Faculty of Medicine

JSS ACADEMY OF HIGHER EDUCATION & RESEARCH
(DEEMED TO BE UNIVERSITY) MYSURU

JSS Academy of Higher Education & Research
(Deemed to be University)
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MBBS 2019 : Regulations & Syllabus

PHASE II - CBME Syllabus
(Theory, Practicals and Clinicals)

Volume 1

MBBS 2019 Regulations & Syllabus
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VOLUME 1

PHARMACOLOGY

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I. GOAL

The goal of teaching pharmacology to MBBS students is to create an ideal Indian Medical Graduate who has basic pharmacology knowledge and apply the knowledge of clinical pharmacology so that he can be a good clinician, communicator, lifelong learner, professional, leader and member of health care team.

II. OBJECTIVES

A. KNOWLEDGE

By the end of Phase II, the undergraduate medical student should be able to:

- Elucidate the pharmacokinetic and pharmacodynamics parameters like absorption, distribution, metabolism, excretion; of the drug, drug potency and drug efficacy and the appropriate choice of drug for treatment of a given patient.
- Explain how to utilize pharmacokinetic parameters to calculate, to monitor, design and to modify appropriate dosing regimens of drugs in specific patient populations.
- Outline the process of new drug discovery, development,testing and approval by the regulatory authorities for use in clinical practice
- Discuss the fundamentals of pharmacogenomics that can influence the pharmacokinetic and pharmacodynamics of a drug that could affect the clinical response to medications.
- Describe the approaches in pharmacogenetics that can influence the process of drug discovery and the selection of drugs in the treatment of specific diseases.
- Classify the drugs used in medical practice and describe their pharmacological actions, pharmacokinetics, indications, contraindications, mechanisms of action, adverse effects and important drug interactions.
- Apply pharmacological knowledge of various drugs for the effective therapy of a given disease or condition in a specific patient.

- Understand the molecular, cellular and physiological mechanisms involved in the aetiology of the most common disease states and describe how targeting these mechanisms with the appropriate drug(s) can effectively treat, cure, or mitigate the underlying disease.
- Explain the rationales for the use of national organization-approved treatment algorithms for the treatment of common diseases
- Identify the recently accepted diagnostic criteria to start the therapy and the therapeutic goals to be achieved.
- Identify tests required for monitoring the efficacy and toxicity of drugs used in the treatment of diseases.
- Explain the acute and chronic effects of drugs with abuse potential, and the symptoms of sudden withdrawal of such a drug.
- Describe the principles of toxicology; adverse toxicological effects of certain drugs, toxins, chemicals, heavy metals and poisons; and the management of the poisoned patient.
- Enumerate the advantages and disadvantages of dietary supplements and herbal;describe their efficacy, adverse effects and drug interactions.
- Discuss the differences between the laws and regulations governing the approval, safety, efficacy and marketing of dietary supplements and herbal medications in comparison with FDA-approved drugs.
- Discuss the importance of designing and conducting basic scientific research and explain how the findings could be applied for developing new therapeutic modalities that can influence care of the patient.

B. SKILLS:

- Mannequin assisted administration of drugs through various routes in a simulated environment
- Demonstrate the effects of various drugs and their blockers on blood pressure using CAL lab
- Demonstrate competency in performing drug dosage calculations
- Demonstrate rational prescription writing and P drug selection for common disease conditions and critically audit the same

C. INTEGRATION:

- The integrated teaching should be aligned and integrated horizontally and vertically in organ systems recognizing the interaction between drug, host and disease in order to provide an overall understanding of the context of therapy.

D. ATTITUDE AND COMMUNICATION:

- Demonstrate the ability of small group setting to communicate effectively and work together successfully to address the issues of pharmacological importance.
- Create awareness among patients, patient attenders, Medical Representatives and public by involving in small group activities within the course.

III COURSE OUTCOMES

At the end of the course the learners should be able to

a) Understand the Basic Pharmacological aspects of Drugs & Drug development.
b) Familiarize with mechanism of action, therapeutic uses & Adverse effects of drugs in various systems,
c) Applications of antimicrobial agents in various infections and anticancer drugs in various cancers.
d) Application of drugs in special age groups, clinically important drug interactions.
e) Develop skills regarding drug administration. Good communication with patients.

IV SYLLABUS:

A. Number of teaching hours recommended by MCI:

Teaching method	Hours
Lecture	80
Small group discussion- SGD (Practicals, seminars, tutorials)	138
Self-directed learning- SDL	12
Total	**230**

Syllabus

Theory Topics

CORE TOPICS

1. GENERAL PHARMACOLOGY
❖ Principles of Pharmacology ❖ Pharmacotherapeutics ❖ Evidence based medicine ❖ Therapeutic drug monitoring, ❖ Drug formulations ❖ Drug delivery systems. ❖ Routes of drug administration ❖ Pharmacokinetics ❖ Pharmacodynamics ❖ Pharmacovigilance ❖ Management of adverse drug reactions (ADR) ❖ Management of drug interactions ❖ Nomenclature of drugs ❖ Generic prescription. ❖ Drug dosage calculation
2. CNS and LA
❖ General anesthetics, ❖ Pre-anesthetic medications ❖ Anxiolytics, ❖ Sedatives & hypnotics, ❖ Anti-psychotics ❖ Antidepressant drugs, ❖ Anti-maniacs, ❖ Opioid agonists and antagonists, ❖ Anti-epileptics drugs ❖ Effects of acute and chronic ethanol intake ❖ Drugs of abuse ❖ Dependence, ❖ Addiction,

❖ Stimulants, ❖ Depressants, ❖ Psychedelics, ❖ Drugs used for criminal offences ❖ Methanol and ethanol poisonings ❖ Drug deaddiction ❖ Local anesthetics
3. ANS Including Parkinsonism
❖ Adrenergic and anti-adrenergic drugs ❖ Cholinergic and anticholinergic drugs ❖ Drugs used for neurodegenerative disorders ❖ Skeletal muscle relaxants
4. CVS
❖ Drugs modulating the rennin angiotensin ❖ And aldosterone system ❖ Antihypertensive drugs and ❖ Drugs used in ischemic heart disease ❖ Stable, unstable angina ❖ Myocardial infarction ❖ Peripheral vascular disease ❖ Drugs used in congestive heart failure
5. BLOOD AND PHARMACOTHERAPY OF SHOCK, DIURETICS AND ANTIDIURETICS
❖ Anticoagulants, ❖ Antiplatelets, ❖ Fibrinolytics, ❖ Plasma expanders ❖ Management of dyslipidemias ❖ Drugs used in anemias ❖ Colony stimulating factors ❖ Drugs used in shock ❖ Diuretics, ❖ Antidiuretics ❖ Vasopressin and analogues

6. CHEMOTHERAPY
❖ General principles of chemotherapy ❖ Rational use of antimicrobials ❖ Antibiotic stewardship program ❖ Antitubercular dugs ❖ Antileprotic drugs ❖ Drugs used in malaria, ❖ Kala-azar, ❖ Amebiasis ❖ Intestinal helminthiasis ❖ Drugs used in UTI/ STD ❖ Viral diseases ❖ HIV ❖ Anticancer drugs
7. ENDOCRINES (HORMONES)
❖ Drugs used in diabetes mellitus, ❖ Thyroid disorders ❖ Osteoporosis ❖ Drugs used as sex hormones, their analogues ❖ Anterior pituitary hormones ❖ Corticosteroids ❖ Drugs used for contraception ❖ Drugs used in the treatment of infertility ❖ Drugs used in erectile dysfunction ❖ Uterine relaxants and stimulants
8. GASTRO INTESTINAL SYSTEM
❖ Acid-peptic disease and GERD ❖ Antiemetics and prokinetics ❖ Antidiarrhoeals ❖ Laxatives ❖ Inflammatory Bowel Disease ❖ Irritable Bowel Disorders ❖ Biliary and pancreatic diseases

9. AUTOCOIDS
❖ Anti-histaminics, ❖ 5-HT modulating drugs, ❖ NSAIDs, ❖ Drugs for migraine
10. RESPIRATORY SYSTEM
❖ Drugs used in bronchial asthma ❖ Drugs used in COPD ❖ Drugs used in cough ❖ Antitussives, ❖ Expectorants ❖ Mucolytics
11. CHELATING AGENTS/ IMMUNOSUPPRESSIVE/DRUG USED IN GOUT & RHEUMATOID ARTHRITIS/ VITAMINS
❖ Immunomodulators ❖ Management of organ transplant rejection ❖ Drugs for gout, ❖ Anti-rheumatic drugs ❖ Vitamins
12. ENZYMES IN THERAPY/DRUGS ACTING ON UTERUS/ ANTISEPTIC AND DISINFECTANTS
❖ Antiseptics and disinfectants ❖ Uterine relaxants and stimulants ❖ Enzymes in therapy

Practical Syllabus

Sl no	Topics
1	Clinical Pharmacy
2	Clinical Pharmacology
3	Experimental Pharmacology
4	Communication

Clinical pharmacy	Clinical Pharmacology	Experimental Pharmacology	Communication Pharmacology
❖ Dosage forms ❖ Preparation of ORS packet ❖ Setting up an intravenous drip ❖ Drug dosage calculation	❖ Prescription writing ❖ Prescription audit ❖ Drug promotional literature ❖ Reporting Adverse drug Reaction ❖ Preparing P-drugs for a given condition ❖ Interacting with pharmaceutical representative ❖ Preparing list of essential medicines ❖ Communicate effectively with a patient on medication usage and adherence	❖ Administering drugs through various routes in mannequins ❖ Effects of drugs on blood pressure using Computer Aided Learning (CAL)	❖ Communicate with patient with ethics and empathy on drug use ❖ Communicate with the patient regarding optimal use of a) drugs, b) devices and c) storage of medicines ❖ Motivate patients with chronic diseases regarding adherence to medications ❖ Explain the patient about the cost of treatment and compliance ❖ Prescribe drugs with caution which are likely to produce dependence and recommend the line of management ❖ Educate public & patients about drug dependence and OTC drugs ❖ Demonstrate understanding on the legal and ethical aspects of prescribing drugs

B. Distribution of teaching hours for theory and Practicals/ Small group discussion & self-directed learning is as follows:

THEORY:

Sl no	Topic	Competency	Theory	SGD	SDL
1	General Pharmacology Toxicology Clinical Pharmacology and rational drug use	PH 1.1 to PH 1.12	10	9	1
2	Autonomic Nervous System	PH 1.13 to PH 1.14	6	3	1
3	Peripheral nervous system & Autacoids	PH 1.15, PH1.16 PH1.17	7	4	1

4	Central Nervous System	PH 1.18, PH 1.19 to PH 1.23	12	5	1
5	Diuretics and Cardiovascular System	PH 1.24, PH 1.26 to PH 1.31	9	2	1
6	Drugs affecting blood and blood formation	PH 1.25, PH 1.35	5	2	1
7	Respiratory System:	PH 1.32 to PH 1.33	2	1	1
8	Gastrointestinal System	PH 1.34	4	3	1
9	Endocrine System	PH 1.36 to PH 1.41	10	6	1
10	Chemotherapy, Anticancer drugs & Immunotherapy	PH 1.42 to PH 1.49, PH 1.50	10	6	1
11	Miscellaneous	PH 1.51 to PH 1.64	5	3	2
12	Communication	PH 5.1 to PH 5.7		14	
	CBME requirement		**80 hours**	**58 hours**	**12 hours**

PRACTICALS:

Topic	Competency	Description	Practicals
Clinical Pharmacy	PH 2.1	Demonstrate understanding of the use of various dosage forms (oral/local/parenteral; solid/liquid)	9 hours + 7 hours
	PH 2.2	Prepare oral rehydration solution from ORS packet and explain its use	
	PH 2.3	Demonstrate the appropriate setting up of an intravenous drip in a simulated environment.	
	PH 2.4	Demonstrate the correct method of calculation of drug dosage in patients including those used in special situations	
	PH 3.1-**C**	Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient	30 hours

Clinical Pharmacology	PH 3.2-**C**	Perform and interpret a critical appraisal (audit) of a given prescription	
	PH 3.3-**C**	Perform a critical evaluation of the drug promotional literature	
	PH 3.4- **L**	To recognise and report an adverse drug reaction	
	PH 3.5-**C**	To prepare and explain a list of P-drugs for a given case/condition	
	PH 3.6-**L**	Demonstrate how to optimize interaction with pharmaceutical representative to get authentic information on drugs	
	PH 3.7-**L**	Prepare a list of essential medicines for a healthcare facility	
	PH 3.8	Communicate effectively with a patient on the proper use of prescribed medication	
Experimental Pharmacology	PH 4.1	Administer drugs through various routes in a simulated environment using mannequins	10 hours + 7 hours
	PH4.2	Demonstrate the effects of drugs on blood pressure (vasopressor and vaso-depressors with appropriate blockers) using CAL	
		CBME requirement	**63 hours**
Communication	PH5.1	Communicate with the patient with empathy and ethics on all aspects of drug use	14 hours (SGD)
	PH5.2	Communicate with the patient regarding optimal use of a) drug therapy, b) devices and c) storage of medicines	
	PH5.3	Motivate patients with chronic diseases to adhere to the prescribed management by the health care provider	
	PH5.4	Explain to the patient the relationship between cost of treatment and patient compliance	
	PH5.5	Demonstrate an understanding of the caution in prescribing drugs likely to produce dependence and recommend the line of management	
	PH5.6	Demonstrate ability to educate public & patients about various aspects of drug use including drug dependence and OTC drugs	
	PH5.7	Demonstrate an understanding of the legal and ethical aspects of prescribing drugs	

DISTRIBUTION OF TEACHING HOURS									
SL NO	TOPIC	Competencies (85)	TEACHING LEARNING METHOD (hours)						
			Lecture (80)	small group discussions (58)	Tutorials (10)	Integrated (7)		Practical (63)	Self directed learning (12)
1.	General pharmacology	12	10	9	1	0		7	1
2.	Autonomic nervous system	2	6	3	1			7	1
3.	Respiratory system	2	2	1	1	1			1
4.	Endocrine system	6	10	6	1	1			1
5 & 6	Peripheral nervous system & Autacoids	3	7	4		0			1
7.	Central nervous system	6	12	5	1	1			1
8 & 9	Cardiovascular system & Renal system	6	9	2	1	1			1
10.	Drugs acting on Blood	3	5	2	1	1			1
11.	Gastrointestinal tract	1	4	3	1	1			1
12 & 13	Chemotherapy,anticancer drugs & Immunotherapy	9	10	6	2	1			1
14.	Miscellaneous	14	5	3				0	2
15.	Clinical pharmacy	4						9	
16.	Clinical pharmacology	8						30	
17.	Experimental pharmacology	2						10	
18.	Communication	7		14					

COURSE CONTENT AND TEACHING HOURS

TEACHING HOURS TOTAL: 230 HOURS

Theory Syllabus: Topics and the competencies

Number	Unit 1: General Pharmacology					
Lecture	Small group discussions	Tutorials	Integrated		Practical	Self directed learning
10	9	1	0		7	1
PH1.1	Define and describe the principles of pharmacology and pharmacotherapeutics					
PH1.2	Describe the basis of Evidence based medicine and Therapeutic drug monitoring					
PH1.3	Enumerate and identify drug formulations and drug delivery systems					
PH1.4	Describe absorption, distribution, metabolism & excretion of drugs					
PH1.5	Describe general principles of mechanism of drug action					
PH1.6	Describe principles of Pharmacovigilance& ADR reporting systems					
PH1.7	Define, identify and describe the management of adverse drug reactions (ADR)					
PH1.8	Identify and describe the management of drug interactions					
PH1.9	Describe nomenclature of drugs i.e. generic, branded drugs					
PH1.10	Describe parts of a correct, complete and legible generic prescription. Identify errors in prescription and correct appropriately					
PH1.11	Describe various routes of drug administration, eg., oral, SC, IV, IM, SL					
PH1.12	Calculate the dosage of drugs using appropriate formulae for an individual patient, including children, elderly and patient with renal dysfunction.					
PH1.59	Describe and discuss the following: Essential medicines, Fixed dose combinations, Over the counter drugs, Herbal medicines					

PH1.60	Describe and discuss Pharmacogenomics and Pharmacoeconomics
PH1.63	Describe Drug Regulations, acts and other legal aspects
PH1.64	Describe overview of drug development, Phases of clinical trials and Good Clinical Practice

Number	**Unit 2: Drugs acting on Autonomic Nervous System**

Lecture	Small group discussions	Tutorials	Integrated		Practical	Self directed learning
6	2	0			7	1

PH1.13	Describe mechanism of action, types, doses, side effects, indications and contraindications of adrenergic and anti-adrenergic drugs
PH1.14	Describe mechanism of action, types, doses, side effects, indications and contraindications of cholinergic and anticholinergic drugs

Number	**Unit 3: Pharmacology of Respiratory system**

Lecture	small group discussions	Tutorials	Integrated		Practical	Self directed learning
2	1	1	1		0	1

PH1.32	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in bronchial asthma and COPD
PH1.33	Describe the mechanism of action, types, doses, side effects, indications and contraindications of the drugs used in cough (antitussives, expectorants/ mucolytics)

Number	**Unit 4: Hormones and related drugs**

Lecture	Small group discussions	Tutorials	Integrated		Practical	Self directed learning
10	6	1	1		0	1

PH1.36	Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in endocrine disorders (diabetes mellitus, thyroid disorders and osteoporosis)
PH1.37	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used as sex hormones, their analogues and anterior Pituitary hormones
PH1.38	Describe the mechanism of action, types, doses, side effects, indications and contraindications of corticosteroids
PH1.39	Describe mechanism of action, types, doses, side effects, indications and contraindications the drugs used for contraception
PH1.40	Describe mechanism of action, types, doses, side effects, indications and contraindications of 1. Drugs used in the treatment of infertility, and 2. Drugs used in erectile dysfunction

Number	**Unit 5: Drugs acting on Peripheral Nervous System** **Unit 6: Autocoids& related drugs**

Lecture	small group discussions	Tutorials	Integrated		Practical	Self directed learning
7	4	0	0		0	1

PH1.15	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of skeletal muscle relaxants
PH1.17	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of local anaesthetics

PH1.16	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act by modulating autacoids, including: anti-histaminics, 5-HT modulating drugs, Prostaglandins and its analogues NSAIDs, drugs for gout, anti-rheumatic drugs, drugs for migraine

Number	Unit 7: Drugs acting on Central nervous system

Lecture	small group discussions	Tutorials	Integrated		Practical	Self directed learning
12	5	1	1		0	1

PH1.18	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of general anaesthetics, and preanesthetic Medications
PH1.19	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act on CNS, (including anxiolytics, sedatives & hypnotics, anti-psychotic, antidepressant drugs, anti-maniacs, opioid agonists and antagonists, drugs used for neurodegenerative disorders, anti-epileptics drugs
PH1.20	Describe the effects of acute and chronic ethanol intake
PH1.21	Describe the symptoms and management of methanol and ethanol poisonings
PH1.22	Describe drugs of abuse (dependence, addiction, stimulants, depressants, psychedelics, drugs used for criminal offences)
PH1.23	Describe the process and mechanism of drug deaddiction

