN & end stage kidney.

3. Nephrotic syndrome

4. Acute & Chronic Renal failure & Renal function Tests.

5, 6. Pyelonephritis and renal calculi, obstructive uropathy: paralytic bladder

7. Tumors of kidney, Pelvis, Ureter, bladder.

Male & Female Genital System (Total Lecture 4)

1. Tumors of Testis and Prostate,

2. Diseases & Tumors of Cervix,

3. Diseases & Tumors of uterus,

4. Tumours of Ovary and trophoblastic tissue.

Breast (Total Lecture 1)

1. Non-neoplastic and Neoplastic lesions of the breast.

Hematology (Total Lecture 12)

1. Introduction to haematology and hemopoiesis --classification & general Features of anemia.

2, 3, 4. Introduction to Anemia, Iron deficiency anaemia & Megaloblastic anemia,

5. Haemolytic anaemia,

6. Haemoglobinopathies,

7. Haemorrhagic disorders

8. MDS & Acute Leukaemias,

9. Chronic Leukaemias, Leukemoid reaction & MPD,

10. Paraproteinemia,

12. Blood groups, Blood transfusion & blood components.

Central Nervous System (Total Lecture 2)

1. Inflammatory conditions of CNS,

2. Neoplasms of CNS.

Head & Neck Pathology (Total Lecture 2)

1, 2. Lesions of oral cavity and salivary glands.

Respiratory system (Total Lecture 6)

1, 2. Pneumonias,

3. Lung Abscess and Bronchiectasis,

4. Chronic Bronchitis and Emphysema,

5. Environmental pathology & Occupational lung diseases,

6. Tumors of lung and pleura.

Bone & Soft Tissue (Total Lecture 3)

1. Soft tissue tumors,
2. Non-neoplastic lesions of bone and joints,
3. Tumors of bone, cartilage and joints.

Lymph node & Spleen (Total Lecture 3)

1. Non-neoplastic lesions of lymph nodes and Spleen,
2. Hodgkin's Lymphoma,
3. Non-Hodgkin's Lymphoma.

Endocrine System (Total Lecture 2)

1. Diabètes mellites
2. Lesions of Thyroid.

SKIN (Total Lecture 1)

1. Tumors of skin (pigmented & non pigmented)

Muscle & Nerve pathology (Total Lecture 1)

1. Myopathies, neurogenic atrophy.

Clinical Pathology & Recent Diagnostic techniques. (Total Lecture 3)

1. Differential diagnosis of Jaundice & LFTS,
2. Recent diagnostic techniques in pathology,
3. Cytology.

GENERAL PATHOLOGY I

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Able to recall common definitions in Pathology. • Causes of cell injury. • Mechanisms of cell injury & relate them to the morphological changes. • Types of necrosis and gangrene at gross and microscopic levels • Apoptosis and its relevance. • The types of intracellular accumulations & its aetiology. • Alterations in reversible cell injury along with alterations in cell organelles and cytoskeleton. • Define and describe changes occurring in acute inflammation and integrate the changes with morphological patterns of injury. • Definition, classification, description of chemical mediators of inflammation & role in acute & chronic inflammation. • Define & describe regeneration and repair. The mechanisms and list factors modifying repair & complications. • Define oedema, classify and describe pathogenesis & correlate morphology with clinical significance with emphasis on transudate and exudate. Pulmonary oedema as special type. • Define, classify, pathogenesis & recognize the role of mediators and stages of shock. • Aetio-pathogenesis, fate, morphology and effects of thrombosis. • Enumerate types of embolism morphological changes and correlate clinical significance.	• Correlate various pathological processes (reversible & irreversible cell injuries) with clinical conditions.	• Lab diagnosis of these conditions.

• Definitions, morphology of acute and chronic congestions, clinical significance of haemorrhage. • Types of infarction, morphological changes & correlate clinical significance. • State the type of pigment disturbances and describe the changes associated with common disturbances like Lipofuscin, melanin, Hemosiderin & bilirubin. • Types and morphological changes of pathological calcification. • Climate change, global warming and related health hazards are added in Environmental Pathology.	• Recent advances in pathogenesis of septic shock.	

GENERAL PATHOLOGY II

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Normal karyotype, classification of genetic disorders, types of genetic change, Down syndrome, Klinefelter syndrome, Turner syndrome. • Classify, differentiate between different types of Hypersensitivity reactions. • Mechanisms of autoimmunity and diagnose common autoimmune diseases; overview of SLE. • Definition, physical characters, chemical characters, classification, pathogenesis, morphology, clinical correlation & lab diagnosis of Amyloidosis. • Essential nutrients, pathogenesis of obesity, starvation, protein energy malnutrition & disorders of vitamins trace elements.	• Lysosomal storage disorders, glycogen storage diseases. • Methods of diagnosis of Genetic Diseases – Cytogenetic studies, PCR, FISH etc. • Conversant with organ transplant rejections & its immunologic basis	• Diagnosis of autoimmune diseases

INFECTIOUS DISEASES

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Understand the natural history of the HIV- AIDS & recommend relevant investigations in the management of AIDS. • The importance of tuberculosis in the present day Context, its Pathogenesis & basic histopathology. List and describe the various pulmonary lesions of tuberculosis. Describe changes in various organs in TB and understand their functional correlation, sequelae, lab diagnosis and TB in AIDS. Methods of rapid diagnosis of TB viz PCR. • Classify, differentiate between different types of leprosy and describe the diagnostic histologic features and sequelae. Its clinical relevance & deformities due to neuropathy	• Epidemiological trends in opportunistic infection. • Multi drug resistant TB • Various reactions & immunological changes related to leprosy.	
	• Emerging infectious diseases viz. Ebola, H1 N1, Zika Viral illnesses	

GENERAL NEOPLASIA

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Define the various growth disturbances and appreciate the clinical significance of each with examples. • Define important terms, classify and differentiate benign from malignant neoplasms. Precancerous conditions in various organ systems. • Molecular and physical carcinogenesis and analyse the mechanism of genetic changes in carcinogenesis. • Understand the tumour host interactions in neoplasia and recommend the diagnostic workup for detection of cancer. • Biology of tumour growth, metastases, types, mechanisms, clinical correlations, grading of cancer and staging of cancer. • Recent methods of cancer diagnosis – cytogenetic studies, tumor markers, Immuno histo chemistry & Flow Cytometry & PCR etc.	• Special emphasis on viral oncogenes. • Methods used for staging of cancer. • Carcinogenicity of Various Chemicals causing soil, air water pollution due to improper waste disposal (Industrial/ Domestic) etc as recent health hazards.	

CARDIOVASCULAR SYSTEM & BLOOD VESSELS

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Incidence, risk factors, Pathogenesis, morphological changes, clinical course, complications and investigations of ischaemic heart disease. • Incidence, aetiopathogenesis, morbid anatomy, histopathology, lesions in the organs, clinical course and sequelae of rheumatic heart disease & CHD. • Aetiology, Pathogenesis, morphology, differential diagnosis of cardiac vegetation's. • Aetiology and basic morphology of different forms of pericarditis. • Definition, risk factors, aetiopathogenesis, gross and microscopic description, complications and clinical correlation of Atherosclerosis. • Develop an index of suspicion for vasculatures and aneurysms. • Laboratory diagnosis of myocardial infarction with recent markers.	• Newer risk factors with clinical relevance for Atherosclerosis. • Lab diagnosis of vasculitis & clinical correlation. • Congenital heart diseases	

RESPIRATORY SYSTEM

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Aetiology, classification, gross, histopathological description in different forms of Pneumonia and its complications. • Aetiopathogenesis, morphological appearances of lung abscess & bronchiectasis & its complications. • Pathogenesis, types of emphysema, definition of chronic bronchitis, morbid anatomy and cardiac sequelae. • Types, aetiopathogenesis, gross anatomical differences between different forms of occupational lung disease and its sequelae. Importance of environmental pathology. • Classification according to recent WHO, aetiology, gross appearances, histological description of important forms of tumors of lung & pleura. Natural history, pattern of spread, Para neoplastic syndromes and secondary Pathology of tumors of lung & pleura.	• Epidemiological changes in lung cancer. • Health hazards of air pollution on Respiratory System.	

HEAD AND NECK

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Differential diagnosis of swelling of salivary glands, aetiopathogenesis, gross and histo pathological descriptions of oral cancer.	• Oral precancerous conditions	

RED BLOOD CELL AND BLEEDING DISORDER

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• The importance of haematology in clinical practice and enumerate the stages of hemopoiesis. • Classify anaemia by various methods, clinical features and lab approach to anaemias. • Definition, causes, haematological features, morbid anatomical features, laboratory diagnosis and differential diagnosis of iron deficiency and megaloblastic anemia. • Definition, classification, Pathogenesis and haematological features of hemolytic anemia. • Definition, classification, Lab diagnosis of thalassaemia and sickle cell anaemia. • Classify haemorrhagic disorders, describe clinical distinction between purpura and coagulation disorders and laboratory screening tests for haemorrhagic disorders. Normal coagulation and fibrinolytic mechanism. Describe aetiopathogenesis, clinical significance and lab diagnosis of haemophilia and DIC .Describe aetiopathogenesis, morphological features (haematological and morbid anatomical) clinical significance and lab diagnosis of ITP.	• Growth factors • Lab diagnosis & various tests.	• Use of growth factors as per indications

DISEASES OF WHITE BLOOD CELLS

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Classify and differentiate different types of acute Leukemia's. • Definition, general features, classification, aetiology, hematological change, morbid anatomy, clinical course and lab. Investigations of chronic leukemia. Introduce leukemia reaction & MPD. • Multiple myeloma/ Plasma dyspraxia – clinical, hematological & radiological feature.	• MDS recent classification. • Recent changes in classification of leukemia according to WHO. • Other myeloproliferative disorder • Understand the relevance of Paraproteinemia's and integrate the various diagnostic modalities with the diagnosis	• Cytogenetic studies of leukemia. • Methods of diagnosis of Paraproteinemia's

TRANSFUSION MEDICINE

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Appreciate the relevance of blood groups in hematology and transfusion medicine. • Erythroblastosis fetalis. • Indications, selection of blood donors. • Autologous transfusions. • Complications of blood transfusions, investigation of suspected transfusion reactions. • Blood components & their uses.	• Blood component therapy & plasmapheresis.	

RECENT DIAGNOSTIC TECHNIQUES

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
	• PCR, flow cytometry, Immunofluroescence, Electron microscopy, Gene microarray Molecular biology & hybridization techniques.	