Number	Unit 8: Drugs acting on Cardiovascular system Unit 9: Drugs acting on Renal system

Lecture	small group discussions	Tutorials	Integrated		Practical	Self directed learning
9	2	1	1		0	1

PH1.26	Describe mechanisms of action, types, doses, side effects, indications and contraindications of the drugs modulating the renin angiotensin and aldosterone system

PH1.27	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antihypertensive drugs and drugs used in shock
PH1.28	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in ischemic heart disease (stable, unstable angina and myocardial infarction), peripheral vascular disease
PH1.29	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in congestive heart failure
PH1.30	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the antiarrhythmics
PH1.31	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in the management of dyslipidemias

PH1.24	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs affecting renal systems including diuretics, antidiuretics- vasopressin and analogues

Number	**Unit 10: Drugs acting on Blood & Blood formation**

Lecture	small group discussions	Tutorials	Integrated		Practical	Self directed learning
5	2	1	1		0	1

PH1.25	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs acting on blood, like anticoagulants, antiplatelets, fibrinolytics, plasma expanders
PH1.35	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in haematological disorders like: 1. Drugs used in anemias 2. Colony Stimulating factors

PH1.61	Describe and discuss dietary supplements and nutraceuticals

Number	Unit 11: Pharmacology of Gastrointestinal system

Lecture	small group discussions	Tutorials	Integrated		Practical	Self directed learning
4	3	1	1		0	1

PH1.34	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs used as below: 1. Acid-peptic disease and GERD 2. Antiemetics and prokinetics 3. Antidiarrhoeals 4. Laxatives 5. Inflammatory Bowel Disease 6. Irritable Bowel Disorders, biliary and pancreatic diseases

Number	Unit 12: Antimicrobial drugs Unit 13: Cancer chemotherapy &Immunopharmacology

Lecture	small group discussions	Tutorials	Integrated		Practical	Self directed learning
10	6	2	1		0	1

PH1.42	Describe general principles of chemotherapy
PH1.43	Describe and discuss the rational use of antimicrobials including antibiotic stewardship program
PH1.44	Describe the first line antitubercular dugs, their mechanisms of action, side effects and doses.
PH1.45	Describe the dugs used in MDR and XDR Tuberculosis
PH1.46	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antileprotic drugs
PH1.47	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in malaria, KALA-AZAR, amebiasis and intestinal helminthiasis

PH1.48	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in UTI/ STD and viral diseases including HIV
PH1.49	Describe mechanism of action, classes, side effects, indications and contraindications of anticancer drugs
PH1.50	Describe mechanisms of action, types, doses, side effects, indications and contraindications of immunomodulators and management of organ transplant rejection

Number	Unit 14: Miscellaneous Drugs

Lecture	small group discussions	Tutorials	Integrated		Practical	Self directed learning
5	3	0	0		0	2

PH1.51	Describe occupational and environmental pesticides, food adulterants, pollutants and insect repellents
PH1.52	Describe management of common poisoning, insecticides, common sting and bites
PH1.53	Describe heavy metal poisoning and chelating agents
PH1.54	Describe vaccines and their uses
PH1.55	Describe and discuss the following National Health Programmes including Immunisation, Tuberculosis, Leprosy, Malaria, HIV, Filaria, Kala Azar, Diarrhoeal diseases, Anaemia& nutritional disorders, Blindness, Non-communicable diseases, cancer and Iodine deficiency
PH1.56	Describe basic aspects of Geriatric and Pediatric pharmacology
PH1.57	Describe drugs used in skin disorders
PH1.58	Describe drugs used in Ocular disorders
PH1.62	Describe and discuss antiseptics and disinfectants

Practical Syllabus: Topics and the competencies

{63 hours+14 hours – (SGD)}

RECORD BOOK

Number	**Topic: Clinical Pharmacy** 9hrs+7hrs=16hrs
PH2.1	Demonstrate the use of various dosage forms (oral/local/parenteral; solid/liquid)
PH2.2	Prepare oral rehydration solution from ORS packet and explain its use
PH2.3	Demonstrate the appropriate setting up of an intravenous drip in a simulated environment
PH2.4	Demonstrate the correct method of calculation of drug dosage in patients including those used in special situations
	Topic: Experimental Pharmacology 10hrs+7hrs =17hrs
PH4.1	Administer drugs through various routes in a simulated environment using mannequins
PH4.2	Demonstrate the effects of drugs on blood pressure (vasopressor and vasodepressors with appropriate blockers) using computer aided learning
	Topic: Communication Pharmacology 14hrs (SGD)
PH5.1	Communicate with the patient with empathy and ethics on all aspects of drug use
PH5.2	Communicate with the patient regarding optimal use of a) drug therapy, b) devices and c) storage of medicines
PH5.3	Motivate patients with chronic diseases to adhere to the prescribed management by the health care provider
PH5.4	Explain to the patient the relationship between cost of treatment and patient compliance
PH5.5	Demonstrate an understanding of the caution in prescribing drugs likely to produce dependence and recommend the line of management
PH5.6	Demonstrate ability to educate public & patients about various aspects of drug use including drug dependence and OTC drugs
PH5.7	Demonstrate an understanding of the legal and ethical aspects of prescribing drugs

	Topic: Clinical Pharmacology 30hrs
PH3.1	Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient
PH3.2	Perform and interpret a critical appraisal (audit) of a given prescription
PH3.3	Perform a critical evaluation of the drug promotional literature
PH3.4	To recognise and report an adverse drug reaction
PH3.5	To prepare and explain a list of P-drugs for a given case/condition
PH3.6	Demonstrate how to optimize interaction with pharmaceutical representative to get authentic information on drugs
PH3.7	Prepare a list of essential medicines for a healthcare facility
PH3.8	Communicate effectively with a patient on the proper use of prescribed medication

LOG BOOK

Clinical Pharmacology and Certifiable Skills

Number	**Topic: Clinical Pharmacology**
PH3.2	Analyze and interpret a critical appraisal (audit) of a given prescription
PH3.3	Perform a critical evaluation of the drug promotional literature
PH3.4	To identify and report an adverse drug reaction
PH3.5	To prepare and substantiate a list of P-drugs for a given case/condition
PH3.6	Demonstrate how to interact with pharmaceutical representative to get authentic information on drugs
PH3.7	Prepare a list of essential medicines for a healthcare facility

Number	**Certifiable Skills**
PH3.1	Write a rational and legible generic prescription for a given condition and communicate the same to the patient
PH3.2	Analyzeand interpret a critical appraisal (audit) of a given prescription
PH3.3	Perform a critical evaluation of the drug promotional literature

PH3.4	Toidentify and report an adverse drug reaction
PH3.5	To prepare and explain a list of P drugs for a given case/condition

AETCOM – competencies (12 hours)

Number	**Topic: Health care as a right**
Module 2.3	Analyze and interpret a critical appraisal (audit) of a given prescription
Module 2.6	**Topic: Bioethics**
	Identify,discuss and defend medico-legal, socio-cultural and ethical issues as they pertain to refusal of care including do not resuscitate and withdrawal of life support
Module 2.7	**Topic: Bioethics continued**
	Identify, discuss and defend, medico-legal, socio-cultural and ethical issues as they pertain to consent for surgical procedures.

SELF DIRECTED LEARNING (12 hours)

1. Pharmacovigilance and Essential medicines (drug) concept.
2. Distribution of Adrenergic and Cholinergic receptors and the response they bring about.
3. Applications of local anesthetic agents in clinical scenarios.
4. Compile the drugs that have a depressant action on the CNS.
5. General Principles of Antihypertensive therapy- JNC7, WHO- ISH, BHS
6. Treatment of bronchial asthma based on the severity and stages of Bronchial asthma.
7. Management of severe Acid peptic disease with Hpylori infection.
8. Indications and uses of Anticoagulants based on the route of administration.
9. The factors that determine the choice of anti-diabetic drugs Insulin or OHA
10. The concept of p-drug (personalized drug) and drug of Choice.
11. Compare and contrast Antiseptics and disinfectants.
12. Vaccines and Immunization schedule.

No	Competency The student should be able to	Domain K/S/A/C	Level K/KH/S H/P	Core (Y/N)	Suggested Teaching Learning method	Time Duration in Hours	Suggested Assessment method	Integration
PH 1.1	**Define and describe the principles of pharmacology and pharmacotherapeutics**							
	1. Define a drug 2. Explain the terms Pharmacology, clinical pharmacology & therapeutics 3. Enlist and explain about various branches of Pharmacology 4. List out sources of drugs with examples 5. List out sources of drug information &Explain each source briefly 6. Explain the importance of Clinical pharmacology towards rational approach to prescribing medicine 7. Explain the evolution of Pharmacology from medieval to contemporary times	K	K	Y	Lecture With a Visit to the departmental museum	1	Written / Viva voce	
PH 1.2	**Describe the basis of Evidence based medicine and Therapeutic drug monitoring**							
	1. Identify reliable sources for research evidence 2. Understand research study designs and the hierarchy for research evidence 3. Ascertain strength of evidence for treatments and understand guidelines in different therapeutic areas	K	KH	Y	SGD	1	Written / Viva voce	

	4. Explain the importance of updating about advances in medical knowledge							
Therapeutic drug monitoring	1. Understand the purpose of TDM 2. Explain the methods in therapeutic drug monitoring 3. Enlist the drugs that require TDM 4. Understand the purpose for and methods in therapeutic drug monitoring * TDM to be covered after PK/PD							
PH 1.3	**Enumerate and identify drug formulations and drug delivery systems**							
	At the end of the session the student should be able to: 1.3.1 Define dosage form, formulation and excipient 1.3.2 List out different drug formulations with an example of each. 1.3.3 Choose appropriate formulation based on clinical need 1.3.4 Explain the advantages and disadvantages of different drug delivery systems 1.3.5 Enlist the new drug delivery system and discuss their utility	K	KH	Y	SGD/Practical	1	Written / Viva voce	
PH 1.4	**Describe absorption, distribution, metabolism & excretion of drugs**	K	KH	Y	Lecture	5	Written / Viva voce	
	At the end of the session the student should be able to: 1. Define the term Pharmacokinetics (PK) 2. Explain the four phases of PK							

	3. Explain why PK is important to prescribers Drug Absorption 1. Explain the principles involved in drug absorption 2. Explain the concept of bioavailability and describe the factors affecting bioavailability 3. Explain the importance of bioequivalence							
	Drug Distribution 1. Describe the distribution of drugs in the body 2. Define apparent volume of distribution 3. Explain the clinical significance of drug distribution 4. Explain the clinical significance of plasma protein binding of drugs 5. Describe redistribution of drugs with clinical application							
	Biotransformation 1. Define biotransformation 2. Describe first pass metabolism and its importance 3. Describe phase 1 and phase 2 reactions 4. Explain factors affecting biotransformation **5.** Explain the clinical significance of enzyme induction and inhibition							
	Drug Excretion: 1. Describe the various routes of excretion of drugs 2. Explain factors affecting renal							

	excretion 3. Explain plasma half-life and its clinical significance 4. Explain steady state concentration and its significance 5. Explain the different kinetics of elimination and their clinical significance 6. calculate the dose for a patient using clearance, loading dose and maintenance dose. 7. Explain various methods of prolonging drug action 8. Explain the PK factors that determine the choice of dose, route, and frequency of Drug administration.							
PH 1.5	**Describe general principles of mechanism of drug action**	K	KH	Y	Lecture Lecture / Small group discussion SGD	4	Written / Viva voce	
	At the end of the session the student should be able to: Describe the concept of Pharmacodynamics 1. Mention different mechanisms by which a drug acts giving an example of each 2. Enlist different types of receptors giving examples of drugs acting through them 3. Explain the terms – 'up regulation' and 'down regulation' of receptors 4. Explain the terms –affinity, efficacy, intrinsic activity &potency. 5. Define the terms –agonist, antagonist, partial agonist & inverse agonist. Give examples of drugs for							

	each							
	1. Describe dose-response relationship and interpret dose- response curves 2. Explain drug synergism with examples 3. Describe the different types of drug antagonism with examples 4. 4.Describe factors modifying drug action and its clinical implications 5. Explain therapeutic index and therapeutic range with clinical significance							
PH 1.6	**Describe principles of Pharmacovigilance& ADR reporting systems.**	K	KH	Y	SGD SGD	1	Written / Viva voce	
	1. Define the basic terminologies (ADR, Serious ADR, AE, Toxicity, Pharmacovigilance and Causality assessment) 2. Explain the history, need and principles of pharmacovigilance 3. Discuss various methods/systems of ADR reporting 4. Discuss Pharmacovigilance program of India 5. Report ADRs to a Pharmacovigilance Centre by filling the ADR reporting form 6. Discuss the role of doctors' responsibility in Pharmacovigilance,							
PH 1.7	**Define, identify and describe the management of adverse drug reactions (ADR)**	K/S	KH	Y	SGD	1	Written / Viva voce	
	1. Define an ADR 2. Explain the frequency of ADRs and							

	their impact on public health 3. Describe the common classification of ADRs with examples 4. Describe the management of ADRs. 5. Describe the important risk factors that predict susceptibility to ADRs. 6. Explain the importance of monitoring in prevention of ADRs.							
PH 1.8	**Identify and describe the management of drug interactions**	K/S	KH	Y	SGD	1	Written / Viva voce	
	1. Define Drug interactions. 2. Describe the types of Drug interactions as In vivo, In vitro & PK and PD with suitable examples 3. Describe the useful and harmful drug interactions with suitable examples 4. Describe Drug–drug; drug-food; Drug-alcohol; drug–tobacco; Drug-complementary/alternative medicine interactions with examples 5. Discuss how to predict and avoid harmful drug interactions in clinical practice 6. Management of DI. 7. Identify the sources of information about DI to inform prescribing				SGD			
PH 1.9	**Describe nomenclature of drugs i.e. generic, branded drugs**	K/S	KH	Y	SGD	1	Written / Viva voce	
	At the end of the session, student should be able to							

	1. Describe the chemical name, nonproprietary and Proprietary name of a drug **2.** Discuss the importance of using nonproprietary name in prescribing.							
PH 1.10	**Describe parts of a correct, complete and legible generic prescription. Identify errors in prescription and correct appropriately**				SGD			
	At the end of the session, student should be able to 1. Define a prescription along with the importance of each part of prescription 2. Describe the format of prescription as per MCI model. 3. Write an unambiguous, legible, complete and legally valid prescription 4. Identify and correct prescription writing errors 5. Describe the importance of maintaining records of prescriptions.	K/S	KH	Y		1	Written / Viva voce	
PH 1.11	**Describe various routes of drug administration, eg., oral, SC, IV, IM, SL**				SGD			
	1. List the various routes of drug administration-oral, parenteral and topical with examples 2. Describe the merits and de-merits of each route **3.** Choose the correct route of drug administration in a given clinical scenario	K/S	KH	Y		1	Written / Viva voce	
PH 1.12	**Calculate the dosage of drugs using appropriate formulae for an individual**	K/S	KH	Y	SGD	1	Written / Viva voce	

	patient, including children, elderly and patient with renal dysfunction							
	At the end of the session, student should be able to. 1. Calculate appropriate doses for individual patients based on age, body weight, and surface area. 2. Calculate the dose of drug using appropriate formulae in a given clinical case in children 3. Calculate the dose of drug using appropriate formulae in a given clinical case in elderly 4. Calculate the dose of drug using appropriate formulae in a given clinical case in patients with renal dysfunction and other pathological conditions like CCF, Liver disease.							
PH 1.13	**Describe mechanism of action, types, doses, side effects, indications and contraindications of adrenergic and anti-adrenergic drugs**	K/S	KH	Y	Lecture SGD	6 3	Written / Viva voce	
	1. Describe about the organization of ANS 2. Describe the steps involved in neurotransmission 3. Describe the synthesis, storage, release and fate of adrenergic transmitters 4. Classify adrenergic receptors with respect to their structure, localization and second messenger system							
	1. Classify adrenergic agonists based							

	on their therapeutic uses and actions. 2. Describe the pharmacological effects of adrenaline and correlate the effects of their therapeutic uses and adverse effects 3. Mention the salient Pharmaco-kinetic features of adrenaline 1. Differentiate between adrenaline, nor-adrenaline, isoprenaline and dopamine with respect to pharmacological effects, adverse effects and therapeutic uses. (Enumerate the Adverse effects, therapeutic uses and contraindication of most commonly used Adrenergic Drugs in therapy.) 2. Compare and contrast directly and indirectly acting sympathomimetics with examples 3. Mention the therapeutic uses and ADRs of indirectly acting sympathomimetics 4. Mention the precautions and contraindications of sympathomimetics 1. Classify alpha-adrenergic receptor antagonists, and compare and contrast selective alpha1 antagonists with non-selective alpha antagonists 2. Describe the pharmacological effects and applied pharmacokinetics, ADRs, precautions and therapeutic uses of prazosin 3. Mention the advantages of other							

	selective alpha1 antagonists over prazosin, co-relating the same with their therapeutic use							
	1. Classify beta-adrenergic receptor antagonists with examples 2. Describe the pharmacological effects, pharmacokinetics, ADRs, precautions and contra-indications of beta-adrenergic receptor antagonists 3. Mention the therapeutic uses of beta- blockers giving pharmacological basis for their use							
	1. Mention the advantages of selective beta1 antagonists over non selective beta antagonists corelating the same with their therapeutic uses and ADRs 2. Mention the beta blockers with (ISA) intrinsic sympathomimetic activity giving their advantages and indications 3. Mention the beta blocker of choice with Rationale for the following clinical conditions-Glaucoma, CHF, angina, hypertension, thyrotoxicosis, pheochromocytoma, arrhythmias 4. List the various preparations of beta							

	blockers with their routes of administration. (State the beta-blockers that can be given by IV route)							
PH 1.14	**Describe mechanism of action, types, doses, side effects, indications and contraindications of cholinergic and anticholinergic drugs**							
	At the end of the session, student should be able to 1. Explain the synthesis, storage, release and fate of cholinergic transmitters 2. List the sites where acetylcholine is released 3. Classify cholinergic receptors with their structure, localization and second messenger system 4. Classify cholinomimetic drugs 5. Describe the pharmacological effects of directly acting cholinomimetic drugs 6. Compare the effects of muscarinic agonists on the basis of selectivity and therapeutic uses, adverse effects and contraindications	K	KH	Y	Lecture	3	Written / Viva voce	
	7. Describe the metabolism of acetyl choline 8. Classify anti-cholinesterase agents 9. Compare the various reversible anti-cholinesterase's with respect to their pharmacological properties and therapeutic uses 10. Describe the management of myasthenia gravis							

	12. Mention the signs and symptoms of organophosphate compound poisoning 13. Describe the treatment of organophosphorus poisoning with rationale 14. Explain the term enzyme aging and its clinical significance 15. Explain how the treatment of organochlorine compound poisoning differs from that of organophosphate compound poisoning							
	16. Classify cholinergic receptor antagonists giving examples of muscarinic and nicotinic (Nn: ganglion, Nm: Neuromuscular) blockers 17. List the anticholinergic side effects 18. Compare and contrast atropine and hyoscine 19. Mention the salient pharmacokinetic features of atropine and its Substitutes 20. List the adverse drug reactions of anticholinergic drugs 21. List the contraindications to anticholinergic drugs 22. Mention the advantages of atropine substitutes over atropine and state their clinical uses giving suitable examples 23. List the major clinical indications of atropine							
PH	**Describe mechanism/ s of action, types,**	K	KH	Y		1	Written / Viva	

1.15	**doses, side effects, indications and contraindications of skeletal muscle relaxants**				Lecture		voce	
	1. Define skeletal muscle relaxant. 2. Classify skeletal muscle relaxants. 3. Explain mechanisms of action of skeletal muscle relaxants 4. Compare and contrast (competitive) non-depolarizing blockers and persistent depolarizing blockers. 5. Describe the pharmacokinetics of skeletal muscle relaxants. 6. Mention the Uses of skeletal muscle relaxants. 7. Describe the important drug interactions and adverse effects that occur with skeletal muscle relaxants. 8. Discuss the advantages of newer neuromuscular blockers over the older ones. 9. Compare centrally and peripherally acting skeletal muscle relaxants.							
PH 1.16	**Describe mechanism/ s of action, types, doses, side effects, indications and contraindications of the drugs which act by modulating autacoids, including: anti-histaminics, 5-HT modulating drugs, NSAIDs, drugs for gout, anti-rheumatic drugs, drugs for migraine**	K	KH	Y	Lecture SGD SDL	3 4 1	Written / Viva voce	
	1. Describe the role of histamine and bradykinin in various physiological and pathophysiological processes. 2. Describe the mechanisms of action of drugs that act as antagonists of the H1 receptor. 3. Mention the therapeutic utility of H1-							

	receptor antagonists, alone and in combination with other agents. 4. Mention the important adverse effects of H1-receptor antagonists, and the difference between first- and second-generation H1 antihistamines with regard to adverse effects. 5. Outline the treatment of vertigo							
	At the end of this theory session student should be able to 1. Describe the synthesis, storage and destruction of 5-Hydoxytryptamine. 2. Enlist and describe the salient features of important 5-HT receptor sub types. 3. Describe the pharmacological actions and pathophysiological roles of 5-Hydroxytryptamine 4. Describe drugs affecting 5HT system. 5. Discuss the mechanism of action, uses and side effects of 5HT modulating drugs. 6. Describe the pathophysiology of migraine. 7. Describe the mechanism of action, adverse effects, contraindications and important drug interactions of anti-migraine drugs 8. Describe the management of migraine and the drugs used for prophylaxis of migraine.							
	At the end of this theory session student should be able to 1. Classify Non-steroidal Anti-inflammatory drugs based on							

	selectivity of COX enzyme. 2. Explain mechanisms of action of NSAIDs. 3. Compare and contrast features of nonselective COX inhibitors and selective COX -2 inhibitors and enumerate the concerns with selective COX 2 inhibitors. 4. Describe pharmacokinetics and pharmacological actions of NSAIDs. 5. Describe the therapeutic uses of NSAIDs and enumerate doses of most commonly used NSAIDs. 6. List out the adverse effects, drug interactions and necessary precautions and contraindications to be followed with NSAIDs. 7. Outline the management of Salicylate poisoning and Paracetamol poisoning. 8. Describe guidelines for choice of non-steroidalanti-inflammatory drugs. 9. Enumerate the analgesic combinations in common use and discuss about topical NSAIDS. 10. Discuss the rationality of analgesic combinations and topical NSAIDs.							
	At the end of this theory session student should be able to 1. Explain pathophysiology of rheumatoid arthritis and understand the goals of drug therapy in rheumatoid arthritis. 2. Classify drugs used in rheumatoid							

	arthritis. 3. Describe the mechanism of action and pharmacological actions of antirheumatic drugs 4. Describe the adverse effects of antirheumatic drugs and enumerate the doses of commonly used antirheumatic drugs. 5. Explain the pathophysiology of Gout. 6. Classify drugs used for Gout. 7. Describe mechanism of action and pharmacological actions of drugs used for Gout. 8. Describe the therapeutic uses of drugs used for Gout and enumerate the doses of commonly used drugs for Gout. 9. Discuss the adverse effects, precautions and contraindications of drugs used for Gout. 10. Explain the management of Gout.							
PH 1.17	**Describe the mechanism/ s of action, types, doses, side effects, indications and contraindications of local anesthetics**							
	At the end of this theory session student should be able to 1. Define local anesthetics. 2. Classify local anaesthetics. 3. Differentiate between the features of general and local anesthesia. 4. Compare features of amide linked local anaesthetics and ester linked local anaesthetics. 5. Describe mechanism of action, local and systemic actions of local anaesthetics.	K	KH	Y	Lecture	1	Written / Viva voce	

	6. Describe pharmacokinetics and enumerate the doses of commonly used local anaesthetics. 7. Describe the adverse effects, precautions and drug interactions with local anaesthetics. 8. Describe the indications for local anaesthetics and various dosage forms of lignocaine. 9. Describe the techniques of administration of local anaesthetics and their relevance in clinical practice. 10. Explain the complications of spinal anaesthesia. 11. Explain rationale of combining local anaesthetics with adrenaline and clinical significance							
PH 1.18	**Describe the mechanism/ s of action, types, doses, side effects, indications and contraindications of general anesthetics , and pre- anesthetic medications**	K	KH	Y	Lecture	2	Written / Viva voce	
	At the end of this theory session student should be able to 1. Define general anaesthesia and explain stages of General Anaesthesia. 2. Describe the mechanisms of action of general anaesthetics. 3. Enumerate the properties of ideal general anaesthetics 4. Classify general anaesthetics 5. Explain the pharmacokinetics of general anaesthetics. 6. Describe the pharmacological actions and important adverse							

	effects of general anaesthetics. 7. Enumerate the complications and the important drug interactions with general anaesthetics. 8. Define preanaesthetic medication with the aims of preanaesthetic medication and rationality of use of drugs as preanaesthetic medication. 9. Describe about balanced anaesthesia and its components 10. Compare and contrast nitrous oxide and halothane 11. Enumerate intravenous anaesthetic agents							
PH 1.19	**Describe the mechanism/ s of action, types, doses, side effects, indications and contraindications of the drugs which act on CNS, (including anxiolytics, sedatives & hypnotics, anti- psychotic, anti-depressant drugs, anti- maniacs, opioid agonists and antagonists, drugs used for neurodegenerative disorders, anti-epileptics drugs)**	K	KH	Y	Lecture SGD	8 1	Written / Viva voce	
	At the end of this theory session student should be able to 1. Define Sedatives and Hypnotics. 2. Describe the different phases of Sleep. 3. Classify Sedative and Hypnotics. 4. Describe the mechanism of action, pharmacokinetics and pharmacological actions of Sedative hypnotics. 5. Describe adverse effects and precautions with long term use and							

	important drug interactions with Sedative and Hypnotics. 6. Describe therapeutic uses of Sedative and Hypnotics. 7. Describe the management of different types of Insomnia. 8. Describe the management of Sedative and Hypnotic overdose. 9. Discuss the use of melatonin for disturbed biorhythms and sleep disorders. 10. Define Anxiety and Anxiolytics. 11. Classify Anxiolytics. 12. Describe pharmacological actions of Anxiolytics. 13. Describe the management of Anxiety 14. Enumerate doses of commonly used sedative hypnotics & anxiolytics.							
	At the end of this theory session student should be able to 1. Define Psychosis. And enumerate the different types of Psychiatric illness. 2. Explain the pathophysiology of Psychoses. 3. Classify Psychotropic drugs and Antipsychotic drugs. 4. Describe the pharmacokinetics, mechanism of action and pharmacological actions of Antipsychotic drugs. 5. Describe the adverse effects and drug interactions of Antipsychotic drugs. 6. Describe the therapeutic uses of							

	Antipsychotic drugs. 7. Explain the advantages of second-generation Antipsychotics over conventional drugs.							
	At the end of this theory session student should be able to 1. Define Depression. 2. Explain the pathophysiology of Depression. 3. Classify Antidepressant drugs. 4. Describe the mechanism of Antidepressant action. 5. Describe the pharmacokinetics and pharmacological actions of Antidepressants. 6. Describe the adverse effects and drug interactions with Antidepressants. 7. Outline the management of acute poisoning with tricyclic antidepressants. 8. Describe therapeutic uses of Antidepressants including those other than depression. 9. Define Mania. 10. Explain the pathophysiology of Mania. 11. Classify Antimanic drugs. 12. Describe mechanisms of action of Lithium. 13. Describe the pharmacokinetics and pharmacological actions of Lithium. 14. Describe the adverse effects and drug interactions of Lithium. 15. Describe the therapeutic uses of							

	Lithium and newer drugs used for mania with their status in management of mania 16. Describe Psychotomimetic drugs.							
	At the end of this theory session student should be able to 1. Define Algesia (Pain). 2. Define and Classify Analgesics. 3. Classify Opioid Agonists and Antagonists. 4. Describe mechanism of action of Opioid Analgesics. 5. Describe pharmacokinetics and pharmacological actions of Opioid Analgesics. 6. Describe adverse effects, precautions and contraindications with Opioid analgesics. 7. Describe types of Opioid receptors. 8. Explain about complex action Opioids-Nalorphine, Pentazocine, Butorphanol, Nalbuphine, Buprenorphine. 9. Describe pure Opioid antagonists and their therapeutics uses. 10. Enumerate endogenous Opioid peptides. 11. Discuss opioid deaddiction Explain treatment of morphine poisoning							
	At the end of this theory session student should be able to 1. Describe Epilepsy and the types of Epilepsy. 2. Classify Antiepileptic drugs. 3. Explain the pathophysiology of Epilepsy.							

	4. Describe mechanism of action and pharmacological actions of Antiepileptic drugs. 5. Describe the adverse effects and important drug interactions of Antiepileptic drugs. 6. Explain the management of different types of Epilepsy including Status Epilepticus. 7. Enumerate the doses of commonly used Antiepileptic drugs. 8. Mention the non-epileptic uses of anti-epileptic drugs							
	At the end of this theory session the phase II MBBS student should be able to 1. Describe Parkinsonism and its pathophysiology. 2. Classify Antiparkinsonian drugs. 3. Describe mechanism of action of Antiparkinsonian drugs. 4. Describe pharmacokinetics and pharmacological actions of Antiparkinsonian drugs. 5. Describe the adverse effects and their management, important drug interactions of Levodopa.Describe Alzheimer's disease and its pathophysiology. 6. Classify Cognition enhancers. 7. Describe drugs used in Alzheimer's disease.							
PH 1.20	**Describe the effects of acute and chronic ethanol intake**	K	KH	Y		1	Written / Viva voce	
	At the end of this theory session student should be able to							

	1. Describe pharmacological actions of ethanol. 2. Describe the pharmacokinetics of ethanol. 3. Describe the important drug interactions with ethanol . 4. Describe drugs used in alcohol deaddiction 5. Explain the therapeutic uses of alcohol.				SGD			
PH 1.21	**Describe the symptoms and management of methanol and ethanol poisonings**	K	KH	Y	SGD	1	Written / Viva voce	
	At the end of this theory session the phase II MBBS student should be able to 1. Describe the symptoms of methanol poisoning. 2. Explain the mechanism of methanol poisoning. 3. Describe the management of methanol poisoning. 4. Describe the symptoms of ethanol poisoning. 5. Explain the mechanism of ethanol poisoning. 6. Describe the management of ethanol poisoning.							
PH 1.22	**Describe drugs of abuse (dependence, addiction, stimulants, depressants, psychedelics, drugs used for criminal offences)**	K	KH	Y		1	Written / Viva voce	
	At the end of the session the student must be able to 1. Define drug addiction and drug dependence. 2. List the pharmacological classes of drugs of abuse.							

	3. Classify the drugs of abuse based on the CNS effects (stimulants, depressants, hallucinogens) with examples. 4. List out hallucinogens. 5. Describe the source, pharmacological effects. withdrawal symptoms and the management of cocaine addiction. 6. Describe the source, pharmacological effects. withdrawal symptoms and the management of barbiturate addiction. 7. Describe the source, signs and symptoms and withdrawal symptoms of morphine addiction and its management. 8. Describe the source, signs and symptoms of addiction to and withdrawal symptoms and management of cannabis addiction, 9. Enumerate the drugs of abuse associated with criminal offences. 10. Enumerate club drugs, the signs and symptoms of their addiction, withdrawal symptoms and management of their addiction.				SGD			
PH 1.23	**Describe the process and mechanism of drug deaddiction** At the end of the session the student must be able to 1. Outline the general principles and steps in the management of drug deaddiction. 2. Explain the mechanism of action of the drugs used in drug deaddiction	K/S	KH	Y	SGD	1		Written / Viva voce

PH 1.24	**Describe the mechanism/ s of action, types, doses, side effects, indications and contraindications of the drugs affecting renal systems including diuretics, antidiuretics-vasopressin and analogues** At the end of the session,the student must be able to 1. Explain the transport of electrolytes at proximal convoluted tubule, 2. loop of Henle, distal convoluted tubule and the collecting duct. 3. Classify diuretics based on their efficacy with examples 4. Mention the site of action of all classes of diuretics. 5. Explain the mechanism of action, pharmacological actions and adverse effects of Thiazide diuretics. 6. Explain the mechanism of action, pharmacological actions and adverse effects of Loop diuretics. 7. Explain themechanism of action and pharmacological actions and adverse effects of potassium sparing diuretics. 8. Explain the mechanism of action and pharmacological actions and adverse effects of osmotic diuretics 9. Describe the therapeutic uses of diuretics with their rationale. 10. Describe briefly the carbonic anhydrase inhibitors and their current uses. 11. Enumerate doses, routes of administration and preparations of	K	KH	Y	Lecture SDL	3 1		Written / Viva voce

	hydrochlorthiazide, furosemide,amiloride, eplerenone, triamterene 12. Classify vasopressin receptors. 13. Describe the physiological actions of Vasopressin 14. Classify anti-diuretic drugs. 15. Enumerate the vasopressin analogues 16. Describe the adverse effects of Vasopressin. 17. Describe the therapeutic uses of Vasopressin and its analogues explaining the rationale behind their use 18. . Mention vasopressin antagonist and its clinical uses							
PH 1.25	**Describe the mechanism/ s of action, types, doses, side effects, indications and contraindications of the drugs acting on blood, like anticoagulants, antiplatelets, fibrinolytics, plasma expanders** (Coagulants and anti-coagulants) At the end of the session the student must be able to 1. Describe the coagulation cascade 2. Define the role of coagulants with examples 3. Enumerate the coagulants used clinically 4. Explain the mechanism of anti-coagulant action, adverse effects and therapeutic uses of Vitamin.K 5. Classify anti-coagulants based on their mechanism of action with	K	KH	Y	Lecture SDL	3 1	3 1	Written / Viva voce

	examples. 6. Describe the pharmacological actions, pharmacokinetics and adverse effects of Heparin 7. Explain the therapeutic uses and contraindications to Heparin. 8. Describe the advantages and disadvantages of low molecular weight heparin 9. Enumerate the preparations, routes and dose of Heparin. 10. Describe the treatment of Heparin overdose 11. Compare the anticoagulant actions of Heparin with fondaparinux 12. Describe the mechanism of action, pharmacokinetics and actions of Warfarin. 13. Describe the adverse effects and therapeutic uses of Warfarin. 14. Explain the dose regulation and monitoring of patients while on anti-coagulants with reference to parameters such as INR and APTT. 15. Explain the Drug interactions of warfarin 16. Mention the examples of Direct factor X a inhibitors and explain their advantages over Warfarin. 17. Explain the advantages and disadvantages of dabigatran over warfarin as anti-coagulant Describe how anticoagulant therapy is monitored							
	1.25.2.(Fibrinolytic drugs and antifibrinolyticdrugs).							

	At the end of the session, the students must be able to 1. Define fibrinolysis and its mechanisms 2. Enumerate fibrinolytics 3. Describe the actions, adverse effects and advantages of alteplase over streptokinase 4. Describe the therapeutic uses of fibrinolytics 5. Describe the contra-indications to fibrinolytics 6. Describe antifibrinolytic and its application Explain the mechanism of action, indications and therapeutic uses of Tranexamic acid							
	At the end of the session the student must be able to 1. Define the functions of platelets in cardiovascular diseases 2. Classify anti-platelet drugs based on their mechanisms of action with examples 3. Compare aspirin, dipyridamole and clopidogrel as anti-platelet agents 4. Describe the therapeutic uses of anti-platelet agents with the rationale for their use in the conditions mentioned 5. Describe the indications for the use of newer antiplatelet agents Compare the newer anti-platelet drugs with aspirin							
	At the end of the session the student must be able to 1. Define plasma expanders							

	2. Classify plasma expanders with examples 3. Describe the mechanism of actions of crystalloids and colloids 4. Explain the detailed composition of crystalloids 5. Compare crystalloids and colloids 6. Describe the adverse effects and precautions while using plasma expanders 7. Describe the therapeutic uses of plasma expanders							
PH 1.26	**Describe mechanism s of action, types, doses, side effects, indications and contraindications of the drugs modulating the renin- angiotensin and aldosterone system** At the end of the session, the student must be able to 1. Explain the physiology of renin angiotensin system 2. Describe the pathophysiological actions of Angiotensin-II with reference to the location of its receptors 3. Enumerate the drugs that modulate Renin angiotensin system 4. Enumerate the Angiotensin converting enzyme inhibitors (ACEIs) 5. Describe the mechanism of action and pharmacological actionsof Angiotensin converting enzyme inhibitors 6. Describe the adverse effects and therapeutic usesof ACE inhibitors explaining the rationale for their uses 7. Mention the route, dose and preparations of enalapril, Lisinopril	K	KH	Y	SDL **Lecture**	**2** **1**	Written / Viva voce	