CYTOLOGY

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Exfoliative cytology, Pap smear. FNAC of common organs. • Guided FNAC.	• Procedure • USG guided FNAC, CT guided FNAC • Image & Guided needle core biopsy as Demonstrations	

GASTROINTESTINAL TRACT & HEPATOBILIARY SYSTEM

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Definition of peptic ulcer, etiological factors, gross and microscopic appearances and sequelae of gastritis and peptic ulcer. • Etiological classifications, Morphological appearances of typhoid, tubercular, amoebic ulcers and bacillary dysentery. Differential diagnosis of different forms of ulcers. Types of appendicitis, pathology of hemorrhoids	• Overview of etiology and types of gastritis with recent advances. • Neuroendocrine tumor • Various lab markers for diagnosis: HBV vaccine. • Pathology of tumors of Pancreas.	• Clinical courses and lab diagnosis of paraneoplastic syndromes.

• IBD aetiopathogenesis, Enumerate similarities and differences between the two component disorders viz., Crohn's disease and ulcerative colitis and its complications. • Aetiopathogenesis, morphological features of carcinoma oesophagus, classification and morbid anatomy and histopathology of gastric carcinomas. • Pathology of carcinoma colon. Various types of Intestinal polyps, GI stromal tumours , carcinoid tumors • Aetiology, clinical course and enzymology, salient histological features and sequelae of viral hepatitis. • Pathogenesis, morphological manifestations and correlation with clinical features of an .l .d & cirrhosis, in addition classification & d /d of cirrhosis. • Etiolog**y,** Pathology of Hepatocellular carcinoma, lab diagnosis of pancreatitis. • Acute & chronic cholecystitis. Common types of stones & tumors of gall bladder. • The differential diagnosis and laboratory investigations in jaundice.	• Interpretation of lab tests. Including recent tests & FNAC etc. tumor markers. • Pathological effects of soil, air & water pollution on GIT & hepatobiliary system	

GENITOURINARY SYSTEM

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Understand and integrate clinical and pathologic features of these syndromes with aetiopathogenesis and lab diagnosis of acute nephritis, rapidly progressive GN and end stage kidney. • Integrate clinical and pathological features of nephritic syndrome & remaining types of GMN. • Definitions, criteria, aetiology, systemic manifestations and laboratory investigations of renal failure. • Aetiology, pathogenesis of acute and chronic pyelonephritis Morphological features and clinical correlation pyelonephritis. • Study of common types of calculi & causes of obstruction of urinary tract & their consequences • Classification, Morphological features, clinical course including para neoplastic syndromes of common tumours.	• Recent advances in diagnosis of renal diseases	

MALE AND FEMALE GENITAL TRACT & BREAST

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Classification, morphological features, clinical course including par neoplastic syndromes of common tumours and clinical course of tumours of testis and prostate. • Aetiopathogenesis, role of HPV, salient morphological features, dysplasia and role of cytological screening in tumour of cervix. • Aetiopathogenesis, morphological types of tumors of uterus. • Teratoma and dermoid cyst • Non-neoplastic & neoplastic lesions of breast.	• Pathology of infertility • Semen/ Sperm Banking. • Approach to patient with Breast lump & utility f Needle Core Biopsy.	• Tumour markers • HPV vaccine for prevention of Ca cervix. • IHC Markers ER PR & Her 2 neu.

LYMPH NODE AND SPLEEN

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Aetiology, differential diagnosis, morphological features of common causes of lymphadenopathy. • Common causes and appearances of splenomegaly. • Definition, classification, salient diagnostic features and clinical course of Hodgkin lymphoma. • Definition, classification, salient diagnostic features and clinical correlation of non-Hodgkin lymphoma.	• How to investigate patient having lymphadenopathy & / or spleenomegaly. • Extra nodal lymphomas.	• IHC Markers

ENDOCRINE

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Differential diagnosis of thyroid nodule. • Classification, pathogenesis of system involvement, sequelae, complications & lab diagnosis	• Thyroid tumours	• Methods of diagnosis of thyroid lesion

SKIN

MUST KNOW	DESIRABLE TO KNOW	NICE TO KNOW
• Classification, morphological features of most common types and natural history of naevi & malignant melanoma. • Pigmented & Nonpigmented tumors – Basal Cell Carcinoma, Squamous Cell Carcinoma.	• Xeroderma Pigmentosa & skin tumors	• Premalignant conditions of skin tumors.

Name of the Department - Pathology
Additional Changes

Date of BOS	Topic	New Methods for Teaching & Learning
16-2-2019	• Hypersensitivity Reactions • Diabetes Mellitus • Autoimmune Diseases • Hypertension	• Flipped classroom • Problem based learning • Case based learning --- • Theory- MCQ, BAQ, SAQ.LAQ Practicals and specimens: DM: Table exercise

Term-wise distribution

1st Term:

1. General Pathology
2. Neoplasia
3. Cardiovascular System
4. Tutorials
5. Revisions

2nd Term:

1. G.I.T with Hepatobiliary System,
2. Renal
3. Male & Female Genital System
4. Breast
5. Hematology
6. CNS
7. Head & Neck Pathology

8. Tutorials
9. Revisions

3rd Term:

1. Respiratory System
2. Bone & Soft tissue
3. Lymph node & Spleen
4. Endocrine System
5. Skin
6. Clinical Pathology
7. Tutorials
8. Revision.

Practicals and Demonstrations with Revision

Total hours: 102

Contents – 51

I Term Practicals (III Semester)

A) GENERAL PATHOLOGY: (n=16)

1. Microscopy and tissue processing
2. Identify the common types of cells by light microscopy
3. Intracellular accumulation

4. Necrosis & Gangrene
5. Acute inflammation
6. Chronic inflammation and Repair
7. Thrombosis, Embolism,
8. Infarction
9. Oedema and Congestion
10. Disturbances of pigment metabolism
11. Tuberculosis
12. Leprosy
13. Amyloidosis
14. Disturbances of growth (Atrophy, Hypertrophy, Hyperplasia, Metaplasia, Dysplasia, Hypoplasia)
15. Epithelial tumors
16. Soft tissue tumors.

II Term Practicals (IV Semester)

B) HAEMATOLOGY: (n=11)

1. Collection of specimen, anticoagulants
2. Common hematological tests (Hb)
3. Common Hematological Counts TLC
4. Common Hematological Counts DLC
5. Interpretation of ESR, PCV
6. P.S. reporting

7. Haemopoiesis
8. Investigations in Anemia
9. Investigations in Leukemia
10. Investigations in haemorrhagic disorders
11. Blood Banking – Blood group.

C) SYSTEMIC PATHOLOGY: (n=17)

1. Diseases of blood vessels (Atherosclerosis, syphilitic aortitis)
2. Diseases of Heart (IHD & RHD)
3. Pneumonias
4. Tumors of lung
5. Diseases of kidney
6. Gross and Microscopic features of peptic ulcer and duodenal ulcer
7. Gross and Microscopic features of other intestinal ulcers
8. Tumours of GIT
9. Diseases of Liver

10. Lymphomas

11. Diseases of Male genital system.

12. Female genital system

13. Tumours of breast

14. Tumours of skin (Pigmented & non-pigmented)

15. Tumours of bone

16. Diseases of thyroid

17. Diseases of CNS

III Term Practicals (V Semester)

D) CLINICAL PATHOLOGY: (n=4)

1. Urine RE - Carryout a bedside routine urine examination and interpret the Results.
2. Pregnancy test and Semen Analysis - (Practical demonstration).
3. Common cytological preparations & serous fluid examination.
4. CSF examination.

E) AUTOPSY: (n=3)

1 & 2) to study and describe five autopsy reports.

Seminar by Postgraduate student for Undergraduate students on topics such as Emerging diseases – Dengue, Ebola, H1N1, Chikungunya etc.

Tutorials / Test

I Semester:

GENERAL PATHOLOGY:

1. Cell injury and cell death
2. Cellular accumulations
3. Inflammation and repair
4. Circulatory disturbances
5. Immunological disorders
6. Infections
7. Neoplasia
8. Amyloidosis, AIDS
9. Tuberculosis

II Semester:

HAEMATOLOGY:

1. Anemia's
2. Leukemia's
3. Interpretation of hematological case charts
4. Hemorrhagic disorders
5. Blood group & transfusion
6. Identification of instruments

SYSTEMIC PATHOLOGY:

1. Diseases of blood vessel & Heart
2. Pneumonia & tumors of lungs

3. Oral cancer
4. Peptic ulcer & Intestinal ulcers
5. Tumors of G.I.tract
6. Diseases of liver & D/D of jaundice
7. Glomerulonephritis
8. Carcinoma Breast
9. Carcinoma Cervix
10. Bone tumors
11. Museum specimens
12. Museum specimens

III Semester:

CLINICAL PATHOLOGY:

1. Glucose Tolerance Test
2. Renal Function Tests
3. Differential Diagnosis of Meningitis
4. Identification of needles and instruments used in clinical pathology

5) AUTOPSY:

CPC of common diseases like - (Presented by students) 1.Tuberculosis 2. Myocardial infarction 3. Carcinoma/ sarcoma 4. Hypertension. 5. Liver cirrhosis

Problem based learning, Case based learning -

On hematology, Clinical Pathology & investigations of common disorders.

Integrated Teaching:

Vertical Integration with preclinical and clinical subjects

Horizontal integration with paraclinical subjects.

Frequency of Horizontal Integration will be two modules per term. Thus one Batch will have total 6 modules in 1 ½ year of II phase.

Term	Topic	Departments Involved
III (II/I)	Sterilization	Microbiology, Pharmacology.
III (II/I)	Common Poisonings	FMT, Pharmacology, Pathology.
IV (II/II)	Peptic Ulcer	Pathology, Microbiology, Pharmacology.
IV (II/II)	Tuberculosis/Enteric Fever	Microbiology, Pathology, Pharmacology

V (II/III)	HIV- AIDS	Microbiology, Pathology, Pharmacology, FMT.
V (II/III)	Malaria	Microbiology, Pathology, Pharmacology.

Student Seminars:

It helps to encourage self-learning, presentation skill etc. Advanced learners are encouraged to take seminars. They are expected to use AV aids.

Frequency: 1 per semester

Topics:

Acute Inflammation with its applied aspect.

Bronchial Asthma

Peptic Ulcer

Myocardial Infarction

Enteric fever

Carcinogenesis with emphasis on molecular biology.

Quiz:

It is recommended that one quiz including all four para clinical subjects will be conducted once in the 1 ½ year period of one batch, preferably after completion of syllabus i.e. for V term (II/III) students.