	8. Enumerate Angiotensin receptor blockers (ARBs) used clinically 9. Describe the pharmacological actions, adverse effects, and therapeutic uses of ARBs 10. Describe the advantages of ARBs over ACEIs 11. Explain the mechanism of action, pharmacokinetics therapeutic uses and adverse effects ofAliskiren							
PH 1.27	**Describe the mechanism s of action, types, doses, side effects, indications and contraindications of antihypertensive drugs and drugs used in shock** At the end of the session the student must be able to 1. Define the categories of hypertension as per JNC 7 and JNC 8 criteria 2. Describe the pathophysiology of hypertension 3. Classify anti-hypertensives with examples 4. Describe the mechanism of antihypertensive action, anti-hypertensive effects, adverse effects and drug interactions dose, routes of administration and uses of Diuretics in hypertension 5. Describe the mechanism of antihypertensive action, anti-hypertensive effects, adverse effects, drug interactions, dose, routes ofadministration and uses of ACE inhibitors in hypertension 6. Describe the mechanism of	K	KH	Y	Lecture SGD	2 1	Written / Viva voce	

	antihypertensive action, anti-hypertensive effects, adverse effects, drug interactions, dose routes of administration and uses of calcium channel blockers in hypertension 7. Describe the mechanism of antihypertensive action, anti-hypertensive effects, adverse effects, drug interactions, dose routes of administration and uses of beta blockers in hypertension 8. Enumerate the sympatholyticused in the management of hypertension 9. Explain the mechanism of action, adverse effects and indications for the use of sympatholytic 10. Explain the management of hypertensive crisis 11. Describe the mechanism of antihypertensive action, anti-hypertensive effects, adverse effects, drug interactions, and use of alpha `blockers in hypertension. 12. Describe the mechanism of antihypertensive action, anti-hypertensive effects, adverse effects, drug interactions, dose routes and uses of Vasodilators in hypertension 13. Describe which drugs are most effective in treating individual hypertensive patients with specific comorbidities, including diabetes mellitus, congestive heart failure, and renal disease.							
	At the end of the session, the student must be able to				Small group discussion	1	Written / Viva voce	

	1. Define shock 2. Enumerate the types of shock 3. Explain the pathophysiology of shock 4. Describe the pharmacological management of anaphylactic shock explaining the rationale for the use of drugs used in the management 5. Describe the pharmacological management of hypovolemic shock explaining the rationale for the use of drugs used in the management 6. Describe the pharmacological management of cardiogenic shock explaining the rationale for the use of drugs used in the management				On clinical case scenarios			
PH 1.28	**Describe the mechanism s of action, types, doses, side effects, indications and contraindications of the drugs used in ischemic heart disease (stable, unstable angina and myocardial infarction), peripheral vascular disease**							
	At the end of the session the student must be able to 1. Define angina pectoris 2. Explain the various types of angina pectoris describing their underlying pathology 3. Classify anti-anginal drugs 4. Describe the mechanism of action, pharmacological actions, adverse effects and therapeutic uses of nitrates 5. Describe the routes of administration, doses and preparations of Nitrates	K	KH	Y	Lecture SGD	2 1	Written / Viva voce	

	6. Classify Calcium channel blockers. 7. Describe the mechanism of action, pharmacological actions, adverse effects and therapeutic uses of calcium channel blockers 8. Mention the routes of administration, doses and preparations of Nifedipine and amlodipine 9. Mention the unique features of Felodipine, Nitrendipine, Cilnidipine, Nicardipine and Nimodipine 10. Compare Dihydropyridines with Phenylalkylamines 11. Describe the anti-anginalactions, adverse effects and contra-indications to beta blockers 12. Describe the mechanism of action,anti-anginalactions, adverseeffects and the indication for the use of potassium channel openers(nicorandil) in angina pectoris 13. Describe the anti-anginal actions and indications for the use of Trimetazidine in angina pectoris 14. Describe the anti-anginal actions and indications for the use of Ranolazine in angina pectoris **15.** Describe the anti-anginal actions and indications for the use of Ivabradine angina pectoris							
	At the end of the session the student must be able to 1. Explain the pathophysiology of myocardial infarction							

	2. Explain the steps in the use of drugs in myocardial infarction with the rationale for using them							
	At the end of the session the student must be able to 1. Describe the pathophysiology of peripheral vascular disease (PVD) 2. Classify the drugs used in PVD 3. Describe the mechanism of action, pharmacological actions, adverse effects, dose and uses of Pentoxyphilline. **4.** Describe the mechanism of action, pharmacological actions, adverse effects, dose and uses of Cilostazol							
PH 1.29	**Describe the mechanism s of action, types, doses, side effects, indications and contraindications of the drugs used in congestive heart failure** At the end of the session, student should be able to 1. Describe the stages of heart failure and the treatments that are recommended at each stage. 2. Describe the rationale for the use of drugs that prevent and slow the progression of heart failure 3. Describe the mechanism of action of inotropic drugs and how they are used to maintain left ventricular function. 4. Identify the major side effects and adverse drug reactions of the drugs used to treat heart failure. **5.** Describe the Management of Digitalis Toxicity	K	KH	Y	Lecture	1	Written / Viva voce	

PH 1.30	**Describe the mechanism s of action, types, doses, side effects, indications and contraindications of the antiarrhythmics NON-CORE** At the end of the session, student should be able to 1. Describe the principles of cardiac electrophysiology especially the ion channels, exchangers, and pumps that are targets of antiarrhythmic drugs. 2. Describe the mechanisms that cause cardiac arrhythmias. 3. Describe the common and important tachyarrhythmias and their mechanisms. 4. Classify antiarrhythmic drugs. 5. Describe the mechanisms of antiarrhythmic drugs. 6. Describe the pharmacological actionspharmacokinetics, and adverse effects of specific antiarrhythmic agents.	K	KH	N	SDL Lecture	1	Written / Viva voce	
PH 1.31	**Describe the mechanism s of action, types, doses, side effects, indications and contraindications of the drugs used in the management t of dyslipidemias** At the end of the session, student should be able to 1. Describe lipid metabolism, different classes of lipoproteins and their formation 2. Describe the pathophysiology of primary and secondary hyperlipidemias	K	KH	Y	Lecture SDL	1	Written / Viva voce	

	3. Mention the classification of hypolipidemic drugs based on mechanism of action 4. Describe the mechanism of action, pleiotropic effects, indications adverse effects, drug interactions of statins 5. Compare the features of all statins 6. Describe the mechanism of action, indications adverse effects, drug interactions of Resins, ezetimibe, niacin, fibric acid derivatives 7. Describe the combination therapy in dyslipidemia 8. Discuss which patients with dyslipidemias should be treated and when treatment should be initiated. 9. Discuss which drugs are most effective in treating patients with different dyslipidemias. 10.Describe the non-pharmacological treatment including natural agents							
PH 1.32	**Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in bronchial asthma and COPD** At the end of the session, student should be able to 1. Describe the pathophysiology of Bronchial Asthma and COPD 2. Classification of anti-asthmatic drugs 3. Discuss the mechanism of action, pharmacokinetics, Adverse effects, status, merits and demerits of beta2 agonists, methyl xanthine's, corticosteroids, anti-cholinergic,	K	KH	Y	Lecture	2	Written / Viva voce	

	mast cell stabilizers, leukotriene antagonists, anti IgE antibodies in asthma. Discuss inhaled medication in bronchial asthma 1. Describe the step wise management of Bronchial asthma (GINA guidelines) 2. Describe the management of acute severe asthma with the help of a case scenario 3. Enumerate the various inhalational devices available in India, 4. Describe the advantages and disadvantages of MDI, Rota haler, use of spacer, nebulizer							
PH 1.33	**Describe the mechanism of action, types, doses, side effects, indications and contraindications of the drugs used in cough (antitussive s, expectorant s/ mucolytics)** At the end of the session, student should be able to 1. Enumerate various causes of cough 2. Classify the drugs used in cough 3. Explain the mechanism of action, indications and adverse effects of pharyngeal demulcents, expectorants, mucolytics and anti-tussive with examples	K	KH	Y	SGD	1	Written / Viva voce	
PH 1.34	**Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used as below:** **1. Acid- peptic disease and GERD**	K	KH	Y	Lecture SGD SDL	1 3 1	Written / Viva voce	

	2. Antiemetics and prokinetics **3. Antidiarrheals** **4. Laxatives** **5. Inflammatory Bowel Disease** **6. Irritable Bowel Disorders, biliary and intestinal colic**							
	At the end of the session, student should be able to 1. Explain the physiology of vomiting and role of various neurotransmitters 2. Classification of anti-emetics based on mechanism of action 3. Describe the mechanism of action, pharmacological effects, adverse effects and indications of antidopaminergics, antihistaminic, anticholinergics, 5HT3 antagonists, NK1 antagonists, cannabinoid receptor antagonists, steroids which are used as antiemetics 4. Enumerate the drug of choice for various clinical scenarios, such as post-operative vomiting, cancer chemotherapy induced vomiting etc. 5. Enumerate drugs used in vomiting during pregnancy 6. Enumerate the drugs that cause emesis. Compare and contrast Metoclopramide and Domperidone							
	7. Pathophysiology of gastric acid secretion 8. Identify the sites in the gastric parietal cell where drugs act to							

	suppress acid secretion. 9. Describe the mechanism of action of proton pump inhibitors, H2 receptor antagonists, and prostaglandin analogs to suppress gastric acid secretion. 10. Describe the limitations to the use of H2 receptor antagonists in chronic acid suppression. 11. Identify potential drug interactions with proton pump inhibitors and H2 receptor antagonists. 12. Describe the mechanism of action of drugs that enhance gastric cytoprotecting. 13. Describe the recommendations for therapy of gastroesophageal reflux disease (GERD)							
	14. Explain the pathophysiology of constipation 15. Classify laxatives/purgatives 16. Explain the mechanism of action, indications, contra-indications and adverse effects of bulk laxatives, stool softener, stimulant purgative, osmotic purgative and 5HT4 agonists 17. Mention the laxative of choice in bedridden patients, pregnancy, post-operative, functional constipation							
	18. Classify antidiarrheal agents. 19. Enumerate the principles of management of Diarrhea with rationale for its composition 20. Discuss the advantages of New formula WHO-ORS versus the							

	older composition. 21. Explain the role of Zinc in pediatric diarrhea 22. Explain the mechanism of action, indications, contra-indications and adverse effects of opioids, anticholinergics, PG inhibitors, chloride channel inhibitor, racecadotril and probiotics 23. Explain the pathophysiology and pharmacotherapy of Irritable bowel syndrome 24. Explain the pathophysiology and pharmacotherapy of Inflammatory bowel disorderandacute pancreatitis. 25. Explain the pancreatic enzyme replacements and drugs that inhibit formation of gall stones							
PH 1.35	**Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in hematological disorders like:** **1. Drugs used in anemias** **2. Colony Stimulating factors** At the end of the session, student should be able to 1. Define anemias and describe the types and causes of anaemia 2. State the role of iron, its sources, requirements, iron absorption, factors that reduce and enhance iron absorption 3. List the oral and parenteral iron preparations with merits and demerits and specific indications	K	KH	Y	SDL SGD	1 2	Written / Viva voce	

	4. Define megaloblasticanaemia 5. Mention the role of vitamin B12, Folic acid, along with sources and daily requirements 6. Mention the vitamin B12 preparations 7. Mention the indications for use of erythropoietin 8. Describe the various types of colony stimulating factors with their approved indications (Cancer chemotherapy)							
PH 1.36	**Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in endocrine disorders (diabetes mellitus,thyroid disorders and osteoporosis)**	K	KH	Y	Lecture SGD SDL	3 1 1	Written - Viva voce	
	1. Describe the mechanisms of action of insulin and the oral antidiabetic drugs. 2. Describe the components for management of the diabetic patient including the goals of therapy. 3. Describe the pharmacotherapeutic options for the treatment of patients with type 1 or type 2 diabetes. 4. Describe the adverse effects of insulin and the oral antidiabetic drugs. 5. Describe the treatment of hypoglycemia. 6. Discuss the management of diabetic ketoacidosis and							

	hyperosmolar (nonketotic) coma							
	1. Discuss the principles of thyroid hormone regulation 2. Describe the diagnosis and treatment of hypothyroidism and hyperthyroidism, including during pregnancy. 3. Describe the treatment options for well-differentiated thyroid cancer.						Written - Long essay, Short Essay, MCQs, Viva voce	
	1. Describe calcium and phosphorous homeostasis. 2. Describe the roles of PTH, calcitonin, and vitamin D in calcium homeostasis. 3. Explain the concept of bone resorption and bone formation. 4. Describe the mechanism of action and untoward effects of bisphosphonates. 5. Describe the role of bisphosphonates in the prevention and treatment of osteoporosis. 6. Describe the pharmacological management of hypocalcemia and hypercalcemia.						Written - Long essay, Short Essay, MCQs, Viva voce	
PH 1.37	**Describe the mechanism of action, types, doses, side effects, indications and contraindications of the drugs used as sex hormones, their analogues and anterior Pituitary hormones** 1. Describe the functioning of the hypothalamic-pituitary axis. 2. Describe the pharmacotherapy of GH excess and GH deficiency. 3. Mention the clinical uses of				Lecture SGD	2 2	Written - Long essay, Short Essay, MCQs, Viva voce	

	gonadotropin-releasing hormone (GnRH) and its analogs. 4. Describe physiological secretion and regulation of androgens (natural and synthetic) 5. Describe mechanism of action, uses and adverse effects of different preparations of testosterone **6.** Explain mechanism of action, uses and adverse effects of anabolic steroids and anti-androgens **7.** Describe drug therapy of erectile dysfunction 1. Describe physiological secretion and regulation of estrogen and progesterone 2. Describe the therapeutic uses and ADRs of postmenopausal hormonal replacement therapy 3. Describe mechanism of action, uses and adverse effects of selective estrogen receptor modulators, antiestrogens and aromatase inhibitors 4. Describe mechanism of action, uses, adverse effects and contraindications of anti progestins 5. Explain various drugs used in treatment of infertility							

PH 1.38	**Describe the mechanism of action, types, doses, side effects, indications and contraindications of corticosteroids** 1. Physiology of biosynthesis, actions, hypo and hyper secretion of corticosteroids 2. Classify corticosteroid preparations 3. Describe distinctive features, uses, adverse effects and contraindications of various corticosteroid preparations	K	KH	Y	Lecture	1	Written / Viva voce	
PH 1.39	**Describe mechanism of action, types, doses, side effects, indications and contraindications the drugs used for contraception** 1. Female contraceptives preparations Explain all types with mechanism of action, uses adverse effects, contraindications and practical considerations of female contraceptives.	K	KH	Y	SGD	2	Written / Viva voce	
PH 1.40	**Describe mechanism of action, types, doses, side effects,indications and contraindications of** **1. Drugs used in the treatment of infertility, and** **2. Drugs used in erectile dysfunction** At the end of this theory session the student should be able to 1. Describe the causes of infertility 2. Enumerate drugs used in the treatment of infertility 3. Describe the mechanism of action	K	KH	Y	Lecture	2	Written / Viva voce	

	of drugs used in the treatment of infertility 4. Describe the therapeutic uses of drugs used in the treatment of infertility 5. Describe the precautions and contraindications of drugs used in the treatment of infertility 6. Describe the adverse effects of drugs used in the treatment of infertility 7. Describe the drug interactions of drugs used in the treatment of infertility 8. Describe the causes of erectile dysfunction 9. Enumerate drugs used in erectile dysfunction 10. Describe the mechanism of action of drugs used in erectile dysfunction 11. Describe the therapeutic uses of drugs used in erectile dysfunction							
PH 1.41	**Describe the mechanisms of action, types, doses, side effects, indications and contraindications of uterine relaxants and stimulant** At the end of the session the student must be able to a. Classify uterine stimulants b. Explain mechanism of action, uses, adverse effects and contraindications of each group c. Classify uterine relaxants. **d.** Explain mechanism of action, uses, adverse effects and contraindications	K	KH	Y	SGD	1	Written / Viva voce	

	of each group							
PH 1.42	**Describe general principles of chemotherapy** At the end of the session the student must be able to 1. Classify the chemotherapeutic agents based on chemical structure, mechanism of action, source 2. Describe common problems encountered with use of chemotherapeutic agents 3. Describe anti-microbial resistance and discuss monitoring of antimicrobial therapy 4. Enumerate the factors to be considered for choosing an antimicrobial agent 5. Mention the advantages and disadvantages of antimicrobial combination with examples Sulfonamides & Quinolones 1. Explain the mechanism of action of sulphonamide drugs. 2. Explain the various sulphonamide drugs and categorize them according to their absorption from the gastrointestinal (GI) tract. 3. Explain the therapeutic uses and untoward effects of sulphonamide drugs including trimethoprim-sulfamethoxazole. 4. Describe the therapeutic uses, mechanisms of action, and toxicities of quinolone antibiotic	K	KH	Y	Lecture SGD	5 3	Written / Viva voce	

	drugs. Beta lactams 1. Explain the mechanisms of action of the penicillins, cephalosporins, and other β-lactam antibiotics. 2. Explain the mechanisms of resistance of the penicillins, cephalosporins, and other β-lactam antibiotics. 3. Describe the therapeutic effects of the penicillins, cephalosporins, and other β-lactam antibiotics. Describe the untoward effects and contraindications of the penicillins, cephalosporins, and other β-lactam antibiotics.							
	Aminoglycosides 1. Explain aminoglycoside mechanisms of action and resistance. 2. Describe the advantages and disadvantages of multiple daily dosing versus once daily extended-interval dosing regimens for aminoglycosides. 3. Describe the rationale and the methods of plasma concentration monitoring of aminoglycoside therapy. 4. Describe the causes and clinical signs of aminoglycoside ototoxicity and nephrotoxicity and the best means of monitoring therapy to avoid these serious toxicities. 5. Explain the unique clinical differences among the							

	aminoglycosides.							
	Protein Synthesis Inhibitors and Miscellaneous Antibacterial Agents 1. Describe the mechanisms of action and resistance of tetracyclines, macrolides, vancomycin, linezolid, daptomycin, and quinupristin/dalfopristin 2. Describe the unique toxicities of antibiotics that are inhibitors of bacterial protein synthesis 3. Describe the uses and untoward reactions of vancomycin 4. Explain the drug–drug interactions that occur with some of these antibiotics 5. Explain how linezolid, daptomycin, and quinupristin/dalfopristin are used to treat methicillin-resistant and							

	vancomycin-resistant organisms							
PH 1.43	**Describe and discuss the rational use of antimicrobials including antibiotic stewardship program** 1. Enumerate the factors influencing the antimicrobial selection, duration and dose 2. Define appropriate empiric antimicrobial prescribing 3. Explain the mechanisms by which microorganisms develop antimicrobial resistance 4. Explain the impact of pharmacodynamics, pharmacokinetics, bioavailability on development of antimicrobial resistance with examples 5. Explain the principles of antimicrobial selection for a specific infectious condition	**K**	**KH**	**Y**	**SGD**	**4**	**Written / Viva voce**	

	6. Enumerate basic steps of prevention of antimicrobial resistance							
PH 1.44	**Describe the first line anti tubercular dugs, their mechanisms of action, side effects and doses** At the end of the session the student must be able to 1. Discuss pathophysiology of tuberculosis. 2. Enumerate various anti- tubercular drugs. 3. Describe the mechanism of action and resistance to anti tubercular drugs. 4. Describe the adverse effects and drug interactions commonly associated with anti-TB drugs. 5. Explain the rationale for combination drug therapy in the treatment of tuberculosis 6. Describe and discuss the salient features, diagnostic criteria and guidelines for treatment of tuberculosis under NTEP	K	KH	Y	Lecture	1	Written / Viva voce	