Debate, Student Projects, Poster Competitions:

These activities will be optional and are meant for encouraging good/extra ordinary students to show their abilities and to encourage self-learning, out of box thinking and team work. This will be conducted during II term.

For all these active learning methods participating students will be given certificates only and no additional marks in examinations.

Course for Budding Professional

Medicine is changing and so is the process of learning medicine. The objectives and patterns of medical education are progressively changing all over the world. The demands of patients and community for quality medical care are ever increasing and also are the advances and revolutions in treatments and concepts of medicine.

Currently the goals of the MBBS training programme are to create doctors with requisite knowledge, skills, attitudes, values and responsiveness, so that they may function appropriately and effectively as a Basic Doctor, Physician of first contact for the community in the primary care setting both in urban as well as rural areas of our country. They should at least get introduction to recent advances and recent techniques to keep pace with ever advancing modern medicine.

To accomplish these aspects, paramedical curriculum at Phase 2 of MBBS also needed to be reformed. A basic doctor needs to be a good

- Clinician
- Communicator
- Leader and member of health care units
- Lifelong learner

- Professional who is committed to excellence, ethical, responsive and accountable to patients, Community and the Profession.

To achieve this, following special skills are incorporated in Phase 2 of MBBS course. This programme will be during first two terms of II M.B.B.S. and will be organized and conducted by all four Para clinical subjects together.

Special skills for Budding Medical Professionals

1. To be completed during I and II Phase of MBBS
   (I.e. 2.5 years duration)

2. Attendance required: Minimum 80%

3. Minimum criteria is satisfactory completion of course.

4**. Programme objectives: (for Phase 2)**

(Ethics, values and use of information technology and library are covered in Phase I

I.e. during I M.B.B.S.).

- To make budding medical professional as sympathetic, effective communicator.
- To inculcate the ability of introspection for self-development
- To make the budding medical professional well aware of moral values and patients' safety
- To make the budding medical professional aware of traditional and alternative systems of medicine in our country.
- To make the budding medical professional inculcate art of good time management and making quick and effective decision.

A budding medical professional is expected to acquire following skills:

- Communication skill
- Decision making skill
- Positive attitude
- Skill to maintain safety measures in clinical practice.

Following topics will be covered during one week module in Phase 2

Objective 1: Introspection and self-development

Topics covered

1. ASWOPT analysis of self by observing inner self
2. **A** – Achievements

   S- Strengths

   W – Weaknesses

   O – Opportunities

   P - Problems

   T – Threats

3. Meditation – Simple methods and its importance
4. Modifying thought process for positive attitude

Objective2: To develop good communication skill

Topics covered

1. Essentials of effective communication
2. Do's and Don'ts of effective communication
3. Methods and pedagogy of effective communication

- Patients and their attendants
- Near relatives of patients
- Patients of dignified status
- Steps involved in disclosure of unpleasant happening/ news
- Organizations involved if any like NGOs, Government society.
- Employers, Superiors, Juniors and Para medical staff and other employees of own/employer's clinic or hospital
- Importance of knowing vernacular / local language.

Objective 3: To develop skill of time management and decision making

Topics covered

1. Art of efficient and effective management of time
2. Art of effective decision making

Objective 4: To introduce aspects related to safety in clinical practice

Topics Covered:

1. Universal safety precautions
2. Bio waste disposal
3. Ethics in human research
4. Pharmaco vigilance and safe use of drugs
5. Medical laws

Objective 5: To have introduction to traditional and alternative systems of medicine in India

Topics Covered:

1. Introduction to Ayurveda
2. Introduction to Homeopathy
3. Benefits and risks in combining different systems

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5. Evaluation

a. Methods

Theory, Practical and Viva Voce.

a. Pattern of University Theory Examination including Distribution of Marks, Questions, Time.

Nature of Question Paper

i) Total duration – 5 hrs. (each paper of 2 hrs. 30 min or 150 minutes)

ii) Each paper will have 3 sections.

Suggested pattern and marking for each paper of 50 marks

Sections	Nature of Questions	Total No. of Questions	Mark (s) per Question	Total Marks
	Q.1. Multiple Choice Questions (MCQs)	28	½	14
	Q.2. Long Answer Question (LAQ) (Two out of three)	03	08	16
	Q.3. Short Answer Questions (SAQ) (Two out of Three)	03	05	10
	Q.4. Brief Answer Questions (BAQ)	05	02	10
Total Marks =				**50**

c. Paper wise distribution of theory topics and number of questions:-

A) <u>Paper I</u>: - General Pathology inclusive of General Neoplasia

Haematology inclusive of transfusion medicine.

B) <u>Paper II</u>: - Systemic Pathology inclusive of Systemic Neoplasia and Clinical

Pathology

In paper 1 & 2, at least 8 marks should be devoted to hematology & clinical pathology respectively.

d. <u>Marking scheme:-</u>

Each paper of 50 marks as shown in the above table.

e. Nature of practical and duration

<u>University Practical Examination</u>	**Marks 50**
a) 10 Spots 2 minutes each (4 specimen, 1 instrument, 3 Histopathology Slides, 1 Haematology slide and 1 chart) Identification – ½ mark Specific short question – ½ mark Together 1 mark for each spot	10
b) Urine Examination - Physical and two abnormal constituents	10
c) Histopathology slides: Diagnosis and discussion	05
d) Haematology examination	
i) Stained Peripheral blood smears and report	10
ii) Hb/TLC/Blood group / DC (stain smear & count)	05
e) Journal	10

<u>Total Marks</u>	50
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f. Viva: duration and topic distribution

Viva consists of two tables; on each table the student will face 2 examiners

<u>For 5 minutes each</u>:

Table - I General and Systemic Pathology - 10 marks

Table - II Clinical Pathology and Haematology - 10 marks

Total - 20 marks

Number of Students for Practical Examination should not exceed more than 30 / day.

Term Ending Examination:-

Theory - 50 Marks

Time: 2 ½ hrs

Section A

Q.No.1 MCQs ½ x 28 **14 marks**

Section B

Q.2 LAQ- 8 x 2 = (any two out of three) **16 marks**

Q.3 SAQ - 2 x 5 = (any two out three) **10 marks**

Q.4 BAQ - 5 x 2 = (2 marks per BAQ) **10 marks**

Practical - **50 marks**

a) 10 Spots 2 minutes each (4 specimen, 1 instrument, 3 Histopathology Slides, 1 Haematology slide and 1 chart) Identification – ½ mark Specific short question – ½ mark Together 1 mark for each spot	10
b) Urine Examination - Physical and two abnormal constituents	07
c) Histopathology slides: Diagnosis and discussion	03
d) Hematology examination	
i) Stained Peripheral blood smears and report	05
ii) Hb/TLC/Blood group / DC (stain smear & count)	05
e) Journal	05
f) Viva Voce	15

Total Marks	50

Preliminary Examination:-

Theory: - 100 marks -- Two papers of 50 marks each. Each of 2 ½ hrs. duration.

Same pattern as terminal theory paper.

Practical -	**50 marks**
a) 10 Spots 2 minutes each (4 specimen, 1 instrument, 3 Histopathology Slides, 1 Haematology slide and 1 chart) Identification – ½ mark Specific short question – ½ mark Together 1 mark for each spot	10
b) Urine Examination - Physical and two abnormal constituents	07
c) Histopathology slides: Diagnosis and discussion	03
d) Haematology examination	
i) Stained Peripheral blood smears and report	05
ii) Hb/TLC/Blood group / DC (stain smear & count)	05
e) Journal	05
f) Viva Voce	15

Total Marks	**50**

Plan for internal assessment

Theory 15 marks

Practical 15 marks

Internal Assessment Marks Scheme:-

Theory 15 marks + Practical 15 marks = 30 Marks.

Theory - Total 200 marks reduced to 15 marks (50 + 50 + 100)

Practical – Total 150 marks reduced to 15 marks (50 + 50 + 50)

Books recommend for II MBBS – Pathology

a) Basic Pathology of diseases by Robbins & Cottran

b) Text book of General Pathology Part I & II by Bhende and Deodhare

c) Clinical Pathology by Talib

d) Text book of Pathology by Harsh Mohan

e) Text book of Pathology by Muir

f) Hematology De Gruchi

Reference books:

a) Sternberg's text book of Pathology Vol. I, II

b) Ackerman's text book of Pathology Vol. I, II

c) Wintrobes hematology

d) Pathologic basis of Disease Robbins

KRISHNA INSTITUTE OF MEDICAL SCIENCES, KARAD

DEPARTMENT OF MICROBIOLOGY

UG (MBBS) Code - 1101

MICROBIOLOGY Code – 1101-23

1 Goal

The goal of teaching Microbiology is to provide understanding of the natural history of infectious diseases in order to deal with the ethology, pathogenesis, pathogenic city, laboratory diagnosis, treatment, control and prevention of these infections and infectious diseases.

2 EDUCATIONAL OBJECTIVES

(a) Knowledge

The student of the end of one and half years should be able to:-

i State the aetiology, pathogenesis and methods of laboratory diagnosis and apply that Knowledge in the diagnosis, treatment, prevention and control of communicable diseases Caused by microorganisms.

ii. Understand commensal, opportunistic and pathogenic organisms of human body and Describe host parasite relationship.

iii. Know and describe the pathogenesis of diseases caused by microorganisms.

iv. State the sources and modes of transmission of pathogenic & opportunistic microorganisms Including knowledge of insect vectors & their role in transmission of infectious diseases.

v. Choose appropriate laboratory investigations required for clinical diagnosis.

vi. Know the prophylaxis for the particular infecting organics

(b) Skills

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

ii. Identify common infectious agents with the help of laboratory procedure, acquire knowledge of antimicrobial agents, use of antimicrobial sensitivity tests to select suitable antimicrobial agents for treatment.

iii. Perform simple laboratory tests which help to arrive at rapid diagnosis.

iv Be conversant with proper methods of collection, storage & transport of clinical material for microbiological investigations.

v Understand the principles of immunology and its application in the diagnosis and prevention of infectious diseases including immunization schedule, acquire knowledge of the scope of immunotherapy and different vaccines available for the prevention of Communicable diseases.

vi Understand methods of disinfections and sterilization and their application to control and prevent hospital and community acquired infections including universal biosafety Precautions and waste disposal.

vii Recommend laboratory investigations regarding bacteriological examination of food, water, milk and air.

viii. The student should be well equipped with the knowledge of prevalent communicable Diseases of national importance and of the newer emerging pathogens.