PH 1.45	**Describe the drugs used in MDR and XDR Tuberculosis** At the end of the session the student must be able to 1. Define MDR and XDR TB 2. List drugs, mechanism of action, indications, contraindications and adverse effects of drugs used in MDR and XDR Tuberculosis. 3. Explain the regimen for MDR and XDR tuberculosis	**K**	**KH**	**Y**	**Lecture**	**1**	**Written / Viva voce**	
PH 1.46	**Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antileprotic drugs** 1. Classify anti-leprosydrugs. 2. Describe the mechanism of action, ADE, DI of antileprotic drugs 3. Discuss the management of leprosy and treatment of Lepra reactions	**K**	**KH**	**Y**				
PH 1.47	**Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in malaria, KALA-AZAR, amebiasis and intestinal helminthiasis**	**K**	**KH**	**Y**	**Lecture** **SGD**	**4** **2**	**Written / Viva voce**	

	At the end of this theory session student should be able to: 1. Describe the stages of the malaria parasite in the human body. 2. Classify antimalarial drugs into those that are effective against only the blood stages of the parasite, those that are effective against both the blood and liver stages, and those that are effective against only the liver stages of the parasite. 3. Explain the use of antimalarial drugs in clinical context, particularly with regard to their mechanism of action, therapeutic uses, and toxicities. 4. Describe the principles and guidelines for the chemoprophylaxis and treatment of malaria. At the end of this theory session student should be able to 1. Enumerate drugs used in KALA-AZAR 2. Describe the mechanism of action and therapeutic uses of drugs used in KALA-AZAR 3. Describe the adverse effects , precautions and contraindications of drugs used in KALA-AZAR At the end of this theory session MBBS student should be able to: 1. Define amoebiasis 2. Discuss pathophysiology of amoebiasis							

	3. Enumerate drugs used for amoebiasis 4. Describe the mechanism of action of drugs used for amoebiasis 5. Describe the therapeutic uses of drugs used for amoebiasis 6. Describe the precautions and contraindications of drugs used for amoebiasis 7. Describe the adverse effects of drugs used for amoebiasis 8. Describe the drug interactions of drugs used for amoebiasis 9. Describe the management of amoebiasis At the end of this theory session student should be able to: 1. Describe the common helminth infections, the clinical symptoms, and the mainstays of therapy. 2. Describe the therapeutic uses of anthelmintic drugs. 3. Explain the mechanisms of actions of anthelmintic drugs. 4. Describe the toxicities and contraindications of anthelmintic drugs.							
PH 1.48	**Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in UTI/ STD and viral diseases including HIV & Antifungal drugs**	**K**	**KH**	**Y**	**Lecture SGD**	**3 2**	**Written / Viva voce**	

	At the end of this theory session student should be able to: 1. Define UTI 2. Discuss pathophysiology of UTI 3. Enumerate drugs used for UTI 4. Describe the mechanism of action of drugs used for UTI 5. Describe the therapeutic uses of drugs used for UTI 6. Describe the precautions and contraindications of drugs used for UTI 7. Describe the adverse effects of drugs used for UTI 8. Describe the drug interactions of drugs used for UTI . 9. Describe the management of UTI At the end of this theory session student should be able to: 1. Define STD 2. Enumerate common STDs 3. Enumerate drugs used in STDs. 4. Describe the mechanism of action of drugs used in STD 5. Describe the precautions and contraindications of drugs used in STD 6. Describe the adverse effects of drugs used in STD 7. Describe the drug interactions of drugs used in STD 8. Describe the management of STD Antifungal drugs 1. Describe the mechanisms of action and resistance of antifungal agents.							

	2. Describe the therapeutic uses of antifungal agents in the context of treatment for fungal diseases. 3. Develop knowledge of the common and unique toxicities of antifungal agents. 4. Explain the drug–drug interactions that can occur with the use of azole antifungal agents. At the end of this theory session student should be able to 1. Explain the treatment of herpes virus infections and the use of antiherpes drugs. 2. Discuss the treatment strategies for chronic hepatitis B and C infections. 3. Explain the mechanisms of action and resistance, and the therapeutic use of the anti-influenza agents. 4. Discuss the principles of HIV chemotherapy as per National guidelines including HAART regimen Describe the mechanisms of action and resistance, the untoward effects, and the therapeutic uses of the drugs used to treat HIV infections.							
PH 1.49	**Describe mechanism of action, classes, side effects, indications and contraindications of anticancer drug.** At the end of the session the student must be able to 1. Discuss the general principles in chemotherapy of Cancer 2. Classify anticancer drugs 3. Describe the mechanism of action	**K**	**KH**	**Y**	**Lecture**	**2**	**Written / Viva voce**	

	of Anticancer drugs 4. Describe the mechanisms of toxicity of cytotoxic antineoplastic agents on normal cells and strategies for reducing toxic effects. 5. Enumerate the classes of agents are typically used in treating specific cancers.							
PH 1.50	**Describe mechanisms of action, types, doses, side effects, indications and contraindications of immunomodulators and management of organ transplant rejection** At the end of the session the student must be able to 1. Differentiate between Immuno-suppressants and immuno-stimulants. 2. Define immunosuppressants& Classify immuno-suppressants 3. Describe the mechanisms of action of Calcineurininhibitors, 4. Enlist m-Tor inhibitors and antiproliferative agents used as immunosuppressants 5. Enlist Biological agents used as immunosuppressants 6. Enumerate the adverse effects of immunosuppressants 7. Enlist clinical uses of immunosuppressants	**K**	**KH**	**Y**	**Lecture**	**1**	**Written / Viva voce**	
PH 1.51	**Describe occupational and environmental pesticides, food adulterants, pollutants and insect repellents** At the end of the session the student	**K**	**KH**	**Y**	**SDL**	**1**	**Written / Viva voce**	

	must be able to 1. Define the various toxicology terms 2. Define occupational pesticides and enlist them 3. Explain environmental pesticide and its management 4. Enlist food adulterants 5. Enlist insect repellents							
PH 1.52	**Describe management of common poisoning, insecticides, common sting and bites**							
	1. Explain the general management of common poisoning 2. Enlist the specific antidotes used in treatment of common poisons 3. Explain the method of enhancing elimination of toxin using examples 4. Explain the management of Bee sting bite, Scorpion bite and Snake bite	**K**	**KH**	**Y**	**SGD**	**1**	**Written / Viva voce**	
PH 1.53	**Describe heavy metal poisoning and chelating agents** At the end of the session the student must be able to 1. Define Chelating agents and enlist Chelating agents used in Heavy metal poisoning 2. Describe the mechanism of action of Chelating agents 3. Mention the Chelating agents used in the management of Iron, Lead, Copper, and Arsenic intoxication	**K**	**KH**	**N**	**SGD**	**1**	**Written / Viva voce**	

	4. Enlist the clinical uses of penicillamine.							
PH 1.54	**Describe vaccines and their uses** At the end of the session the student must be able to 1. Define Vaccines and classify vaccines 2. Enlist the bacterial vaccines 3. Enlist the viral vaccines 4. Enlist Toxoids and Mixed Toxoids 5. Enlist antisera and immunoglobulins 6. Discuss the routine immunization schedule for infants and children as per IAP guidelines	K	KH	Y	SGD	1	Written / Viva voce	
PH 1.55	**Describe and discuss the following National Health Programmes including Immunization, Tuberculosis, Leprosy, Malaria, HIV, Filaria, Kala Azar, Diarrheal diseases, Anaemia& nutritional disorders, Blindness, Non-communicable diseases, cancer and Iodine deficiency.** At the end of the session the student must be able to 1. Explain the universal immunization programme in India 2. Explain Revised National Tuberculosis Elimination Programme 3. Explain National Leprosy Eradication Programme 4. Enlist National Vector Borne Disease Control Programmes	K	KH	Y	SGD	2	Written / Viva voce	

	5. Explain National AIDS Control Programme 6. Describe National programme for prevention and control of cancer, diabetes, cardiovascular diseases and stroke 7. Describe National Programme For Control of Blindness & Visual Impairment 8. Describe National Programme For Prevention and Control Of cancer 9. Discuss about the Diarrhoeal Disease Control Programme 10. Describe iodine deficiency disorders control programmes							
PH 1.56	**Describe basic aspects of Geriatric and Pediatric pharmacology** At the end of this theory session student should be able to 1. Describe physiological changes in Children and Elderly patients that influence the pharmacokinetic and Pharmacodynamic parameters of medications. 2. Discuss the common drugs which cause variations in response among children/elderly 3. Explain the principles that underlie the prescribing in children/elderly	**K**	**KH**	**Y**	**Lecture**	**1**	**Written / Viva voce**	
PH 1.57	**Describe drugs used in skin disorders** At the end of this theory session student should be able to 1. Discuss how drugs are absorbed through the skin. 2. Define demulcents, emollients,	**K**	**KH**	**Y**	**SDL**	**1**	**Written / Viva voce**	

	adsorbents& protectants, astringents, irritants and counter irritants and keratolytic, Melanizing agents with examples, their uses and adverse reactions. 3. Describe the mechanism of action, therapeutic uses, and toxicities of topical and systemic drugs used to treat common dermatological disorders like seborrheic dermatitis, Vitiligo, Psoriasis and Acne vulgaris. 4. Discuss the science behind use of sunscreen agents. 5. List the topical glucocorticoids, explain the rationale for use of glucocorticoids in skin disorders and their adverse effects.							
PH 1.58	**Describe drugs used in Ocular disorders** At the end of this theory session student should be able to 1. Mention the principles of using drugs to treat ophthalmic disorders. 2. Describe the ocular toxicities of systemic drugs. 3. Explain the mechanisms of action, clinical uses, and toxicities of ophthalmic drugs. 4. Describe how ophthalmic drugs administered topically can cause systemic side effects. 5. Describe the pathophysiology of glaucoma and the role of pharmacotherapy in its management.	**K**	**KH**	**Y**	**SGD**	**1**	**Written / Viva voce**	
PH 1.59	**Describe and discuss the following: Essential medicines, Fixed dose combinations, Over the counter drugs, Herbal medicines**	**K**	**KH**	**Y**	**SGD**	**2**	**Written / Viva voce**	

	At the end of this theory session student should be able to 1. Define Essential medicines concept. 2. Discuss the criteria to prepare list of essential medicines for your community PHC. 3. Define fixed dose combination, advantages and disadvantages of FDC. 4. Describe the pharmacokinetic and pharmacodynamics parameters to be considered to combine two drugs in a FDC. 5. Discuss Rational and irrational prescribing drugs with examples. 6. Define over the counter medicines and prescription medicines. 7. Enumerate the similarities and differences between OTC medicines and prescription medicines. 8. Discuss how to responsibly use OTC medicines and prevent misuse. 9. List 10 Herbal medicines used in allopathic practice. 10. Enumerate advantages and disadvantages of Herbal medicines							
PH 1.60	**Describe and discuss Pharmacogenomics and Pharmacoeconomics** At the end of this theory session student should be able to 1. Define Pharmacogenomics and Pharmacogenetics and Pharmacoeconomics with examples 2. Describe different types of pharmacoeconomic models with examples	**K**	**KH**	**N**	**SGD**	**1**	**Written / Viva voce**	

	3. Discuss the role of Pharmacogenomics and Pharmacoeconomics in modern therapeutics.							
PH 1.61	**Describe and discuss dietary supplements and nutraceuticals** At the end of this theory session student should be able to 1. Describe the role of common vitamins and minerals in normal physiology and diseases. 2. Identify the potential toxic effects of vitamins and minerals. 3. List the fat soluble and water-soluble vitamins, and identify examples of how solubility affects the absorption, transport, storage and excretion of each type. 4. Describe how B vitamins assist with energy metabolism 5. Justify the statement "It is better to get vitamins from food than from supplements" 6. Enumerate anti-oxidant vitamins, list the food source and their functions 7. Analyze from the below list, valid reasons that some individuals require vitamin supplements a) women in childbearing age b) Pregnant and lactating women c) vitamins of AIDS or other wasting illness d) addicted to drugs or alcohol e) strict vegetarians f) recovering from surgery, burns and injury.	**K**	**KH**	**N**	**SDL**	**1**	**Written / Viva voce**	

PH 1.62	**Describe and discuss antiseptics and disinfectants** At the end of this theory session student should be able to 1. Describe antiseptics and their use in wound care with examples 2. Describe disinfectants and their use in infection control with examples 3. Mention the adverse effects of antiseptics and disinfectants 4. Describe Ectoparasitic ides with examples, use and adverse effects 5. Discuss hand hygiene using soap as per WHO guidelines with Information on hand sanitizers	**K**	**KH**	**Y**	**SGD**	**2**	**Written / Viva voce**	
PH 1.63	**Describe Drug Regulations, acts and other legal aspects** At the end of this theory session student should be able to 1. Explain about drug regulations 2. Mention the drug regulatory authorities in India 3. Describe the process of approval for New Drugs. 4. Discuss the major legislation pertaining to drugs	**K**	**KH**	**Y**	**SGD**	**1**	**Written / Viva voce**	
PH 1.64	**Describe overview of drug development, Phases of clinical trials and Good Clinical Practice** 1. Enlist the stages in new drug development 2. Explain the approaches to drug discovery / invention 3. Discuss about the preclinical studies 4. Describe the phases of clinical trials **5.** Describe the Principles GCP	**K**	**KH**	**Y**	**SGD**	**1**	**Written / Viva voce**	

No	COMPETENCY The student should be able to Specific Learning ObjectivesSLO	Domain K/S/A/C	Level K /KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method by MCI	No of Hours	Suggested Assessment method by MCI	Number required to certify P	Vertical Integration	
PH 2.1	**Demonstrate understanding of the use of various dosage forms (oral/local/parenteral; solid/liquid)** The student should be able to 1. Identify various dosage forms – solid, liquid, topical dosage forms 2. Describe the various types of solid dosage form in the given samples with merits and demerits of each 3. Describe the various types of liquid dosage form in the given samples with merits and demerits of each 4. Describe the various types of topical dosage form in the given samples with merits and demerits of each 5. Describe all the components of commercial label of the given dosage form and its importance	S/C	SH	Y	DOAP sessions	10	Skills assessments			

PH 2.2	**Prepare oral rehydration solution from ORS packet and explain its use** The student should be able to: 1. Define and enumerate causes of dehydration 2. Describe the clinical assessment of dehydration 3. Enumerate the different types of ORS along with their composition with actions of each ingredient 4. Choose the appropriate type of ORS for a given condition/patient 5. Calculate the quantity of ORS required to correct / prevent dehydration 6. Demonstrate preparation of ORS from sachet 7. Enumerate non-diarrheal uses of ORS	S/C	SH	Y	DOAP sessions	2	Skills assessment			
PH 2.3	**Demonstrate the appropriate setting up of an intravenous drip in a simulated environment** In a simulated environment, the student should be able to 1. Demonstrate the opening of infusion set following aseptic precautions 2. Appropriately position the patient and select a vein. 3. Prepare the overlying skin with aseptic care. 4. Demonstrate correct IV injection technique and strap the cannula in place. 5. Identify any visible impurities if present in the IV fluids. • Adjust the flow rate according to the requirement • Routinely check patient's ID, drug name, date of expiry etc. before injecting. • Monitor a patient on an IV drip and identify any reactions to it. • Checklist to be used for assessment	S	SH	Y	DOAP sessions	2	Skills assessment			

PH 2.4	**Demonstrate the correct method of calculation of drug dosage in patients including those usedin special situations** 1. At the end of this practical session II MBBS student should be able to: 2. Calculate appropriate doses for individual patients based on age, body weight, and surface area 3. Mention the correct method ofdosage calculation in paediatric patients 4. Demonstrate the iv-drip rate calculation & infusion time 5. Mention the correct method of dosage calculation in patient suffering from renal disease 6. Mention the correct method of dosage calculation in patient suffering from hepatic disease	S	SH	Y	DOAP sessions	4	Skills assessment		Pediatrics, General Medicine	
PH 3.1	**Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient**	S/C	P	Y	Skill station	4	Skill station	5 Exercise	General Medicine	

	At the end of the session, student should be able to 1. Establish therapeutic goal/s, based on a diagnosis following standard treatment guidelines (STG) 2. Choose the appropriate drug/s for the given clinical condition 3. Choose the appropriate dose, route, frequency and duration of therapy for the chosen drug/s 4. Write a legible prescription as per MCI format 5. Provide appropriate information to the patient regarding the prescription 6. Explain the legality (legal implications) of prescriptions.							s		
PH 3.2	**Perform and interpret a critical appraisal (audit) of agiven prescription** At the end of the session, student should be able to 1. Demonstrate the understanding of importance of completeness of prescription 2. Demonstrate the understanding of clinical diagnosis for which drugs are prescribed 3. Demonstrate the understanding of MCI format of prescription 4. Identify and comment on any discrepancies in the completeness and legibility of the prescription 5. Identify and comment on any discrepancies in the selection of drug, drug form, dose, frequency, duration of the treatment, instructions according to STG 6. Re-Write the prescription correcting all the discrepancies identified	S	P	Y	Skill lab	4	Maintenance of Log book	3		

PH 3.3	**Perform a critical evaluation of the drug promotional Literature** At the end of this session student should be able to : 1. Discuss the various types of sources of drug information 2. Demonstrate understanding of importance of critical evaluation of drug promotional literature 3. Critically evaluate the given drug promotional literature based on WHO criteria 4. Appropriateness of illustration 5. Relevance of references cited 6. Content of scientific information	S	P	Y	Skill lab Brainstorming followed by demonstration	2	Maintenance of Log book/ Skill station	3	General Medicine	
PH 3.4	**To recognize and report an adverse drug reaction** At the end of the session the student should be able to 1. Identify an adverse drug reaction (ADR) in the given case 2. Perform causality assessment of the identified ADR using WHO &Naranjo's Scale 3. Fill the ADR reporting form (CDSCO from) 4. Explain the management of the ADR 5. Explain the methods to prevent the occurrence of the ADR Report the ADR to the pharmacovigilancecenter Describe the Importance of reporting ADRs Describe the various levels of reporting ADRs national and international centers	S	SH	Y	Skill station	2	Maintenance of Log book/ Skill station	cases Warfarin induced bleeding Aspirin (NSAID) induced peptic ulcer Carbamazepine induced Steven Johnson Syndrome		
PH 3.5	**To prepare and explain a list of P- drugs for a given case/condition**	S	P	Y	Skill station	4	Maintenance of Log book	3 Exercises	General Medicine	

	At the end of the session the student should be able to 1. Define the diagnosis 2. Specify the therapeutic objective 3. Make an inventory of effective groups of drugs 4. Choose an effective group of drugs according to efficacy, safety and suitability criteria 5. Choose the P-Drug for the given clinical condition							Angina Pectoris Amoebicdysentry Anxiety		
PH 3.6	**Demonstrate how to optimize interaction with pharmaceutical representative to get authentic information on drugs** At the end of the session the student should be able to 1. Enumerate the key elements in the WHO guidelines on Ethical criteria for medicinal drug promotion. 2. Direct the discussion with pharmaceutical representative so as to get the information he needs about the drug effectively. 3. Collect a copy of data sheet of the product under discussion. 4. Compare the verbal statements with those in the official text during presentation effectively. 5. Perform a prior literature search and check quality of research methodology of the drug under discussion including cost comparison. 6. Decide effectively whether to include the drug in personal formulary with regard to efficacy, safety and cost-effectiveness of medicines	S	SH	N	Skill station	2	Maintenance of Log book			