Psychomotor Skills

i. The student will wash his/her hands with soap after each practical class.

ii The student will leave the area allotted for his practical neat and tidy.

iii. The student will discard the slides in the appropriate container provided for the same.

iv. The student report any injury sustained in class immediately..

v. The student will report any breakage occurring during class times immediately.

vi. The student may give suggestions to improve teacher student association.

(c) <u>Attitude</u>

i. The student will be regular, sincere, punctual and courteous and regular in studies.

ii. The student will follow all the rules laid down by the department and participate in all Activities.

iii. The student will understand the importance of practicing the aseptic method and practice Asepsis, biomedical waste segregation and appropriate disposal.

iv. The student will understand the importance of universal safety precautions and practice the best methods to prevent the development of infection in self and patient. (e.g.. hand washing, Using aprons, regularly washing aprons, wearing gloves (as and when required/handling Specimens etc.)

v The student will understand the use of the different antimicrobial agents including the use of antibiotics judiciously and prevent misuse, (prescribing attitude).

vi The student will understand the significance of vaccinations and will receive appropriate Vaccines. (E.g. TT,. Hepatitis B and any other as per needs.)

Total duration of Para-Clinical teaching- 3 Semesters (III, IV, V)

Total number of teaching hours allotted for <u>Microbiology</u> – 250 hours.

I) Teaching Learning Methods:

A. Traditional Teaching -learning methods:

1. Didactic lectures
2. Tutorials
3. Integrated Teaching

4. Practical classes

B. Newer Teaching-learning methods:

1. Problem based learning
2. Students Seminar- for the students by the students
3. Group discussions
4. Quiz
5. Debates
6. Projects

II) Teaching Media:

1. Conventional chalk and blackboard

2. Power Point Presentation on LCD Projector

III) Practical's

1. Brief introduction to the practical

2. Demonstration of practical

3. Performance of practical by students

4. Completion of Journals

IV) Distribution of teaching hours

Sr No		**Hours**
1)	Didactic Lectures including Students Seminar	82
2)	Practical's	127
a.	Demonstrations	
b.	Tutorials	
c.	Problem Based Learning	
d.	Horizontal Integrated teaching	
3)	Assessment	41
Total		**250**

KIMSDU/KIMS/CURRICULUM/MBBS/MICROBIOLOGY/PROGRAMME /COURSE

By the end of II MBBS Course, the UG student should have-

Knowledge

- Knowledge of the classification of microorganisms as bacteria, virus, fungi, parasites, the pathogen city of the organisms and the methods of detection or isolation of these organisms from human body.
- Knowledge of the morphology, cultural characteristics of the bacterial agents causing diseases and also the pathogenesis and laboratory diagnosis of various infectious diseases caused by the pathogenic organisms.
- Knowledge of the structure, antigenic pattern, resistance, pathogen city of viruses and appropriate laboratory tests used to diagnose the viral infections.
- Knowledge of the morphology, life cycle , pathogen city of parasites and the laboratory diagnosis of parasitic infections
- Knowledge of Microbiology in the management of infectious diseases and determining the appropriate laboratory tests to be used for diagnosis based on possible etiologies
- Should know various methods of sterilization and disinfection and biomedical waste management.
- Should have knowledge of collecting the appropriate clinical samples in various infectious diseases and also its methods of transportation to the laboratory.
- Should have knowledge of the processing of the clinical samples using various laboratory tests to arrive at the clinical diagnosis.
- Should have knowledge of the various mechanisms of acquisition of drug resistance by microorganisms and methods of testing the resistance pattern.
- Should have sound knowledge of methods of antibiotic testing and their interpretation, so as to in choose the appropriate antibiotics effectively.

Skill

- Should be able to collect and send the correct clinical specimens and interpret correctly the results generated by laboratory tests for appropriate clinical management.
- Should be able to perform Gram and Zeihl- Neelson stain.
- Should be able to examine stool sample for parasitic infections.

Attitude-

- Should be able to maintain the confidentiality of various laboratory reports.

Communication

- Able to take informed consent of the patients/ relatives for various samples to be collected and tested in the laboratory

- **MICROBIOLOGY SYLLABUS**

GENERAL MICROBIOLOGY: (Didactic Lectures -12 hours)

Introduction and Historical background -1

Morphology of bacteria and Classification -1

Physiology of bacteria including growth requirements & metabolism -1

Sterilization -1

Disinfectants -1

Universal Safety precautions & Infection control -1

Bacterial genetics and drug resistance to antimicrobial agents -3

Host parasite relationship and bacterial infections -1

Normal flora -1

Methods of identification of bacteria .Diagnosis of infectious diseases (direct and indirect) -1

B) IMMUNOLOGY: (Didactic Lectures -11 hours)

Introduction -1

Antigens, HLA -1

Antibodies. -1

Serological reactions. -2

Immune response	-2
Complement	-1
Hypersensitivity	-1
Autoimmunity.	-1
Transplantation &tumour immunology	-1

C) SYSTEMIC BACTERIOLOGY: (Didactic Lectures -28 hours)

Staphylococci	-1
Streptococci, Pneumococci	-1
Neisseria	-1
C. Diphtheria	-1
M. Tuberculosis	-1
Atypical Mycobacteria	-1
M. leprae	-1
Bacillus Methods of Anaerobiosis & Classification Nonsporing anaerobes	-1
Clostridium welchii, tetani, botulinum	-2
Enterobactriaceae	-2
Salmonella typhi	-2
Shigella	-1
Vibrio & Campylobacter	-1
Pseudomonas and MRSA, VRE, ESBL, MBL	- 1
Hospital Acquired infection and Antimicrobial Stewardship	-1
Brucella	-1
Homophiles	-1
Bordetella & Pasteurella	-1
Spirochetes	-2
Actinomycosis&Nocardia	-1
Rickettsia	-1
Chlamydia & Mycoplasma	-2
Bacteriology of air water, milk and food	-1

D) MYCOLOGY :-(Didactic Lectures -5 hours)

Introduction to Mycology -1

Agents of Superficial mycosis -1

Subcutaneous mycosis -1

Systemic mycosis -1

Opportunistic fungal infections -1

E) VIROLOGY: - (Didactic Lectures -15 hours)

General Virology -1

Laboratory diagnosis of viral infections and viral immunity -1

DNA viruses I– Herpes viruses, classification, HSV, HZV -1

DNA viruses II –CMV, EBV, HSV6, 7, 8 and Adenovirus -1

Respiratory viruses I- Orthomyxovirus -1

Respiratory viruses II- Paramyxovirus -1

Picornaviruses -1

Hepatitis viruses I- Hepatitis B -1

Hepatitis viruses II- Hepatitis A, C, D, E -1

Arboviruses I- General Introduction, Chikungunya, KFD -1

Arboviruses II- Dengue, Yellow fever, Misecllaneous -1

Rhabdoviruses -1

Retroviruses. -1

Slow and Oncogenic viruses, -1

Newer viruses (H1N1, Ebola and Zika virus) -1

F) PARASITOLOGY :(Didactic Lectures -11 hours)

Introduction to Medical Parasitology -1

E. histolyticaFree living amoebae and Flagellates -2

Hemoflagellates -1

Malaria -1

Misc. Pathogenic protozoa -1

Cestodes -1

Trematodes -1

Intestinal Nematodes -2

Tissue Nematodes -1

Sequential organization of contents and their hour wise distribution.

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 body.

GENERAL MICROBIOLOGY: (Didactic Lectures -12 hours)

No	Topic of lecture	Must know (MK)	Desirable to know (DK)	Nice to know(NK)
1.	Introduction and Historical background (1 hour)	Definitions: Medical Microbiology, pathogen, commensal symbiont etc. To cover Antony van Leewenhoek Pasteur, Lister, Koch, Flemming etc. in History Scope to cover the importance of Med Microbiology on diagnosis and prevention of infectious diseases.	Micro-organisms as models in Molecular Biology and Genetic engineering	
No	**Topic of lecture**	**Must know (MK)**	**Desirable to know (DK)**	**Nice to know(NK)**
2	Morphology of bacteria and Classification (1 hour)	Bacterial cell and its organelles, morphological classification, methods of studying bacteria, staining methods & their principles, Gram & ZeilNeelson staining, their importance in presumptive diagnosis, negative staining, dark ground illumination, Phase contrast and fluorescent microscopy, briefly about electron microscopy, Principles and applications of all microscopes..		

3	Physiology of bacteria including growth requirements & metabolism(1 hour)	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.	
4	Sterilization. (1 hour)	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.	Working and efficacy testing of autoclave, inspissator and hot air oven, Central Sterile supply. Department (CSSD) – concept only.	
5.	Disinfectants. (1 hour)	Asepsis and antisepsis, mode of action of chemical agents on microbes. Phenols, Halogens, Aldehydes, Acids, Alcohol. Heavy metals. Oxidizing agents etc. Universal biosafety precautions.	Dyes, soaps and detergents. Concentration and contact time.	
6.	Waste disposal (1 hour)	Definition of waste, Classification, Segregation. Transport and disposal.		
7	Universal Safety (1 hour)	Universal Safety precautions & Infection control.		
8,	Bacterial genetics and drug resistance to antimicrobial agents. (3 hour)	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 (Antibiotic policy, formulation)	Transposons	
9	Host parasite relationship and bacterial infections.	Commensal. Pathogenic and opportunistic organisms. Their pathogenic factors and modes of transmission. Microbial factors spores,	ID_{50} and LD_{50}	

	(1 hour)	Capsule, toxins, enzymes, intracellular parasitism, Antigenic variation & extrinsic factors etc. leading to establishment of infection. Types of infection: primary, Secondary, General, Local, natural, nosocomial, introgenic, .zoonotic.		
10	Normal flora(1 hour)	Introduction – various sites, types and role.		
11	Methods of identification of bacteria .Diagnosis of infectious diseases (direct and indirect) (1 hour)	Principles of laboratory diagnosis of infectious diseases. General procedures for collection, transport, processing of specimens for microbiological diagnosis.	PCR, RIA., DNA Probes.	

B) IMMUNOLOGY :(Didactic Lectures -11 hours)

No	Topic	Must know (MK)	Desirable to know (DK)	Nice to know(NK)
1.	Introduction (1 hour)	Definition of immunity, types of immunity, factors responsible, Mechanism of innate immunity, active and passive immunity, local immunity.	Herd immunity	
2	Antigens, HLA (1 hour)	Definition, Types, Antigen determinants, Properties of antigen. MHC – concept, Class-I,II&III functions, Indication of typing, MHC restriction.	Nature of determinants e.g. of haptens. e.g. of cross/reactive antigen.	
3	Antibodies.	Definition, nature, structure of immunoglobulins, papain digestion, understrandisotypic, allotypic and idiotypic markers, immunoglobulin	Pepsin digestion, Amino acid sequence, immunoglobin	

	(1 hour)	classes, physical and biological properties of immunoglobins.	domain, abnormalimmunoglobins.	
4	Serological reactions. (2 hour)	Definition, Characteristics, titre, Sensitivity & specificity, antigen – antibody interaction primary, secondary& tertiary. Prozone phenomenon, Principle, type land application, of precipitation. Agglutination, Complement fixation, enzyme immunoassay, Radioimmunoassay, immunofluoroscence test, Neutralization &opsonisation.	Techniques of precipitation and their uses, Blocking antibodies, antiglobulin reactions. Co-agglutination, In vitro test, Techniques of EIA, IF & electron microscopy.	
5	Immune response (2 hour)	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, factors affecting antibody production, CMI- definition, types, role of T cell and macrophages, Definition of immune tolerance and mechanism of tolerance.	Lymphokines and their role, Clonal selection, mechanism of immunonegulation. theories of antibodies formation, techniques of monoclonal antibody formation. detection of CMI, types of immunotolerance.	
6	Complement (1 hour)	Definition, Synthesis, Pathways, activation, role & biological functions, components, measurement.	Regulation of complement activation, complement deficiency.	

7	Hypersensitivity (1 hour)	Definition, Classification, difference between immediate and delayed reaction, mechanism of anaphylaxis, Types of anaphylaxis, atopy, e.g of anaphylactic reaction. Tests for anaphylaxis mechanism and e.g. of type –II & type III reactions. Mechanism & types of delayed hypersensitivity.	Desensitization in anaphylaxis, type V reaction. ADCC, Schwartzman phenomenon.	
8	Autoimmunity. (1 hour)	Definition, Mechanism, classification, pathogenesis.		
9	Transplantation &tumour immunology (1 hour)	Type of transplants. Mechanism of transplant rejection, Prevention of graft rejection, GVH reaction, IR to tumours. Tumour antigens, mechanism of IR to tumours.	Type of tumour antigens. Immune surveillance.	

C) SYSTEMIC BACTERIOLOGY :(Didactic Lectures -28 hours)

***MK- Must know * DK- Desirable to know * NK- Nice to know**

Pathogenesis includes:

Infectious agent	- MK
Habitat	- MK
Source /reservoir	- MK
Mode	- MK
Infective dose.	- MK
Multiplication, spread	- MK
Clinical features, pathology	- MK
Complications.	- DK
Virulence factors	- NK
Immunological response	- DK

Laboratory diagnosis;-

Specimen selection	- MK
Collection.	- MK
Transport	- MK
Primary smear, hanging drop.	- MK
Selection of media.	- MK
Pathogenicity testing.	- NK
Anti-microbial drug susceptibility testing	- MK
Serological interpretation	- MK

Key to the abbreviations used in the table below:

A- Classification. **B-** Morphology. **C-** Culture & Isolation. **D-** Biochemical reaction.

E- Viability. **F-**Virulence.**G-**Diseases.**H-**Antigens.**I-** Pathogenesis.**J-** Laboratory diagnosis. **K-** Prevention and control. **L-** Immune response

No	Topic/hours	A	B	C	D	E	F	G	H	I	J	K	L
1	Staphylococci (1 hour)	MK	MK	DK	DK	MK	MK	MK	DK	MK	MK	MK	-
2	Streptococci Pneumococci (1 hour)	MK	MK	BA-MK DK	DK	MK	MK	MK	MK	MK	MK	MK	DK
3	Neisseria (1 hour)	DK	MK	DK	DK	MK	MK	MK	DK	MK	MK	MK	-
4	C. diptheriae (1 hour)	DK	MK	DK	-	MK	MK	MK	-	MK	MK	MK	DK
5	M.Tuberculosis (1 hour)	MK	MK	LJ.Growth Time MK	DK	MK	MK	MK	MK	MK	MK	MK	DK
6	Atypical Mycobacteria (1hour)	MK	MK	DK	DK	MK	MK	MK	-	MK	MK	MK	-
7	M.leprae(1hour	MK	MK	Isolation-MK	-	MK	MK	MK	MK	MK	MK	MK	MK
8	Bacillus Methods of Anaerobiosis& Classification Non sporing anaerobes (1 hour)	MK	MK	MK	DK	MK	MK	MK	-	MK	MK	MK	-
9	Clostridium welchii, tetani, botulinum (2 hrs.)	MK	DK	MK	-	-	-	MK	-	-	MK	-	-

10	Enterobactriaceae (2 hours)	MK	MK	DK	DK	MK	MK	MK	DK	-	MK	-	-
11	Salmonella typhi (2 hours)	MK	MK	DK	DK	MK	MK	MK	DK	-	MK	-	MK
12	Shigella (1 hour)	MK	MK	DK	DK	MK	MK	MK	DK	-	MK	-	-
13	Vibrio & Campylobacter (1 hour)	MK	MK	DK	DK	MK	MK	MK	-	-	MK	-	-
14	Pseudomonas (1 hour)	-	MK	DK	DK	MK	MK	MK	-	-	MK	-	-
15	Hospital acquired infection Antimicrobial stewardship (1 hour)		MK	DK	DK	MK	MK	MK	-	-	MK	-	
16	Brucella (1 hour)	-	MK	DK	-	-	MK	-	-	-	MK	-	-
17	Haemophilus (1 hour)	-	MK	DK	-	-	-	-	-	-	MK	-	-
18	Bordetella & Pasteurella (1hour)	-	MK	DK	-	MK	-	MK	-	-	MK	-	DK
19	Spirochetes (2 hr)	MK	MK	DK	-	MK	-	MK	-	-	MK	-	MK

20	Actinomycosis &Nocardia (1hour)	DK	MK	DK	-	-	-	-	-	-	MK	-	-
21	Rickettsia (1 hour)	MK	MK	-	-	-	-	-	-	-	MK	-	-
22	Chlamydia & Mycoplasma (2 hours)	MK	MK	-	-	-	-	-	-	-	MK	-	-
23	Bacteriology of air water, milk and food (1 hour)	-	-	MK	DK	MK	MK	MK	-	MK	MK	MK	-

D) MYCOLOGY :- (Didactic Lectures -5 hours)

No	Topic	Must know (MK)	Desirable to know (DK)	Nice to know(NK)
1	Introduction to Mycology (1 hour)	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 and industrial importance of fungi (brief account)	
2	Agents of Superficial mycosis (1 hour)	Enumerate, predisposing factors, morphological features, Lab. Diagnosis	Colony characteristics of dermatophytes	
3	Subcutaneous mycosis (1 hour)	Enumerate, predisposing factors, Mycetoma, Rhinosporidiosis Pathogenesis, Lab Diagnosis.	-	
4	Systemic mycosis (1 hour)	Classification, predisposing factors, morphology, Pathogesis lab Diagnosis	Cultural characteristics	Mycotic keratitis
5	Opportunistic fungal infections (1 hour)	Classification, Predisposing factors, Mucor, Aspergillus, Pneumocystis carinii ,Candida, Cryptrococcus.	Cultural characteristics	

E) VIROLOGY:- (Didactic Lectures -15 hours)

Morphology, pathogenesis, laboratory diagnosis, prevention and control for all viruses

(Must know)

No.	Topic of lecture	Must know (MK)	Desirable to know (DK)	Nice to know (NK)
1	General Virology (1 hour)	Size. Shape, symmetry, structure, resistance, multiplication, properties and classification of viruses, pathogenesis, bacteriophages, concept of virions.	-	
2	Laboratory diagnosis of viral infections (1 hour)	Collection of samples, transport, cultivation and methods of diagnosis.	-	
3	Viral immunity (1 hour)	Viral immunity, interferon, viral vaccines.	-	
4	Pox viruses (1 hour)	Small pox and Molluscum	-	
5	DNA viruses (1 hour)	Papova, Adeno, Herpes viruses (herpes simplex, Varicella zoster, CMV, EBV)	-	
6	Respiratory viruses(1 hour)	Orthomyxo and Paramyxoviruses ,Ag shift and drift	Rhinoviruses	
7	Picornaviruses (1 hour)	Polio, Coxsackie, Enteroviruses, Viruses causing diarrhoea – Rota viruses, Immunity (polio) .	-	
8	Hepatitis viruses (2 hour)	Hepatitis viruses immunity and laboratory diagnosis	-	
9	Arboviruses. (1 hour)	Dengue, KFD, Japanese encephalitis, definition, Classification, enumeration in India. Pathogenesis, laboratory diagnosis and control.	-	

No.	Topic of lecture	Must know (MK)	Desirable to know (DK)	Nice to know (NK)
10	Rhabdoviruses (1 hour)	Rabies	-	
11	Retroviruses. (2 hour)	HIV/AIDS, mode of transmission, Immunity, Opportunistic infections in AIDS, Laboratory Diagnosis, Strategies of HIV testing Post exposure prophylaxis.	-	
12	Slow and Oncogenic viruses, (1 hour)	Characteristics of slow virus infections. Pathogenesis And laboratory diagnosis and viruses associated with it	-	
13	Newer viruses (1 hour)	H1N1, SARS, Bird flu, Ebola virus	-	

F) PARASITOLOGY :(Didactic Lectures -11 hours)

Must know

A) Classification

B) Geographical distribution

C) Host and Habitat

D) Morphology (different stages) found in human beings

E) Life cycle

F) Pathogenesis and disease caused

G) Laboratory diagnosis

H) Treatment

I) Control

J) Immunoprophylaxsis

No	Topic of lecture	Must know (MK)	Desirable to know (DK)	Nice to know(NK)
1	Introduction to Medical Parasitology (1 hour)	Parasites, their nature, classification and explanation of terminologies, epidemiology, emerging parasitic Infection. Pathogenic and laboratory diagnosis.		
2	E. histolytica (1 hour)	Amoebic infections		
3	Free living amoebae and Flagellates(1 hour)	Free living amoebae. PAME, Giardia & Trichomonas		
4	Hem flagellates (1 hour)	L. donovani, life cycle, morphology, pathogenicity and Lab. diagnosis.	Brief account of Trypanosomes	
5	Malaria (1 hour)	Malarial parasites: life cycle, morphology, Pathogenicity, laboratory diagnosis etc.		
6	Misc. Pathogenic protozoa(1 hour)	Toxoplasma.	Cryptosporidium, Isospora, B coli	
7	Cestodes (1 hour)	Taeniasaginata&solium. Echinococcusgranulosus- life cycle, morphology, pathogenicity and laboratory diagnosis.	Brief mention of other cestodes	
8	Trematodes (1 hour)	Schistosomiasis; life cycle, morphology, pathogenicity & lab diagnosis	Brief account of Fasciola hepatica	
9	Intestinal Nematodes (2 hour)	A duodenale, A lumbricoides, E. vermicularis. T. trichura (Life cycle, Morphology, laboratory diagnosis)	Brief mention of S. stercoralis.	
10	Tissue Nematodes (1 hour)	W. bancrofti, D. medinensis, in brief T. spiralis		