PH 3.7	**Prepare a list of essential medicine for a health care facility** At the end of the session the student should be able to 1. Define and understand the concept of Essential Medicines List for the nation/state/ health care facility 2. Enumerate the factors that determine the choice of drugs in an Essential Medicines List. 3. Prepare a list of essential medicines for a healthcare facility, with justification in a given scenario	S	SH	Y	Skill station	2	Maintenance of Log book			
PH 3.8	**Communicate effectively with a patient on proper use of prescribe medication** **(i) Insulins, (ii) Proton pump inhibitors, (iii) statins, (iv) ferrous** sulfate tablets (v) co-amoxiclav or cotrimoxazole At the end of the session the student should be ableto 1.Communicate about the effects of the prescribed drug with regards to the following: • Why the drug is needed • Which symptoms will disappear, and which will not • When the effect is expected to start • What will happen if the drug is taken incorrectly or not at all 2. Communicate about the adverse effects of the prescribed drug with regards to the following: • Which side effects may occur • How to recognize them • How long they will continue • How serious they are	C/A	SH	Y	Skill lab	4	Skill station			

	• What action to take 3. Communicate about the instructions of drug use as following: • How the drug should be taken • When it should be taken • How long the treatment should continue • How the drug should be stored • What to do with left-over drugs 4. Communicate about the warnings of the prescribed drug with regards to the following: • When the drug should not be taken • What is the maximum dose • Why the full treatment course should be taken 5. Communicate about the future consultations with regards to the following: • When to come back (or not) • In what circumstances to come earlier • What information the doctor will need at the next appointment 6. Conclude the consultation by asking the following questions: • Ask the patient to repeat the most important information • Ask whether the patient has any more questions									

PH 4.1	**Administer drugs through various routes in a simulated environment using mannequins** At the end of the session the student should be able to USE CHECKLIST FOR ASSESSMENT (refer WHO prescribing book) Enteral: Specific Learning Objectives • **Oral route** 1. Identify the different dosage forms administered through the Oral route and instructions given to the patient for administering it. 2. Mention the merits and demerits of Oral route of drug administration. 3. Demonstrate the administration of the drugs through oral route. 4. Identify the different equipment required for Nasogastric tube (NGT) insertion 5. Demonstrate the Nasogastric tube insertion and present the purpose. 6. Demonstrate the positioning of the patient during NGT insertion. 7. Demonstrate the preparation of the feeds for NG feeding. • **Sublingual/ Buccal** . Demonstrate the administration of the drugs through Sublingual and Buccal route. . Present the instructions for administering the same and how to terminate the action of the drug. . Present the different examples with dosage forms for the same. • **Transrectal** 1. Identify the devices used to administer dosage forms through transrectal route. 2. Present the instructions to the patient before administering dosage forms through transcutaneous route. 3. Demonstrate the administration of suppositories by	S	SH	Y	DOAP sessions	10	Skills assessment			

	rectal route. Demonstrate the administration of enema (Evacuant/ Retention) by rectal route. • **Transvaginal** 1. Identify the devices used to administer dosage forms through transvaginal route. 2. Present the instructions to the patient before administering dosage forms through transvaginal route. 3. Demonstrate the administration of pessary, creams and foams by vaginal route. 4. Demonstrate the administration of douche by vaginal route. 5. Identify different types of Intrauterine contraception 6. Counsel the patients on intrauterine contraception. 7. Demonstrate the placement of intrauterine contraception using the simulation setting **PARENTERAL** Specific learning Objective for parenteral injections on mannequins • **Intra Muscular injection** 1. Identify the devices required for IM injection 2. Demonstrate the prerequisites for injection along with aseptic precautions. 3. Present instructions to the patient about the injection procedure. 4. Identify the sites of IM injection on mannequin and present merits and demerits of each site. 5. Demonstrate the proper technique for IM injection. • **Intravenous injection** 1. Identify the devices required for IV injection 2. Demonstrate the prerequisite preparations for injection along with aseptic precautions 3. Present instructions to the patient about the									

	injection procedure. 4. Identify the sites of IV injection on mannequin 5. Demonstrate the proper technique for IV injection. • <u>Subcutaneous injection</u> 1. Identify the devices required for SC injection. 2. Demonstrate the prerequisite preparations for injection along with aseptic precautions. 3. Present instructions to the patient about the injection procedure. 4. Identify the sites of SC injection on mannequin. 5. Demonstrate the proper technique for SC injection. • <u>Intradermal injection</u> 1. Identify the devices required for Intradermal injection. 2. Demonstrate the prerequisite preparations for injection along with aseptic precautions. 3. Present instructions to the patient about the injection procedure. 4. Demonstrate the proper technique for Intradermal injection. • <u>Local / Topical application</u> Specific Learning Objectives. <u>Transcutaneous</u> – Iontophoresis, Inunction, Jet Injection, Transdermal drug delivery system 1. Identify the devices used to administer dosage forms through transcutaneous route. 2. Present the instructions to the patient before administering dosage forms through transcutaneous route. 3. Demonstrate the administration of Transdermal patches.									

	Transmucosal/ Inhalational 1. Identify the inhalational devices used to administer inhalational dosage forms. 2. Present the merits and demerits of inhalational devices. 3. Present the instructions to the patient before using inhalational devices. 4. Demonstrate the administration of inhalational dosage forms. 5. Identify the different types of airway masks and intubation tubes. Present a method for selection of intubation tubes. 6. Demonstrate the administration of anesthetic/ therapeutic gases through airway masks and intubation tubes. **Transnasal** 1. Identify dosage forms administered transnasally. 2. Identify the devices used for administering dosage forms transnasally. 3. Present the merits and demerits of Transnasal route of drug administration. 4. Present the instructions to the patient before administering dosage forms by transnasal route. **Ophthalmic/ Ear route** 1. Identify dosage forms administered by ophthalmic/ ear route. 2. Present the instructions to the patient before administering dosage forms by ophthalmic/ ear route.									
PH 4.2	**Demonstrate the effects of drugs on blood pressure (vasopressor and vasodepressors with appropriate blockers) using computer aided learning**	S	SH	Y	Skill lab	6	Skill station			

	1. At the end of the session the student should be able to 2. Choose the appropriate animal experiment to study the effects of drugs on blood pressure 3. Explain the differences in actions of different vasopressor (adrenaline, noradrenaline) 4. Explain the differences in actions of different vasodepressors (ACh, alphablockers, histamine) 5. Analyse and interpret the graph obtained accurately on application of various drugs 6. Enumerate the therapeutic uses of vasopressors and vasodepressors									
PH 5.1	**Communicate with the patient with empathy and ethics on all aspects of drug use** At the end of the session the student should be able to: 1. Describe what information should be given to patients to allow them to make informed decisions 2. Communicate treatment plan and instructions to patient, at a suitable level of information 3. Engage in shared decision making where appropriate	A/C	SH	Y	Small group discussion	2	Skill station		General Medicine	
PH 5.2	**Communicate with the patient regarding optimal use of** **a) drug therapy,** **b) devices and** **c) storage of medicines** • At the end of this session, the student should be able to • **<u>Drug Therapy</u>** • 1.Communicate about the effects of the prescribed drug with regards to the following: • Why the drug is needed • Which symptoms will disappear, and which will not?	A/C	SH	Y	Small group discussion	4	Skill station			

	• When the effect is expected to start • What will happen if the drug is taken incorrectly or not at all • Communicate about the adverse effects of the prescribed drug with regards to the following: • Which side effects may occur? • How to recognize them • How long they will continue • How serious they are • What action to be taken • Communicate about the instructions of drug use as following: • How the drug should be taken • When it should be taken • How long the treatment should be continued • How the drug should be stored • What to be done with left-over drugs • Communicate about the warnings of the prescribed drug with regards to the following: • When the drug should not be taken • What is the maximum dose? • Why the full treatment course should be taken? • Communicate about the future consultations with regards to the following: • When to come for follow up • In what circumstances to consult a doctor . • What information the doctor will need at the next appointment • Conclude the consultation by asking the following questions: • Ask the patient whether everything is understood • Ask the patient to repeat the most important information									

	• Ask whether the patient has any other question • **Devices** • The student should be able to communicate • Step wise points or instructions on use of device • Communicate list of do's and don'ts on the device • Demonstrate the proper use of device and ask the patient to show the same. • Methods on handling, cleaning and storage of device • Dangers of use of device on other persons, without the prescription of doctor • Importance of keeping the device away from reach of the children • Contact numbers of manufacturers to be communicated if needed. **Storage of Medicines:** • The student should be able to communicate to patients on • Ideal storage condition of a pharmaceutical product as per product label • Effect of storage condition on potency and efficacy of the drug • ill effects of improper storage condition on human consumption • Importance of expiry date of the drug • Factors to be taken in to consideration for drug storage like sanitation, temperature, light, moisture, ventilation and segregation. • Importance of storage of medicines away from reach of the children • Disposal of expired drugs									

PH 5.3	**Motivate patients with chronic diseases to adhere to the prescribed management by health care provider** • At the end of the session the student should be able to: • Counselthe patient about medication adherence • Communicate the consequences of non-adherence in chronic diseases • Communicate the methods to measure the medication adherence • Communicate the barriers affecting medication adherence • Communicate the measures to be taken to motivate the patient to adhere to medications in chronic diseases	A/C	SH	Y	Small group discussion	4	Skill station/ short note			
PH 5.4	**Explain to the patient the relationship between cost of treatment and patient compliance** At the end of this session, the student should be able to: 1. Assess the cost of the treatment 2. Communicatethe various factors influencing patient compliance (patient related, disease condition related, therapy related and health system related factors). 3. Communicate clearly to the patient about cost of treatment and non-compliance	A/C	SH	Y	Small group discussion	2	Short note/ Viva voce		General Medicine	
PH 5.5	**Demonstrate an understanding of the caution in prescribing drugs likely to produce dependence and recommend the line of management** At the end of the session the student should be able 1. Describe the term drug dependence and enumerate the drugs that produce dependence 2. Describe the Legality involved in prescribing drugs likely to produce dependence (Drugs and Cosmetics Act, 1940; Pharmacy Act, 1948; NarcoticDrugs and Psychotropic substances Act, 1985)	K	KH	Y	Small group discussion	4	Short note/ Viva voce		Psychiatry	

	3. Describe the psychosocialassessment of the patient before prescribing. 4. Describe the importance of documentation of prescribing process 5. Describe the importance of periodic review of prescriptions 6. Describe the basic treatment regimens for various addictions and withdrawal states along with psycho-social rehabilitation									
PH 5.6	**Demonstrate ability to educate public & patients about various aspects of drug use including drug dependence and OTC drugs** 1. At the end of this session, the student should be able to educate the patients and public regarding: 2. Communicatethe importance of complying with the doctor's instructions 3. Communicatethe demerits of self-prescription 4. Inform the importance of identifying and reporting ADRs to concerned authorities 5. Informaboutcautionsto be taken while using drugs causing dependence 6. Counsel regarding Safe use of OTC	A/C	SH	Y	Small group discussion	4	Skill station		Psychiatry	
PH 5.7	**Demonstrate an understanding of the legal and ethical aspects of prescribing drugs** At the end of this session, the student should be able to: **Legal aspects** 1. Explain who is entitled to prescribe medicines 2. Describe the legal requirements associated with prescribing controlled drugs 3. Describe the legal implications of irrational prescription that could endanger the life of patients **Ethical aspects** 1. Describe the importance of rational prescription 2. Explain the responsibilities of prescribing in a	K	KH	Y	Small group discussion	2	Short note/ Viva voce			Forensic Medicine

	resource limited setting 3. Describe the informationsto be given to patients to make informed decisions 4. Explain theimportantanceof recognizing the limits of competence and to seek help when needed 5. Explain the responsibility of all prescribers to updatetheir knowledge. 6. Describe the importance of following clinical guidelines, protocols and formularies that are appropriate.									

No	COMPETENCY The student should be able to Specific Learning ObjectivesSLO	Domain K/S/A/ C	Level K/KH / SH/P	Core (Y/N)	Suggested Teaching Learning method by MCI	No of Hours	Suggested Assessment method by MCI	Number required to certify P	Vertical Integration	
PH2.1	**Demonstrate understanding of the use of various dosage forms (oral/local/parenteral; solid/liquid)** The student should be able to 1. Identify various dosage forms – solid, liquid, topical dosage forms 2. Describe the various types of solid dosage form in the given samples with merits and demerits of each 3. Describe the various types of liquid dosage form in the given samples with merits and demerits of each 4. Describe the various types of topical dosage form in the given samples with merits and demerits of each 5. Describe all the components of commercial label of the given dosage form and its importance	S/C	SH	Y	DOAP sessions	10	Skills assessments			
PH 2.2	**Prepare oral rehydration solution from ORS packet and explain its use** The student should be able to: 1. Define and enumerate causes of dehydration 2. Describe the clinical assessment of dehydration 3. Enumerate the different types of ORS along with their composition with actions of each ingredient 4. Choose the appropriate type of ORS for a given condition/patient 5. Calculate the quantity of ORS required to correct / prevent dehydration 6. Demonstrate preparation of ORS from sachet 7. Enumerate non-diarrheal uses of ORS	S/C	SH	Y	DOAP sessions	2	Skills assessment			
PH 2.3	**Demonstrate the appropriate setting up of an intravenous drip in a simulated environment**	S	SH	Y	DOAP sessions	2	Skills assessment			

	In a simulated environment, the student should be able to 1. Demonstrate the opening of infusion set following aseptic technique 2. Appropriately position the patient and select a vein. 3. Prepare the overlying skin with aseptic care. 4. Demonstrate correct IV injection technique and strap the cannula in place. 5. Identify any visible impurities if present in the IV fluids. 6. Adjust the flow rate according to the requirement 7. Routinely check patient's ID, drug name, date of expiry etc before injecting. 8. Monitor a patient on an IV drip and identify any reactions to it. Checklist to be used for assessment									
PH 2.4	**Demonstrate the correct method of calculation of drug dosage in patients including those used in special situations** At the end of this practical session II MBBS student should be able to: 1. Calculate appropriate doses for individual patients based on age, body weight, and surface area 2. Demonstrate the correct method of paediatric dose calculation 3. Demonstrate the Iv-drip rate calculation & infusion time 4. Demonstrate the calculation of drug dosage in patient suffering from renal disease 5. Demonstrate the calculation of drug dosage in patient suffering from hepatic disease	S	SH	Y	DOAP sessions	4	Skills assessment		Pediatrics, General Medicine	
PH 3.1	**Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient**	S/C	P	Y	Skill station	4	Skill station	5 Exercises	General Medicine	

	At the end of the session, student should be able to 1. Establish therapeutic goal/s, based on a diagnosis following standard treatment guidelines (STG) 2. Choose the appropriate drug/s for the given clinical condition 3. Choose the appropriate dose, route, frequency and duration of therapy for the chosen drug/s 4. Write a legible prescription as per MCI format 5. Provide appropriate information to the patient regarding the prescription 6. Review/alter prescription in the light of further investigation 7. Explain the legality (legal implications) of prescriptions.							Iron deficiency anemia due to hook worm infestation Acute attack of Migraine Newly diagnosed obese type 2 DM with Hypertension UTI in pregnancy Typhoid fever in a child		
PH 3.2	**Perform and interpret a critical appraisal (audit) of a given prescription** 1. At the end of the session, student should be able to 2. Demonstrate the understanding of importance of completeness of prescription 3. Demonstrate the understanding of clinical diagnosis for which drugs are prescribed 4. Demonstrate the understanding of MCI format of prescription 5. Identify and comment on any discrepancies in the completeness and legibility of the prescription 6. Identify and comment on any discrepancies in the selection of drug, drug form, dose, frequency, duration of the treatment, instructions according to STG 7. Re-Write the prescription correcting all the discrepancies identified	S	P	Y	Skill lab	4	Maintenance of Log book	3		
PH 3.3	**Perform a critical evaluation of the drug promotional Literature**	S	P	Y	Skill lab Brainstor	2	Maintenance of Log book/	3	General	

	At the end of this session student should be able to: 1. Discuss the various types of sources of drug information 2. Demonstrate understanding of importance of critical evaluation of drug promotional literature 3. Critically evaluate the given drug promotional literature based on WHO criteria 4. Appropriateness of illustration 5. Relevance of references cited 6. Content of scientific information				ming followed by demonstration		Skill station		Medicine	
PH 3.4	**To recognize and report an adverse drug reaction** At the end of the session the student should be able to 1. Identify an adverse drug reaction (ADR) in the given case 2. Perform causality assessment of the identified ADR using WHO &Naranjo's Scale 3. Fill the ADR reporting form (CDSCO from) 4. Explain the management of the ADR 5. Explain the methods to prevent the occurrence of the ADR 6. Report the ADR to the pharmacovigilancecenter 7. Describe the Importance of reporting ADRs 8. Describe the various levels of reporting ADRs national and international centres	S	SH	Y	Skill station	2	Maintenance of Log book/ Skill station	cases Warfarin induced bleeding Aspirin (NSAID) induced peptic ulcer Carbamazepine induced Steven Johnson Syndrome		
PH 3.5	**To prepare and explain a list of P- drugs for a given case/condition** At the end of the session the student should be able to Define the diagnosis 1. Specify the therapeutic objective 2. Make an inventory of effective groups of drugs 3. Choose an effective group of drugs according to efficacy, safety and suitability criteria 4. Choose the P-Drug for the given clinical condition	S	P	Y	Skill station	4	Maintenance of Log book	Exercises Angina Pectoris Amoebicdysentry Anxiety	General Medicine	

PH 3.6	**Demonstrate how to optimize interaction with pharmaceutical representative to get authentic information on drugs** At the end of the session the student should be able to 1. Enumerate the key elements in the WHO guidelines on Ethical criteria for medicinal drug promotion. 2. Direct the discussion with pharmaceutical representative so as to get the information he needs about the drug effectively. 3. Collect a copy of data sheet of the product under discussion. 4. Compare the verbal statements with those in the official text during presentation effectively. 5. Perform a prior literature search and check quality of research methodology of the drug under discussion including cost comparison. 6. Decide effectively whether to include the drug in personal formulary with regard to efficacy, safety and cost-effectiveness of medicines	S	SH	N	Skill station	2	Maintenance of Log book			
PH 3.7	**Prepare a list of essential medicine for a health care facility** At the end of the session the student should be able to 1. Define and understand the concept of Essential Medicines List for the nation/state/ health care facility 2. Enumerate the factors that determine the choice of drugs in an Essential Medicines List. 3. Prepare a list of essential medicines for a healthcare facility, with justification in a given scenario	S	SH	Y	Skill station	2	Maintenance of Log book			
PH 3.8	**Communicate effectively with a patient on proper use of prescribe medication** **(i) Insulins, (ii) Proton pump inhibitors, (iii) statins, (iv) ferrous** **sulfate tablets (v) co-amoxiclav or cotrimoxazole**	C/A	SH	Y	Skill lab	4	Skill station			