Term wise distribution of topics

TERM	TOPICS
First term	General Microbiology
	Immunology
Second term	Systemic Bacteriology
	Mycology
Third term	Virology
	Parasitology

Practical's:- Total hours, number & contents: - 127 hours

List of Practical

Sr No	Topic	Hr.
1	Introduction to Microbiology, Microscopy and Micrometry.	3
2	Morphology and physiology of bacteria and methods staining	4
3	Growth requirements of bacteria (media) and identification of bacteria (biochemical reactions	4
4	Scheme for laboratory diagnosis of infectious diseases; and collection, storage and transport of microbiological specimens (and laboratory animals)	4
5	Sterilization- the physical agents. Sterilization- the chemical agents and method of waste disposal.	4
6	Serological tests for diagnosis of microbial infections	3

7	Staphylococci and other gram-positive cocci	4
8	Streptococci and Pneumococci	4
Sr No	**Topic**	**Hr.**
9	Gram negative cocci	4
10	C. Diphtheria and other gram positive non sparing bacilli	4
11	Mycobacteria	4
12	Spore bearing aerobic and anaerobic bacilli.	3
13	Enteric gram-negative bacilli – lactose fermenters – E coli etc	4
14	Non lactose fementers – Salmonella and Shigella	4
15	V. cholerae and other Vibrio like organisms	3
16	Pseudomonas, Proteus	3
17	Hospital acquired infection and Antibiotic Sensitivity testing	3
18	Spirochetes	3
19	Actinomycetes, Nocardia and Fungi	3
20	Rickettsia, Chlamydia, Mycoplasma and Viruses.	4
21	Introduction to parasitology and Protozoal infections.	4
22	Haemoflagellates	4
23	Plasmodia and toxoplasma	4

24	Cestodes and trematodes.	4
25	Intestinal nematodes.	4
26	Extra – intestinal nematodes.	4
27	Practical Revision	4
28	Tutorials+ PBL+ Horizontal Integrated Teaching	27

TUTORIALS (APPLIED MICROBIOLOGY) :- (20 hours)

Regular tutorials shall be conducted in addition to lectures.
Students must know:-

Micro-organisms causing diseases & pathological lesions

Methods of collection & transportation of specimens

Methods of laboratory diagnosis

Serological response produced by organisms.

Interpretation of laboratory report.

No.	**Topic of Tutorial**	**Hours**
1	Gastrointestinal infections (diarrhoea and dysentery) and their laboratory diagnosis	2
2	Upper respiratory tract infection (patch sore throat) and their laboratory diagnosis	2
3	Lower respiratory tract infection (pneumonia, bronchitis, bronchiolitis etc.)and their Laboratory diagnosis	2
4	Urinary tract infection and their laboratory diagnosis	1
5	Infections of the central nervous system (meningitis, encephalitis, brain abscess) and their laboratory diagnosis.	2

6	Wound infections and pyogenic infections	2
7	Septicaemia and PUO and laboratory diagnosis.	2
8	Eye infections and their laboratory diagnosis.	1
9	Sexually transmitted disease (STD) and their laboratory diagnosis (genital ulcerative disease,	2
10	Role of laboratory in cross infection. Nosocomial infections /outbreak / epidemic	2
11	Vehicles and vectors of communicable disease & zoonosis.	1
12	Preventive inoculations immunomodulation and immunotherapy	1

Problem based learning

Frequency of PBL will be one per term

To be conducted during practical hours.

PBL will be done in three to four sessions for small groups.

Teacher will act as facilitator.

Trigger: Initially a problem or a case is given to the students.
They will collect information by using Internet, Library etc.

Session 1: Identification of the etiological agents, pathogenesis, clinical features, Differential diagnosis

Session 2: Laboratory Investigations required

Session 3: Treatment, Prophylaxis and control measures

This will encourage self-learning, rational approach for treatment, decision making and also good teamwork in students.

Topics for Problem Based Learning

I Term

1. Anaphylaxis
2. Autoimmunity

II Term

1. Brucellosis
2. Leptospirosis
3. Syphilis
4. Tuberculosis
5. Typhoid fever

III Term

1. Dengue
2. Filariasis
3. Hepatitis
4. HIV
5. Hookworm infestation.

Integrated Teaching

Vertical Integration with preclinical and clinical subjects

Horizontal Integration with preclinical subjects.

Frequency of Horizontal Integration will be two modules per term.

Thus one batch will have total 6 modules in 1 ½ year of II phase.

Term	Topic	Departments Involved
III (II/I)	Sterilization	Microbiology, Pharmacology
III (II/I)	Common Poisonings	FMT, Pharmac, Patho
IV (II/II)	Peptic Ulcer	Patho, Micro, Pharmac
IV (II/II)	Tuberculosis/Enteric Fever	Micro, Patho, Pharmac
V (II/III)	HIV- AIDS	Micro, Patho, Pharmac, FMT
V (II/III)	Malaria	Micro, Patho, Pharmac

Topics for Integrated Teaching

Each topic allotted **3 hrs.**

These topics are to be covered in **1st2nd and 3rd term** of 2nd MBBS.

1. Tuberculosis
2. Leprosy
3. Pyrexia of Unknown Origin (PUO)
4. Sexually Transmitted Diseases
5. Hepatitis
6. HIV/AIDS
7. Malaria
8. Diarrhea and Dysentery
9. Medical Ethics

Student Seminars:

FOR THE STUDENTS AND BY THE STUDENTS

It helps to encourage self-learning, presentation skill, self-confidence, etc.
Fast learners should be encouraged to take seminars. They should use AV aids.

Frequency: 1 per semester

Topics for student's seminar

I Term

1. Sterilization & disinfection
2. Immunity & Immunization Program
3. Biochemical Reactions
4. Structure & function of Immune system.

II Term

1. Meningitis
2. STDS
3. PUO
4. Diarrhea & food poisoning

III Term

1. DNA Viruses & Adenovirus

EXAMINATION PATTERN

A. Internal assessment

I. A candidate must obtain 50% in aggregate with a minimum of 50% in Theory including Oral and minimum of 50% in Practical.

A candidate must obtain 50 % in Internal Assessment (combined theory and practical)

II. **THEORY:**

a) Internal Assessment shall be computed on the basis of three term ending examination (Two Terminals & one Preliminary examination before the University examination)
b) Final Internal Assessment in THEORY shall be computed on the basis of actual marks obtained out of 200, reduced to marks out of 15.

III. **PRACTICAL:**

a) Internal Assessment in PRACTICALS shall be computed on the basis of three term ending examinations.
b) Final internal assessment in PRACTICALS shall be computed on the basis of actual marks obtained out of 150, reduced to marks out of 15.

Thus, Internal Assessment: - Theory -15 + Practical -15 – Total -30

Scheme of internal assessment for Microbiology There shall be two Terminals and one Preliminary examination (in all three internal assessment examinations

First terminal examination	At the end of third semester
Second terminal examination	At the end of fourth semester
Preliminary examination	At the end of fifth semester

Each session examination shall have theory, oral and practical examination as under-

Table-1

Examination	**Theory**	**Practical**	**Oral**	**Practical + Oral**
1st terminal	50	35	15	50
2nd terminal	50	35	15	50
Preliminary	100	40	10	50
TOTAL	**200**	**110**	40	150
Reduced to	15	15		

PATTERN OF THEORY PAPER OF INTERNAL ASSESSMENT

(A). <u>Terminal examination:</u> (1st&11nd Terminal)

Duration: 2 ½ hours (Section A: 30 mines & Section B: 2 hours) There shall be one theory paper of 50 marks consisting of:

Section A	Que.1	M.C.Q.	All compulsory	28 x ½	14 Marks
Section B	Que.2	B.A.Q.	All compulsory	5x2	10 Marks
	Que.3	S.A.Q.	Any two out of three	2x5	10 Marks
	Que.4	L.A.Q.	Any two out of three	2 x8	16 Marks
Total					50 Marks

(At least one Long Question shall be on applied aspects)

(B) Preliminary Examination

This exam shall be conducted on the pattern of University examination both in Theory and Practical. There shall be **two** theory papers of **50 marks each** in Microbiology consisting of:

Duration: 2 ½ hours (Section A: 30 mins & Section B: 2 hours)

Section A	Que.1	M.C.Q.	All compulsory	28 x ½	14Marks
Section B	Que.2	B.A.Q.	All compulsory	5 x2	10 Marks
	Que.3	S.A.Q.	Any two out of three	2x5	10 Marks
	Que.4	L.A.Q.	Any two out of three	2 x8	16 Marks
Total					50 Marks

(At least one Long Question shall be on applied aspects)

UNIVERSITY EXAMINATION

University examination shall be held after the end of second phase i.e. at the end of fifth semester on the following pattern:

Theory Examination

There shall be **2 Theory papers of 50 marks** each in the subject of Microbiology

The paper-wise distribution of topics shall be as under:

Paper-I

General Bacteriology, Systemic Bacteriology including Ricketiest, Chlamydia and Mycoplasma, Related applied Microbiology

Paper-II

Parasitological, Mycology, Virology, Immunology, Related applied Microbiology.

The pattern of the theory papers shall be as under:

Duration: 2 ½ hours (Section A: 30 mines & Section B: 2 hours)

Section A	Que.1	M.C.Q.	All compulsory	28 x ½	14Marks
Section B	Que.2	B.A.Q.	All compulsory	5 x2	10 Marks
	Que.3	S.A.Q.	Any two out of three	2x5	10 Marks
	Que.4	L.A.Q.	Any two out of three	2 x8	16 Marks
Total					50 Marks

(At least one Long Question shall be on applied aspects)

B. Practical Examination

I. **I st Terminal Examinations** :-

Duration: 4 hours

Maximum Marks	50 marks
Exercise-I: Spots	10 Marks
Exercise-II: Gram's stain	10 Marks
Exercise-III: Ziehl Neelsen's staining	10 Marks
Exercise-IV: Viva	10 Marks
Exercise-V: Journal	10 Marks
Total	**50 Marks**

II. **IInd Terminal Examinations** :-

Duration: 4 hours

Maximum Marks	50 marks
Exercise-I: Spots	10 Marks
Exercise-II: Gram's stain	10 Marks
Exercise-III : ZiehlNeelsen's staining	10 Marks
Exercise-IV: Applied Microbiology	10 Marks
Exercise-V: Viva	10 Marks
Total	**50 Marks**

III. Preliminary Examination :-

Duration: 4 hours

Maximum Marks	50 marks
Exercise-I: Spots	10 Marks
Exercise-II: Gram's stain	05 Marks
Exercise-III: ZiehlNeelsen's staining	05 Marks
Exercise-IV: Stool Examination for Ova /Cyst	05 Marks
Exercise-V: Applied Microbiology	10 Marks
Exercise-VI: Journal	05 Marks
Exercise- VII: Viva	10 Marks
Total	**50 Marks.**

(Viva A-10 marks + Viva B-10 Marks Average of A+B=10 marks Viva)

III**. <u>University Examination:-</u>**

Duration: 4 hours

Maximum Marks	50 marks
Exercise-I: Spots	10 Marks
Exercise-II: Gram's stain	10 Marks
Exercise-III: ZiehlNeelsen's staining	10 Marks
Exercise-IV : Stool Examination for Ova /Cyst	05 Marks
Exercise-V: Applied Microbiology	10 Marks
Exercise-VI: Journal	05 Marks
	Total **50 Marks**

Viva A-10 marks + Viva B -10 Marks = 20 marks, to be added to Theory

Spots: Contents:

- Microscopic slides
- Mounted specimen
- Instruments used in laboratory
- Serological tests
- Inoculated culture media
- Sterile culture medium
- Vaccines / Antisera
- Laboratory Animals

ORAL/VIVA- 5minutes for each candidate 20 marks

ORAL-I 10 marks

On topics included in Paper-I

ORAL-II 10 marks

On topics included in PAPER-II

Shall be conducted on 2 different tables with a pair of examiners, one internal and one external.

Marks will be out of 10 each and total of two oral marks (oral I & II) shall be entered in the Mark list separately.

TEXT BOOKS & REFERENCE

Books recommended

1. Textbook of Microbiology - R Ananthanarayan
   - C K JayaramPanikar
2. A textbook of Microbiology - P. Chakra borty
3. Textbook of Medical Microbiology - Rajesh Bhatia
4. Textbook of Medical Microbiology - Arora and Arora
5. Textbook of Medical Parasitology - C. K. Jayaram Panikar
6. Textbook of Medical Parasitology - Arora and Arora.
7. Textbook of Medical Parasitology - S.C. Parija.
8. Microbiology in clinical practice - D. C .Shanson

Reference books:-

1. Mackie McCartney practical Medical Microbiology - Colle. JG. Fraser AG
2. Principles of Bacteriology, Virology & Immunology Vol. 1, 2,3,4,5, - Topley- Wilsons
3. Medical Mycology (Emmons) - Kwon Chung
4 Review of Medical Microbiology (Lange) - Jawetz
5. Immunology -Weir DM
6. Medical Microbiology - David Greenwood
7. Parasitology - KD Chatterjee
8. Medical Virology - Timbury MC
9. Mackie McCartney medical Microbiology vol 1 - Duguid JP,
10. Microbial infection - Marmion BP. Swain
11. Manson- Barr,- Manson Tropical Diseases - ELBS

KRISHNA INSTITUTE OF MEDICAL SCIENCES, "DEEMED TO BE UNIVERSITY, KARAD.

PROGRAMME NAME & CODE: II M.B.B.S. 1101

SUBJECT NAME & CODE: F.M.T -1101-24

FORENSIC MEDICINE AND MEDICAL JURISPRUDENCE INCLUDING TOXICOLOGY

Goal

The broad goal of teaching undergraduate students of Forensic Medicine is to produce a physician who is well informed about Medico-legal responsibility during his/her practice of Medicine. He/She will also be capable of marking observations and inferring conclusions by logical deductions to set enquiries on the right track in criminal matters and associated medico-legal problems. He/she acquires knowledge of law in relation to Medical practice, Medical negligence and codes of Medical Ethics.

Objectives

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

1) Identify the basic Medico-legal aspects of hospital and general practice.
2) Define the Medico-legal responsibilities of general physician while
3) Rendering community service either in a rural primary health canter or an urban health canter.
4) Appreciate the physician's responsibilities in criminal matters and respect for the codes of Medical ethics.
5) Diagnose, manage and identify also legal aspect of common acute and chronic poisonings.
6) Describe the Medico-legal aspects and findings of post-mortem examination in cases of death due to common unnatural conditions and poisonings.

7) Detect occupational and environmental poisoning, prevention and epidemiology of common poisoning and their legal aspects particularly pertaining to workmen's compensation Act.

8) Describe the general principles of analytical toxicology.

9) Understand clinical Forensic Medicine.

10) Understand issues in Organ Harvesting.

Skill

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

1) Make observations and logical inferences in order to initiate enquiries in criminal matters and Medico-legal problems.

2) To be able to carry on proper Medico-legal examination and documentation /Reporting **of injury and Age.**

3) To be able to conduct examination for sexual offences and intoxication.

4) To be able to preserve relevant ancillary materials for medicolegal examination.

5) To be able to identify important post-mortem findings in common unnatural deaths and be able to distinguish between Natural and Un-natural deaths.

6) To observe the principles of medical ethics in the practice of his profession.

Integration

Department shall provide an integrated approach towards allied disciplines like Pathology, Radiology, Forensic Sciences, Hospital Administration etc. to impart training regarding Medico-legal responsibilities of physicians at all levels of health care. Integration with relevant disciplines will provide scientific basis of clinical toxicology e.g. Medicine, Pharmacology etc.

COURSE CONTENT THEORY

Forensic Medicine

Introduction

Definition Scope Relevant To Subject, History of Forensic Medicine, Need, scope, Importance and probative value of Medical evidence in Crime Investigation

Forensic Identity

Must Know

Introduction, definition, types, corpus delicti, Data useful for identification of Living and dead, Age estimation and it's medico-legal importance, Sex determination and it's medico-legal importance, Other methods of establishing identity : Tattoo marks, Deformities, Seers, Identification of decomposed, Mutilated bodies and skeletal remains, Medico-legal aspect of DNA fingerprinting—a brief introduction, Various trace materials having value for evidence in crime.

Thanatology

Must Know

Brainstem Death in relation to Organ Transplantation, Moment of death, Modes of death, Causes of sudden Natural deaths, Changes after death, Cooling, Hypostasis, Changes in eye, Muscle changes, Putrefaction, Adipocere, Mummification, Estimation of time since death, Presumption of death and survivorship, disposal and preservation of dead.

Medico-Legal Autopsy

Must Know

Autopsy: Objectives, Facilities, Rules and Basic techniques, Proforma for reporting Medico-legal autopsy, Exhumation, examination of mutilated remains, Obscure and negative autopsies and post-mortem artifacts.

Trauma

Must Know

Definition and classification of injuries, Blunt force Trauma : Abrasions, Contusions and Lacerations, Sharp force Trauma : Incised, Stab and Chop wounds, Basics of Firearms injuries and Explosive injuries, 1) PM examination of Firearm injury deaths, 2)Removal and collection of Bullets, Pellets, cloths etc., Complications and causes of death due to injury, Medico-legal aspects of Trauma in General and reporting of cases of Hurts and relevant IPCs, Regional injuries : Head injury, mechanism, injury to Scalp, Skull, Brain, Intracranial Hemorrhages, cut throat injuries and spinal injuries, Road Traffic Accidents injuries, Fabricated and Defence injuries, Physical methods of Torture and their identification, Thermal injuries : Injuries due to heat and cold, Frostbite, Burns, Scalds and Bride burning (Dowry death), Injuries due to Electricity, Lightening, Non-Accidental Domestic Violence, Starvation deaths.

Medico-Legal Aspects of Sex, Marriage And Infant Death

Explanation and ML Importance of Terminologies Impotence, Sterility, Virginity Pregnancy, Delivery, Paternity, Legitimacy, Assisted Reproductive Technique Medico-legal Aspect and PNDT Act, Sexual Offences and Sexual perversions, Examination of Rape and Sodomy cases, Abortions, Medical Termination of pregnancy Act, Criminal abortions and relevant IPC sections.

Infant deaths: Explanation of Terminologies Viability, Live Births, Deadborn, Stillborn, Determination of age of Focus and Infant with apecial reference to 3,5,6 & 9 months of I.U. Age, Infanticides Autopsy to confirm Livebirth, period of survival, causes of deaths, Battered Baby Syndrome and sudden Infant Death Syndrome.

Asphyxia Death

Must Know

Introduction, Pathophysiology, General Signs-Symptoms of Asphyxia, Hanging: Definition, Types and Causes of death, PM Finding, ALI, Strangulation, Suffocation and Traumatic Asphyxia, Definition, Types and Causes of death, PM finding and MLI, Drowning-Definition, Types, mechanisms and Causes of death, PM Finding, Test & MLI.

Forensic Psychiatry

Must Know

Basic concepts of Forensic Psychiatry in respect of Vivil and Criminal responsibility, Examination, Certification, restraint and admission to psychiatric hospital and nursing homes, Mental Health Act 1987: Principles and Objectives.

Toxicology

General Principles

Introduction to Toxicology, Epidemiology of poisoning, General consideration and Laws in relation to poisons/Narcotic drugs and Psyctropic substances ACT, duties and Responsibilities of attending Physician, Basic of Environmental and Industrial Toxicology in relation to Health & Ecology, Common poisons and their classification. Identification of common poisons Rules of Administration. Actions of poison and factors modifying them, Diagnosis of poisoning (Clinical and Confirmatory), Treatment/Management of cases of acute and chronic poisoning, Analytical Toxicology (Principles Bedside & Common Lab. Tests), Collection, Preservation and Dispatch of Viscera to FSL, Regulation Toxicology for prevention of Hazards to Health and Ecology.

Corrosive and Irritant Poisons

Must Know

Inorganic Corrisives-Sulpuric, Nitric & Hydrochloric Acid, Organic Corrosives-Phenol, Oxalic Acid, Inorganic Non Metallic Irritants-Phosphorus, Halogens, Inorganic Metallic Irritants-ARSENIC, Lead, Mercury, Copper, Organic Vegetable Irritants- Abrus, Castor, Croton, Caltrops, Semicarpus, Ergot, Organic Animal Irritants-Snakes Bite, Scorpion & other common insect bites diagnosis and Management, Mechanical Irritants-diagnosis and treatment.