	At the end of the session the student should be able to 1. Communicate about the effects of the prescribed drug with regards to the following: • Why the drug is needed • Which symptoms will disappear, and which will not • When the effect is expected to start • What will happen if the drug is taken incorrectly or not at all 2. Communicate about the adverse effects of the prescribed drug with regards to the following: • Which side effects may occur • How to recognize them • How long they will continue • How serious they are • What action to take 3. Communicate about the instructions of drug use as following: • How the drug should be taken • When it should be taken • How long the treatment should continue • How the drug should be stored • What to do with left-over drugs 4. Communicate about the warnings of the prescribed drug with regards to the following: • When the drug should not be taken • What is the maximum dose • Why the full treatment course should be taken 5. Communicate about the future consultations with regards to the following: • When to come back (or not)									

	• In what circumstances to come earlier • What information the doctor will need at the next appointment 6. Conclude the consultation by asking the following questions: • Ask the patient whether everything is understood • Ask the patient to repeat the most important information • Ask whether the patient has any more questions									
PH 4.1	**Administer drugs through various routes in a simulated environment using mannequins** At the end of the session the student should be able to USE CHECKLIST FOR ASSESSMENT (refer WHO prescribing book) Enteral Specific Learning Objectives **Oral route** • Identify the different dosage forms administered through the Oral route and instructions given to the patient for administering it. • Mention the merits and demerits of Oral route of drug administration. • Demonstrate the administration of the drugs through oral route. • Identify the different equipment required for Nasogastric tube (NGT) insertion • Demonstrate the Nasogastric tube insertion and present the purpose. • Demonstrate the positioning of the patient during NGT insertion.	S	SH	Y	DOAP sessions	10	Skills assessment			

	• Demonstrate the preparation of the feeds for NG feeding. **Sublingual/ Buccal** • Demonstrate the administration of the drugs through Sublingual and Buccal route. • Present the instructions for administering the same and how to terminate the action of the drug. • Present the different examples with dosage forms for the same. **Transrectal** • Identify the devices used to administer dosage forms through transrectal route. • Present the instructions to the patient before administering dosage forms through transcutaneous route. • Demonstrate the administration of suppositories by rectal route. • Demonstrate the administration of enema (Evacuant/ Retention) by rectal route. **Transvaginal** • Identify the devices used to administer dosage forms through transvaginal route. • Present the instructions to the patient before administering dosage forms through transvaginal route. • Demonstrate the administration of pessary, creams and foams by vaginal route. • Demonstrate the administration of douche by vaginal route. • Identify different types of Intrauterine contraception • Counsel the patients on intrauterine									

	contraception. • Demonstrate the placement of intrauterine contraception using the simulation setting **PARENTERAL** Specific learning Objective for parenteral injections on mannequins • Intra Muscular injection • Identify the devices required for IM injection • Demonstrate the prerequisites for injection along with aseptic precautions. • Present instructions to the patient about the injection procedure. • Identify the sites of IM injection on mannequin and present merits and demerits of each site. • Demonstrate the proper technique for IM injection. **Intravenous injection** • Identify the devices required for IV injection • Demonstrate the prerequisite preparations for injection along with aseptic precautions • Present instructions to the patient about the injection procedure. • Identify the sites of IV injection on mannequin • Demonstrate the proper technique for IV injection. **Subcutaneous injection** • Identify the devices required for SC injection. • Demonstrate the prerequisite preparations for injection along with aseptic precautions. • Present instructions to the patient about the injection procedure. • Identify the sites of SC injection on mannequin.									

	• Demonstrate the proper technique for SC injection. **Intradermal injection** • Identify the devices required for Intradermal injection. • Demonstrate the prerequisite preparations for injection along with aseptic precautions. • Present instructions to the patient about the injection procedure. • Demonstrate the proper technique for Intradermal injection. **Local / Topical application** Specific Learning Objectives. Transcutaneous – Iontophoresis, Inunction, Jet Injection, Transdermal drug delivery system Identify the devices used to administer dosage forms through transcutaneous route. Present the instructions to the patient before administering dosage forms through transcutaneous route. Demonstrate the administration of Transdermal patches. **Transmucosal/ Inhalational** • Identify the inhalational devices used to administer inhalational dosage forms. • Present the merits and demerits of inhalational devices. • Present the instructions to the patient before using inhalational devices. • Demonstrate the administration of inhalational dosage forms. • Identify the different types of airway masks and intubation tubes. Present a method for selection of intubation tubes.									

	• Demonstrate the administration of anesthetic/ therapeutic gases through airway masks and intubation tubes. <u>Transnasal</u> • Identify dosage forms administered trans nasally. • Identify the devices used for administering dosage forms transnasally. • Present the merits and demerits of Transnasal route of drug administration. • Present the instructions to the patient before administering dosage forms by transnasal route. <u>Ophthalmic/ Ear route</u> • Identify dosage forms administered by ophthalmic/ ear route. • Present the instructions to the patient before administering dosage forms by ophthalmic/ ear route.									
PH 4.2	**Demonstrate the effects of drugs on blood pressure (vasopressor and vasodepressors with appropriate blockers) using computer aided learning** 1. At the end of the session the student should be able to 2. Choose the appropriate animal experiment to study the effects of drugs on blood pressure 3. Explain the differences in actions of different vasopressor (adrenaline, noradrenaline) 4. Explain the differences in actions of different vasodepressors (Ach, alpha-blockers, histamine) 5. Analyze and interpret the graph obtained accurately on application of various drugs 6. Enumerate the therapeutic uses of vasopressors and vasodepressors	S	SH	Y	Skill lab	6	Skill station			

PH 5.1	**Communicate with the patient with empathy and ethics on all aspects of drug use** At the end of the session the student should be able to: 1. Describe what information should be given to patients to allow them to make informed decisions 2. Communicate treatment plan and instructions to patient, at a suitable level of information 3. Engage in shared decision making where appropriate	A/C	SH	Y	Small group discussion	2	Skill station		General Medicine	
PH 5.2	**Communicate with the patient regarding optimal use of** **a) drug therapy,** **b) devices and** **c) storage of medicines** At the end of this session, the student should be able to **a) Drug Therapy** 1.Communicate about the effects of the prescribed drug with regards to the following: • Why the drug is needed • Which symptoms will disappear, and which will not? • When the effect is expected to start • What will happen if the drug is taken incorrectly or not at all 2. Communicate about the adverse effects of the prescribed drug with regards to the following: • Which side effects may occur? • How to recognize them • How long they will continue • How serious they are • What action to be taken 3. Communicate about the instructions of drug use as following: • How the drug should be taken • When it should be taken	A/C	SH	Y	Small group discussion	4	Skill station			

	• How long the treatment should be continued • How the drug should be stored • What to be done with left-over drugs 4. Communicate about the warnings of the prescribed drug with regards to the following: • When the drug should not be taken • What is the maximum dose? • Why the full treatment course should be taken? 5. Communicate about the future consultations with regards to the following: • When to come for follow up • In what circumstances to consult a doctor. • What information the doctor will need at the next appointment 6. Conclude the consultation by asking the following questions: • Ask the patient whether everything is understood • Ask the patient to repeat the most important information • Ask whether the patient has any other questions <u>b) Devices</u> The student should be able to communicate 1. Step wise points or instructions on use of device 2. Communicate list of do's and don'ts on the device 3. Demonstrate the proper use of device and ask the patient to show the same. 4. Methods on handling, cleaning and storage of device 5. Dangers of use of device on other persons, without the prescription of doctor 6. Importance of keeping the device away from reach of the children 7. Contact numbers of manufacturers to be communicated if needed.									

	c) Storage of Medicines: 1. The student should be able to communicate to patients on 2. Ideal storage condition of a pharmaceutical product as per product label 3. Effect of storage condition on potency and efficacy of the drug 4. ill effects of improper storage condition on human consumption 5. Importance of expiry date of the drug 6. Factors to be taken in to consideration for drug storage like sanitation, temperature, light, moisture, ventilation and segregation. 7. Importance of storage of medicines away from reach of the children 8. Disposal of expired drugs									
PH 5.3	**Motivate patients with chronic diseases to adhere to the prescribed management by health care provider** At the end of the session the student should be able to: 1. Counselthe patient about medication adherence 2. Communicate the consequences of non-adherence in chronic diseases 3. Communicate the methods to measure the medication adherence 4. Communicate the barriers affecting medication adherence 5. Communicate the measures to be taken to motivate the patient to adhere to medications in chronic diseases	A/C	SH	Y	Small group discussion	4	Skill station/ short note			
PH 5.4	**Explain to the patient the relationship between cost of treatment and patient compliance** At the end of this session, the student should be able to: 1. Assess the cost of the treatment 2. Communicatethe various factors influencing patient	A/C	SH	Y	Small group discussion	2	Short note/ Viva voce		General Medicine	

	compliance (patient related, disease condition related, therapy related and health system related factors). 3. Communicate clearly to the patient about relationship between cost of treatment and non-compliance									
PH 5.5	**Demonstrate an understanding of the caution in prescribing drugs likely to produce dependence and recommend the line of management** At the end of the session the student should be able to 1. Describe the term drug dependence 2. Enumerate the drugs that produce dependence 3. Describe the Legality involved in prescribing drugs likely to produce dependence (Drugs and Cosmetics Act, 1940; Pharmacy Act, 1948; Narcotic Drugs and Psychotropic substances Act, 1985) 4. Describe the clinical including psychosocial assessment of the patient before prescribing 5. Describe the importance of documentation of prescribing process 6. Describe the importance of periodic review of prescriptions 7. Describe the basic treatment regimens for various addictions and withdrawal states along with psycho-social rehabilitation	K	KH	Y	Small group discussion	4	Short note/ Viva voce		Psychiatry	
PH 5.6	**Demonstrate ability to educate public & patients about various aspects of drug use including drug dependence and OTC drugs** 1. At the end of this session, the student should be able to educate the patients and public regarding: 2. Communicatethe importance of complying with the doctor's instructions 3. Communicatethe demerits of self-prescription 4. Inform the importance of identifying and reporting ADRs to concerned authorities 5. Informaboutcautionsto be taken while using drugs causing dependence 6. Counsel regarding Safe use of OTC	A/C	SH	Y	Small group discussion	4	Skill station		Psychiatry	

PH 5.7	**Demonstrate an understanding of the legal and ethical aspects of prescribing drugs** At the end of this session, the student should be able to: **Legal aspects** 1. Explain who is entitled to prescribe medicines and the legal requirements involved 2. Describe the legal requirements associated with prescribing controlled drugs 3. Describe the legal implications of irrational prescription that could endanger the life of patients **Ethical aspects** 1. Describe the importance of rational prescription 2. Explain the responsibilities of prescribing in a resource limited setting 3. Describe what information should be given to patients to allow them to make informed decisions 4. Explain why it is important to recognize limits of competence and to ask for help when needed 5. Explain the responsibility of all prescribers to updatetheir knowledge. 6. Describe the importance of following clinical guidelines, protocols and formularies that are appropriate.	K	KH	Y	Small group discussion	2	Short note/ Viva voce			Forensic Medicine

SUGGESTED AREAS FOR INTEGRATION:- (20 hours)

As per "Competency based Undergraduate Curriculum for the Indian Medical Graduate Medical Council of India"

Pediatrics

Numbers	Topics
1	Calculate the dosage of drugs using appropriate formulae for an individual patient, including children, elderly and patient with renal dysfunction.
2	Describe the mechanism of action, types, indications and contraindications of Pencillines, Cephalosporins, Aminoglycosides, Macrolides, Flouoroquinolones, Sulfonmides, Broad Spectroum Antibiotics
3	Describe basic aspects of Geriatric and Pediatric pharmacolog
4	Demonstrate the correct method of calculation of drug dosage in patients including those used in special situations

General Medicine:-

Numbers	Topics
1	Calculate the dosage of drugs using appropriate formulae for an individual patient, including children, elderly and patient with renal dysfunction.
2	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act by modulating autacoids, including: anti-histaminics, 5-HT modulating drugs, NSAIDs, drugs for gout, anti-rheumatic drugs, drugs for migraine
3	Describe the symptoms and management of methanol and ethanol poisonings
4	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs acting on blood, like anticoagulants, antiplatelets, fibrinolytics, plasma expanders
5	Describe mechanisms of action, types, doses, side effects, indications and contraindications of the drugs modulating the renin-angiotensin and aldosterone system
6	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antihypertensive drugs and drugs used in shock

7	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in ischemic heart disease (stable, unstable angina and myocardial infarction), peripheral vascular disease
8	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in congestive heart failure
9	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the antiarrhythmics
10	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in the management of dyslipidemias
11	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs used as below: 1. Acid-peptic disease andGERD 2. Antiemetics and prokinetics 3. Antidiarrhoeals 4. Laxatives 5. Inflammatory BowelDisease 6. Irritable Bowel Disorders, biliary and pancreaticdiseases
12	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in hematological disorders like: 1. Drugs used inanemias 2. Colony Stimulatingfactors
13	Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in endocrine disorders (diabetes mellitus, thyroid disorders and osteoporosis)
14	Describe the mechanism of action, types, indications and contraindications of Pencillines, Cephalosporins, Aminoglycosides, Macrolides, Flouoroquinolones, Sulfonmides, Broad Spectroum Antibiotics
15	Describe the mechanisms of action, types, doses, sideeffects, indications and contraindications of the drugs used in malaria, KALA-AZAR, amebiasis and intestinalhelminthiasis

16	Describe management of common poisoning, insecticides, common sting and bites
17	Demonstrate the correct method of calculation of drug dosage in patients including those used in special situations
18	Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient
19	Perform a critical evaluation of the drug promotional literature
20	Communicate with the patient with empathy and ethics on all aspects of drug use
21	Explain to the patient the relationship between cost of treatment and patient compliance

Anesthesiology:-

Numbers	Topics
1	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of skeletal muscle relaxants
2	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of local anesthetics
3	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of general anaesthetics, and pre- anesthetic medications

Physiology:-

Numbers	Topics
1	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of skeletal muscle relaxants
2	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act on CNS, (including anxiolytics, sedatives & hypnotics, anti-psychotic, anti- depressant drugs, anti-maniacs, opioid agonists and antagonists, drugs used for neurodegenerative disorders, anti-epileptics drugs)
3	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs acting on blood, like anticoagulants, antiplatelets, fibrinolytics, plasma expanders
4	Describe mechanisms of action, types, doses, side effects, indications and contraindications of the drugs modulating the renin-angiotensin and aldosterone system

5	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in hematological disorders like: Drugs used inanemias Colony Stimulatingfactors

Psychiatry:-

Numbers	Topics
1	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act on CNS, (including anxiolytics, sedatives & hypnotics, anti-psychotic, anti- depressant drugs, anti-maniacs, opioid agonists and antagonists, drugs used for neurodegenerative disorders, anti-epileptics drugs)
2	Describe the effects of acute and chronic ethanol intake
3	Describe drugs of abuse (dependence, addiction, stimulants, depressants, psychedelics, drugs used for criminal offences)
4	Describe the process and mechanism of drug deaddiction
5	Demonstrate an understanding of the caution in prescribing drugs likely to produce dependence and recommend the line of management
6	Demonstrate ability to educate public & patients about various aspects of drug use including drug dependence and OTC drugs

Respiratory Medicine :-

Numbers	Topics
1	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in bronchial asthma and COPD
2	Describe the mechanism of action, types, doses, side effects, indications and contraindications of the drugs used in cough (antitussives, expectorants/ mucolytics)

3	Describe the first line antitubercular dugs, their mechanisms of action, side effects and doses.
4	Describe the dugs used in MDR and XDR Tuberculosis

Obstetrics & Gynecology:-

Numbers	Topics
1	Describe mechanism of action, types, doses, side effects, indications and contraindications the drugs used for contraception
2	Describe mechanism of action, types, doses, side effects, indications and contraindications of 1. Drugs used in the treatment of infertility, and 2. Drugs used in erectile dysfunction
3	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of uterine relaxants and stimulants

Dermatology:-

Numbers	Topics
1	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antileprotic drugs
2	Describe drugs used in skin disorders

Ophthalmology:-

Numbers	Topics
1	Describe drugs used in Ocular disorders

Forensic Medicine:-

Numbers	Topics
1	Describe drugs of abuse (dependence, addiction, stimulants, depressants, psychedelics, drugs used for criminal offences)
2	Demonstrate an understanding of the legal and ethical aspects of prescribing drugs

Microbiology:-

Numbers	Topics
1	Describe the mechanism of action, types, indications and contraindications of Pencillines, Cephalosporins, Aminoglycosides, Macrolides, Flouoroquinolones, Sulfonmides, Broad Spectroum Antibiotics
2	Describe the dugs used in MDR and XDR Tuberculosis
3	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antileprotic drugs
4	Describe the mechanisms of action, types, doses, sideeffects, indications and contraindications of the drugs used in malaria, KALA-AZAR, amebiasis and intestinalhelminthiasis
5	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in UTI/ STD and viral diseases including HIV, Antifungal agents

PRACTICAL EXAMINATION- BLUE PRINT

Exercise 1: Prescription writing, Marks: 10

A clinical case scenario is given to the student and asked to write appropriate prescription for the given clinical scenario.

Evaluation will be based on the checklist.

Exercise 2: Drug dose calculation, Marks: 10

Student is given a problem statement and asked to calculate the appropriate dose for drug

Evaluation is by the correction of the problem.

Exercise 3: Graph interpretation based on computer assisted learning, Marks: 10

A graph will be given to the student.

The student will be asked to interpret and draw inference from the graph

Evaluation based on checklist

Exercise 4: Oral rehydration solution (ORS) or critical evaluation of drug promotional literature (DPL), Marks: 10

ORS: A clinical scenario will be given to the student and asked to answer a set of questions related to scenario

DPL: Hard copy of one drug promotional literature will be given to the student and asked to evaluate according to the WHO criteria

Evaluation based on checklist

Exercise 5: Dosage form, Marks: 10, (Competency 2.1)

A clinical scenario is given to the student. The student will be asked to answer a set of questions related to scenario.

Evaluation based on checklist

Exercise 6: Adverse drug reactions, Marks: 10.

A clinical scenario will be given to the student.The student will be asked to answer a set of questions related to scenario.

Evaluation based on checklist

Exercise 7: Drug counselling and communication, Marks: 10.

A clinical scenario will be given to the student.The student will be asked to answer a set of questions related to scenario.

Evaluation based on checklist

Exercise 8: Spotters, Marks: 10.