Neurotoxin

Must Know

Inebriant-Ethyl Alcohol, Methyl Alcohol, Benzo-diazepine, Somniferons and Sedative Hypnotics-Opium and Derivatives Barbiturates Chloral Dhatura Cannabis Cocaine, Insecticides/Pesticides/Agrochemical-organo-phosphorus compounds Organo-chlorides, Carbamates, Pyrethroids, Aluminium phosphide.

Other Poisons

Must Know

Cardiac Poisons-Oleanders, Aconite, Tobacco, Spinal Poisons-Strychnine, Asphyxiates (Gases) Carbon monoxide, Carbon Dioxide, Cyanogens gas and Cyanides, Domestic/Household Poisons-Kerosene, Detergents, Disinfectants, Cosmetics, Rodenticide mothballs etc., Therapeutic Drug Toxicity/poisoning by Medicines-Salicylates, Paracetamol, Newer derivatives of sedatives, Food Poisoning-Bacterial, Viral, Mushrooms, Chemical etc., Drug of dependence and Drug Abuse-Alcohol, Tobacco, Hypnotics, Hallucinogens, Stimulants Organic, Solvents.

Medical Jurisprudence

Legal and Ethical Aspects of Practice of Medicine

Must Know

The Indian Medical Council and State Medical Council Formation, Functions, Rights, Privileges and Duties of Registered Medical Practitioners, Infamous conduct, Professional secrecy and privileged communications, Medical Ethics and prohibition of Torture & care of Torture Victims, Animal Ethics, Consent-Its relevance in Medical Practice, Medical Negligence and contributory negligence. Precautionary measures and defences for Medical Practitioners against legal actions, Medical/Doctors indemnity insurance, Consumer Protection Act relevant to medical practice, Euthanasia-Current views and dilemmas, Different code of Medical Ethics and Ethics in Research, Common medico-legal problems in Hospital practice, Biomedical waste, disposal.

Legal Procedures in Medico – Legal cases

Must Know

Medico-legal Investigations of death in suspicious circumstances, different Inquests type of offences, Types of Criminal courts and their powers, punishments prescribed by law, kinds of witnesses, Evidence, Documentary Medical evidence, Dying, declaration and Dying deposition, The Trial criminal cases, Rules and Conventions to be followed by Medical Witness at Medical evidence, subpoena, conduct money Relevant Sections from the Indian Evidence Act, Indian Penal code and criminal Procedure code.

a. **PCPNDT Act**

b. The Clinical Establishments (Registration and Regulation) Act, 2010.

c. Attitude, communication, Professionalism and Medical records in medical practice.

Practical

Forensic Medicine

Report on: Estimation/Certification of Age, Recording of fingerprints, Examination/Certifications of the Injured - (Prescribed Forms), Examination of the Causative Agents in cases of Injuries - (e.g. Weapons, Instruments), Hard and blunt weapons, Sharp cutting, sharp pointed and Sharp Heavy cutting weapons, Firearm weapons, Sexual offences - Examination/Certification of Victim, Examination/Certification of Accused,

Examination of Focus to opine about age with reference to 3,5,6,7 months LU period, Examination of Bones for Medico-legal purpose to determine age, sex, stature, cause of death, time since death - a) Skull and Mandible, b) Pelvis, c) Femur, Humours.

Study of

Medical certification of cause of Death as per Birth and Death registration Act (Prescribed Forms), Studies of Ski grams for estimation of age, bony injury, foreign body and pregnancy, Photograph of different events of Medico-legal importance and post-mortem c changes, Study of Various slides of medico-legal significance, Demonstration of Instruments - a) Used in treatment of acute poisoning cases, b) Used for causing abortions, c) Used for carrying out autopsy

Forensic Toxicology

Examination/Certification of Alcoholic (Prescribed Forms 'A' & 'B'), Study of Common poisons - (Sulphuric Acid, Nitric Acid, Hydrochloric Acid, Carbolic Acid and Oxalic Acid, Phosphorous, Lead, Arsenic, Mercury, Copper, Glass powder, Castor, Croton, Caltrops, Abrus Precatorious (Ratti), Dhatura, Cannabis Indica, Opium, Aconite, Yellow Oleander Strychnine, Snakes, Scorpoin, Alcohol, Methyl Alcohol, Kerosene, Organo-phosphorus compounds, Oregano Chloral compounds, Carbamates (Carbary I) and other commonly used poisons antidotes and preservatives.

Medical Jurisprudence

Study of Medical Certificates (Prescribed Forms)

a) Sickness Certificate

b) Fitness Certificate

c) Certificate of Physical fitness

Legal procedures in medico-legal cases

Orientation of various formats of specified forms : Consent to surgery, Anesthesia and other Medical services, Request for sterilization, consent to access for hospital records, Authorization for Autopsy, Dead body Challan used for sending Dead body for post-mortem examination, Request for the second inquest by Magistrate on the Dead body. Advance post-mortem certificate, Post-mortem form and Pictorial Post-mortem form. Form for the Final cause of death, Form for dispatch of exhibits other than the viscera to chemical analyzer. Forms for dispatch of Viscera for Histopathological Examination, Form for Dispatch of viscera to chemical analyzer, Forensic Science Laboratory report form, Summers to Witness.

Teaching Methods and Hours

1.	**Total No. of Hours**	**100 hrs.**
	Theory didactic lectures	40 hrs.
	Non-lecture teaching	20 hrs.
	Practical/Demonstration	40 hrs.

2. Topic wise/System wise distribution of teaching hours:

Sr. No	Topic / System	No. of hours
1.	Forensic Medicine	15
2.	Toxicology	15
3.	Medical Jurisprudence	06
4.	Legal procedure in Medico-legal cases	04
5.	Court Attendance	04
6.	Integrated Approach Towards allied disciplines	06
7.	Tutorials and Seminars	10

Scheme of Examination

Internal Assessment Examination Scheme

1st Term Ending		2nd Term Ending		Preliminary Examination	
Theory (A)	Practicals (B)	Theory (C)	Practicals (D)	Theory (E)	Practicals (F)
40	10	40	20	80	30

1) Theory marks to be sent to the University out of 10 =

$$\frac{(A) + (C) + (E)}{16} = \frac{40 + 40 + 80}{16} = \frac{160}{16} = 10$$

2) Practical marks to be sent to the University out of 10 =

$$= \frac{(B) + (D) + (F)}{6} = \frac{10 + 20 + 30}{6} = \frac{60}{6} = 10$$

University Examination – Distribution of Marks

	Pattern of Examination	**F.M.T.**
1.	THEORY Written Paper No. of Papers Maximum Marks for each Paper – 40 marks	 2 80
2.	Viva-Voce	10
3	Internal Assessment (Theory)	10
A	**Total Theory**	**100**
	PRACTICAL	
1.	Practical	30
2.	Internal Assessment (Practical)	10
3.	Journal / Assignment	10
B.	**Total Practical's**	**50**
	Grand Total A + B	**150**

Nature of Question Paper

One Paper		40 marks
Section – A	Multiple Choice Questions (24 – MCQs)	- 12 marks
Section – B	Long Answer Questions (LAQs)	- 14 marks
	(Any Two out of Three)	
Section – C	Short Answer Questions (SAQs)	– 8 marks
	(Any two out of Three)	
	Brief answer questions (BAQs) (3 – BAQS)	– 6 marks

Topic distribution in the theory Paper.

Section A & C: Forensic Medicine Toxicology. Medical Jurisprudence. Legal Procedure.

Section B: Forensic Medicine, Toxicology and/or Medical Jurisprudence.

PATTERN OF VIVA VOCE AND PRACTICAL EXAMINATION

(i)	Viva examination (Orals):	Total	- 10 marks
(ii)	Practical examination :	Total	- 30 marks

Nature of Practical and duration

Practical's		Marks 30
Report on Four Exercises [With available resources]		Time: About 2 hrs.
Exercise A: An Injured OR Age of the child		
OR An Alcoholic OR Sexual offence		05 Marks
Exercise B: Bone OR X-ray		05 Marks
Exercise C: Weapon		05 Marks
Exercise D: Certificate of Sickness, fitness OR Medical certification		05 Marks
Cause of death.		
Exercise E: Spotters		10 Marks
	TOTAL	30 Marks
F Journal/Assignment		10 Marks
Viva voce		10 Marks

VIVA:

Two tables. Five marks each (Adequate time to be given) added together (total out of 10)

Table 1Syllabus covering Forensic Medicine - Two examiners

Table 2Syllabus covering Toxicology - Two examiners

Viva 10 marks

Duration

Four examiners 10 mines with each candidate

Two examiners for topics a Toxicology and Medical Jurisprudence.

Two examiners for topics b. Forensic Medicine and Legal Procedures.

At each table marks given will be out of 5 and then added together (total out of 10)

Books recommended:

1. Dr. K.S.N. Reddy – The essential of Forensic Medicine & Toxicology, 31st Ed. 2012. Published by K. Saguna Devi, H. No. 16-11-15/2/2, Salem nagar Colony, No. 1, malapet, Hyderabad – 500036.
2. Modi's Textbook of Medical Jurisprudence andtoxicology – Edited by BV Subramanyam, Butterworths India, New Delhi, 22nd Ed. 2001.
3. Dr. C.K. Parikh – A text book of Medical Jurisprudence, Forensic Medicine & Toxicology, CBS, Publishers, Delhi, 6th Ed. 1999.
4. Dr. Apurba Nandy – Principles of Forensic Medicine, 4th Ed. 2012, New Central Book Agency (P) Ltd. Calcutta.
5. Dr. Krishan Vij – text book of Forensic Medicine & Toxicology – Principles and Practice, BI Churchill Livingston, New Delhi, 6th Ed. 2014.
6. Dr. A.C. Mohanty – Legal Medicine, 2nd Ed. 2014.
7. Dr. Rajesh Bardale, Jaypee Publication, 2nd Ed. 2013.

8. Dr. Putl Mupulpante Text Book of Forensic Medicine & Toxicology Jaypee Publication, 1st Ed. 2014.
9. Dr. Gupta – Short Text book of Forensic Medicine.
10. Burke Michael P – Forensic pathology of fracture and mechanisms of injury postmortem CT scanning. 1st Ed. 2012.
11. Medical Jurisprudence and Toxicology - Bernard Knight et al.: Cox's
12. Modern Medical Toxicology - V.V. Pillay

Reference Books

- Forensic Pathology - Russell S. Fisher & Charles S. Petty
- Forensic Medicine - Keith Simpson
- Current Methods of autopsy practice - Jorgen Ludwig
- Legal Medicine - Gradwohl