Questions based on all practical exercises, one mark each, one minute for each question, total of 10 questions will be given

Evaluation based on correction

Checklists

PH 3.1	Check list for Prescription writing	Marks
1	Particular's of Prescriber: Name, qualification, registration number, address, contact details	0.5
2	Date	0.5
3	Particulars of patient: Name, Address, age, gender, height, weight, LMP if applicable	1
4	Clinical details: Chief complaints, history, examination/lab diagnosis, Diagnosis	1
5	Generic name with capital	1
6	Drug form	1
7	Dose	1
8	Frequency	1
9	Duration	1
10	Label: instructions, warnings	1
11	Signature of prescriber	1
	TOTAL	**10 MARKS**

PH 4.2	Graph interpretation from CAL	Marks
1	Describes the Graph (Observation)	2
2	Interprets the graph (Pharmacological actions, receptors, any phenomenon etc)	4
3	Describes the inference drawn from graph	2
4	Implication of the graph	2
	Total	**10**

PH 2.2	Prepare oral rehydration solution from ORS packet and explain its use	Marks
1	Describes the causes and clinical assessment of dehydration	1
2	Enumerate the different types of ORS along with their composition with actions of each ingredient	2
3	Choose the appropriate type of ORS for a given condition/patient	1

4	Calculate the quantity of ORS required to correct / prevent dehydration	1
5	Demonstrate preparation of ORS from sachet	4
6	Enumerate non-diarrheal uses of ORS	1
	Total	**10**

PH 3.3	**Perform a critical evaluation of the drug promotional Literature**	**Marks**
1	Discuss the various types of sources of drug information	2
2	Demonstrate understanding of importance of critical evaluation of drug promotional literature	2
3	Critically evaluate the given drug promotional literature based on WHO criteria	
	▫ Appropriateness of illustration	2
	▫ Relevance of references cited	2
	▫ Content of scientific information	2
	Total	**10**

PH2.1	**Demonstrate understanding of the use of various dosage forms**	**Marks 10**
1	Chooses the appropriate dosage form for given clinical scenario	1
2	Describes the reason for choosing the particular dosage form	2
3	Provides the appropriate instructions to be followed for administering the chosen dosage form	4
4	Describes the merits and demerits of the given dosage form	1
5	Explains the components of the commercial label	2
	Total	**10**

PH 3.4	**To recognise and report an adverse drug reaction**	**Marks**
1	Describes the drug therapy of the given case and explains the rationality of prescription	1
2	Recognise an adverse drug reaction (ADR) in the given case	1
3	Perform causality assessment of the identified ADR using WHO &Naranjo's Scale	2
4	Fill the ADR reporting form (CDSCO from)	2

5	Explain the management of the ADR	1
6	Explain the methods to prevent the occurrence of the ADR	1
7	Report the ADR to the pharmacovigilancecentre	1
8	Describe the Importance of reporting ADRs and pharmacovigilance	1
	Total	**10**

3.8, 5.1, 5.2,5.6	**Communicate with the patient on all aspects of drug use**	**Marks**
1	Describes and comment appropriately on the drug therapy	2
2	Demonstrates effective clinical communication skills	4
3	Describes the ethical/ legal considerations around the case appropriately	2
4	Demonstrates empathy effectively	2
	Total	**10**

CERTIFIABLE COMPETENCIES

Competencies in knowledge domain

Sl no	Topic	Competency
1	General Pharmacology Toxicology Clinical Pharmacology and rational drug use	PH 1.1 to PH 1.12
2	Autonomic Nervous System	PH 1.13 to PH 1.14
3	Autocoids	PH1.16
4	Drugs in anaesthetic practice:	PH 1.15, PH1.17 to PH 1.18
5	Central Nervous System	PH 1.19 to PH 1.23
6	Diuretics	PH 1.24
7	Drugs affecting blood and blood formation	PH 1.25, PH 1.35
8	Cardiovascular System	PH 1.26 to PH 1.31
9	Respiratory System:	PH 1.32 to PH 1.33
10	Gastrointestinal System	PH 1.34
11	Endocrine System	PH 1.36 to PH 1.41
12	Chemotherapy	PH 1.42 to PH 1.49
13	Miscellaneous	PH 1.50 to PH 1.64

Competencies in Skills:

There are **21** competencies in this domain. These include clinical pharmacy (04), Clinical Pharmacology (8), Experimental Pharmacology (2) and Communication (7) as given below .

Topic	Competency	Description
Clinical Pharmacy	PH 2.1	Demonstrate understanding of the use of various dosage forms (oral/local/parenteral; solid/liquid)
	PH 2.2	Prepare oral rehydration solution from ORS packet and explain its use
	PH 2.3	Demonstrate the appropriate setting up of an intravenous drip in a simulated environment.
	PH 2.4	Demonstrate the correct method of calculation of drug dosage in patients including those used in special situations
Clinical Pharmacology	PH 3.1-**C**	Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient
	PH 3.2-**C**	Perform and interpret a critical appraisal (audit) of a given prescription
	PH 3.3-**C**	Perform a critical evaluation of the drug promotional literature
	PH 3.4- **L**	To recognise and report an adverse drug reaction
	PH 3.5-**C**	To prepare and explain a list of P-drugs for a given case/condition
	PH 3.6-**L**	Demonstrate how to optimize interaction with pharmaceutical representative to get authentic information on drugs
	PH 3.7-**L**	Prepare a list of essential medicines for a healthcare facility
	PH 3.8	Communicate effectively with a patient on the proper use of prescribed medication
Experimental Pharmacology	PH 4.1	Administer drugs through various routes in a simulated environment using mannequins
	PH4.2	Demonstrate the effects of drugs on blood pressure (vasopressor and vaso-depressors with appropriate blockers) using CAL

Communication	PH5.1	Communicate with the patient with empathy and ethics on all aspects of drug use
	PH5.2	Communicate with the patient regarding optimal use of a) drug therapy, b) devices and c) storage of medicines
	PH5.3	Motivate patients with chronic diseases to adhere to the prescribed management by the health care provider
	PH5.4	Explain to the patient the relationship between cost of treatment and patient compliance
	H5.5	Demonstrate an understanding of the caution in prescribing drugs likely to produce dependence and recommend the line of management
	PH5.6	Demonstrate ability to educate public & patients about various aspects of drug use including drug dependence and OTC drugs
	PH5.7	Demonstrate an understanding of the legal and ethical aspects of prescribing drugs

C- Needs certification: L Needs Maintenance of a log book

CERTIFIABLE SKILLS

Certifiable skill - 1

Skill: PH 3.1 Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient. Student has to perform this activity 5 times to be certified

Certifiable skill - 2

Skill: PH 3.2 Perform and interpret a critical appraisal (audit) of a given prescription. Student has to perform this activity 3 times to be certified

Certifiable skill - 3

Skill: PH 3.3 Perform a critical evaluation of the drug promotional literature. Student has to perform this activity 3 times to be certified

Certifiable skill - 4

Skill: PH 3.5To prepare and explain a list of P-drugs for a given case/condition. Student has to perform this activity 3 times to be certified

Linker cases:

Case 1: Drugs used for criminal offences (Pharmacology + Forensic medicine)

Case 2: Bronchial asthma (Pharmacology+ Respiratory medicine)

Case 3: Antibiotic stewardship programme (Pharmacology+ Microbiology+ General medicine+ Paediatrics)

Case 4: Renin angiotensin system (Pharmacology+ Physiology)

Case 5: Oral contraceptive pills (Pharmacology+ OBG)

Case 6: Anaemia (Pharmacology+ Physiology+ Pathology+ General medicine+ Paediatrics)

Case 7: National programmes of TB, Malaria etc (Pharmacology+PSM)

V ASSESSMENT METHODS

A. Formative assessment

- Assessment of students shall be based day-to-day assessment pertaining to their performance with respect to assignments, preparation for seminar, involvement in discussion in small group teaching & other academic activities
- Minimum of three examinations shall be conducted & average of three is taken into consideration.
- Theory: 100 marks (Theory:70 & Continuous assessment:30)
- Practical: 100 Marks (Practical:70 & Continuous assessment:30)

Formative assessment marks distribution pattern

Theory (100)		Practical (100)	
Internalassessment (70)	**Continuous assessment (30)**	**Internal assessment (70)**	**Continuous assessment (30)**
• MCQ's 01*20= 20 • Long essay 2*10 = 20 • Short essay 3*5= 15 • Short answers 5*3 = 15	• Unit test/ Assignments / • Pharmacotherapeutic exercises / • Seminar/ Drug station discussion • Vivavoce	• Clinical Pharmacology • Experimental Pharmacology	• Records (10) • Punctuality (10) • Skill certification (10)

Learners must secure at least 50% marks of the total marks (combined in theory and practical / clinical; not less than 40 % marks in theory and practical
separately) assigned for internal assessment in a particular subject in order to be eligible for appearing at the final University examination of that subject.
Internal assessment marks will reflect as separate head of passing at the summative examination.

B. University Examinations:

1. **Theory: 200 marks**
   Two papers of 100 marks each and duration of each paper will be 3 hours. Each paper candidate has to score 40% and aggregate of 2 papers is 50% to pass.

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

Paper–I		Paper -II	
Topics	**Marks**	**Topics**	**Marks**
General Pharmacology	20	Endocrines, Drugs acting on uterus	25
Autonomic nervous system	20	Drugs acting on blood	10

Central nervous system	20	Diuretics and antidiuretics	05
Peripheral nervous system	05	Cardiovascular system + treatment of shock Dyslipidemia	15
Autacoids , NSAIDS & Drugs used in the treatment of gout and rheumatoid arthritis	10	Chemotherapy &Immunomodulators	30
Respiratory system	10	Anti cancer agents	05
Gastrointestinal system	10	Drugs to treat skin disorders, Drugs to treat ocular diseases,	05
Occupational and environmental pesticides, Chelating agents, Pharmacogenomics, Pharmacoeconomics, Drug therapy in special population, Drug regulations, Pharmacovigilance	05	Vitamins, Vaccines, Nutraceuticals, Antiseptics and disinfectants,	05
Total	**100**	**Total**	**100**

Theory question paper pattern:

Sl no	Type of question	No of questions	Marks allotted per question	Marks
1	MCQ's	20	01	20
2	Long essay	2	10	20
3	Short essay	6	05	30
4	Short answers	10	03	30
Total				**100**

2. **Practical examination pattern:** 80 marks
   Candidate has to score 50% to pass.
   Practical exam pattern:

Sl No.	Practical Exercises	Marks
1.	Prescription writing	10
2.	Drug dose calculation	10
3.	Graph interpretation based on computer assisted learning	10

4.	Oral rehydration solution or critical evaluation of drug promotional literature	10
5.	Dosage form	10
6.	Reporting an adverse drug reaction	10
7.	Drug counselling and communication	10
8.	Spotters	10
TOTAL		**80**

3. **Viva- Voce:** 20 marks and it will be added to practical exam marks.

- 4 stations * 05 marks = 20 marks
- Stations:
  - General Pharmacology, Clinical Pharmacology, Autonomic nervous system, Peripheral nervous system.
  - Autacoids , Respiratory system, CVS, Diuretics, Blood, NSAIDS & Drugs used in the treatment of gout and rheumatoid arthritis,
  - CNS, Endocrines.
  - Gastrointestinal system, Chemotherapy, Immunomodulators, Miscellaneous.

VI. LEARNING RESOURCE MATERIALS

- **JSSAHER Online Digital content.**
- **Recommended books: Recent Editions.**

S.no	Name of Book	Author(s)	Publishers
1.	Essentials Of Medical Pharmacology	KD Tripathi	Jaypee
2.	Principles of Pharmacology	HL Sharma & KK Sharma	Paras Medical Publisher
3.	Pharmacology and Pharmacotherapeutics	R.S.*Satoskar*, NirmalaN.Rege,S.D. Bhandarkar	Elsevier
4.	Basic & Clinical Pharmacology	Bertram G. Katzung	Lange
5.	Rang & Dale's Pharmacology	James Ritter Rod Flower David MacEwanHumphrey Rang	Elsevier

PATHOLOGY

PREAMBLE

Pathology bridges the gap between basic sciences and clinical medicine, so a proper understanding of pathological processes is crucial for medical practice. The main goals of undergraduate pathology teaching have always been to provide a language or framework for the description of disease and to provide students with knowledge of the functional and structural changes in disease so that clinical signs and symptoms can be understood and interpreted. The understanding of the pathological basis of disease is so vital for practice of medicine that its teaching needs to be integrated throughout the medical course.

The new Graduate Medical Education Regulations provides for an outcome driven undergraduate curriculum, to provide the orientation and the skills necessary for life-long learning, to enable proper care of the patient. The undergraduate medical curriculum has thus evolved from being teacher-centered to student centered, from discipline-based to integrated core and options-based and from passive acquisition of knowledge imparted by teachers to active problem-based learning. Skill acquisition is an indispensable component of the learning process in modern medicine. However the need for development of professional attitude, behaviour and communication skills befitting a medical practitioner is well perceived and emphasized by the new curriculum with incorporation of AETCOM sessions.

Pathology teaching is perceived as fact-based, but the present curriculum will evolve pathology into clinical oriented specialty. The key elements of the curriculum such as integrating basic science with clinical oriented learning, direct faculty feedback, interactive with experiential learning and competency-based student assessments will bring in remarkable changes in pathology teaching. These changes will provide the Indian Medical Graduate a strong foundation in the pathophysiological basis of disease which is critical to the formation of a competent clinician.

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GOAL AND OBJECTIVES

I. GOAL

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

II. OBJECTIVES

a) KNOWLEDGE

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

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

b) SKILLS

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

1. Describe the rationale and principles of technical procedures of thediagnostic laboratory tests and interpretation of the results.
2. Perform the simple bed-side tests on blood, urine and other biological fluidsamples.

3. Draw a rational scheme of investigations aimed at diagnosing andmanaging the cases of common disorders.
4. Understand biochemical/physiological disturbances that occur as a resultof disease in collaboration with preclinical departments.

c) INTEGRATION

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

d) ATTITUDE AND COMMUNICATION:

- Demonstrate the ability to effectively communicate and work together with peers in the small group setting to successfully address problems of disease process.
- Contribute to create awareness among patients, patient attenders, and public by actively engaging in small group sessions and other required group work within the course.

III. COURSE OUTCOMES:

At the end of the course the learners should be able to

f) Understand the Basic concepts of disease process.
g) Familiarize with etiology, risk factors, pathogenesis and complications of disease.
h) To be familiar with gross and microscopic features.
i) Develop skills regarding procedures like bone marrow aspiration, fine needle aspiration cytology, core biopsy etc
j) To develop good communication skills and maintain confidentiality of patients.

TERMS AND TEACHING GUIDELINES

1. LECTURE

Is a teaching learning method which includes traditional and interactive sessions involving a large group.

2. SMALL GROUP DISCUSSION

Is an instructional method involving small groups of students in an appropriate learning context.

3. DOAP (Demonstration- Observation - Assistance - Performance)

A practical session that allows the student to observe demonstration,assists the performer, perform in a simulated environment, perform under supervision or perform independently.

4. SELF DIRECTED LEARNING

A process in which individuals take the initiative, with or without the help of others in diagnosing their learning needs, formulating learning goals, identifying human and material sources for learning , choosing and implementing appropriate learning methods.

5. SKILL ASSESSMENT

Is a session that assesses the skill of the student including those in the practical laboratory, skills lab, skills station that uses mannequins/ paper case/simulated patients/real patients as the context demands.

6. CORE

A competency that is necessary in order to complete the requirements of the subject (traditional- must know)

7. NON – CORE

A competency that is optional in order to complete the requirements of the subject (traditional- nice (good) to know/ desirable to know.

MINIMUM TEACHING HOURS

Sl No	Topic	Number of competencies	Lecture	SGD/ Tutorial	DOAP	SDL
1	Introduction to pathology	3	1	-	2	0
2	Cell Injury and Adaptation	8	3	2	2	0
3	Amyloidosis	2	1	-	0	0
4	Inflammation	4	4	2	2	0
5	Healing and repair	1	1	-	0	0
6	Hemodynamic disorders	7	5	-	4	0
7	Neoplastic disorders	5	6	4	2	0
8	Basic diagnostic Cytology	3	-	4	2	0
9	Immunopathology and AIDS	7	-	4	0	0
10	Infections and Infestations	4	-	4	0	0
11	Genetic and Paediatric diseases	3	-	2	0	1
12	Environmental and Nutritional diseases	3	-	4	0	0
13	Introduction to haematology	5	1	2	2	0
14	Microcytic Anaemia	3	1	-	1	0
15	Macrocytic Anaemia	4	1	-	1	0
16	Haemolytic Anaemia	7	4	-	2	1
17	Aplastic anaemia	2	-	2	0	0
18	Leucocytic disorders	2	3	2	2	0
19	Lymph node and spleen	7	3	-	2	0
20	Plasma cell disorder	1	-	2	1	0
21	Haemorrhagic disorders	5	3	-	1	1

22	Blood banking and transfusion	6	2	**2**	2	0
23	Clinical Pathology	3	-	**4**	2	0
24	Gastrointestinal Tract	7	4	**2**	2	0
25	Hepatobiliary system	6	3	**2**	2	1
26	Respiratory system	7	6	**2**	4	2
27	Cardiovascular system	10	5	**2**	2	1
28	Urinary tract	16	8	**2**	2	0
29	Male genital tract	5	2	**2**	2	0
30	Female genital tract	9	4	**4**	4	0
31	Breast	4	2	**2**	2	1
32	Endocrine system	9	2	**6**	2	2
33	Bone and soft tissue	5	4	**2**	2	1
34	Skin	4	1	0	2	1
35	Central Nervous system	3	0	**4**	2	0
36	Eye	1	-	**2**	-	-
	Revision at the end of first block (one)	-	-	-	2	-
	Revision at the end of second block (one)	-	-	-	2	-
	Revision at the end of third block (three)	-	-	-	4	-
	Total	**181**	**80**	**68**	**66**	**12**

(CODE: PA)

A foundational knowledge of mechanisms of disease including the etiology, local or systemic response to disease, consequences of disease, and cellular events involved in disease or adaptive changes is essential for understanding disease processes in organ system, pathology and in patients. There are several topics within this competency area. Each topic includes general learning goals and specific objectives that students should know. Table 1 lists the topic areas and reference codes and shows the number of goals and objectives for each. It includes 36 topics with 182 outcomes

Table 1 lists the topic areas and reference codes and shows the number of goals and objectives for each.

Topic	Number of competencies	Number of Objectives	Reference Code
Introduction to Pathology	03		PA1.1 – PA1.3
Cell Injury and Adaptation	08		PA2-1 - PA2.8
Amyloidosis	02		PA3-1 – PA3-2
Inflammation	04		PA4-1 – PA4-4
Healing & repair	01		PA5-1
Hemodynamic disorders	07		PA6-1 – PA6-7
Neoplasia	05		PA7-1 – PA7.5
Basic diagnostic cytology	03		PA8.1 – PA-8.3
Immunopathology & AIDS	07		PA9.1 – PA9.7
Infections & Infestations	04		PA10.1 –PA10.4
Endocrines	03		PA11.1 – PA 11.3
Environmental & nutritional diseases	03		PA12.1 – PA 12.3
Introduction to hematology	O5		PA13.1 – PA 13.5

Microcytic anemia	03		PA14.1 – PA 14.3
Macrocytic anemia	04		PA 15.1 - PA15.4
Hemolytic anemia	06		PA16.1 – PA16.6
Aplastic anemia	02		PA17.1 –PA 17.2
Leukocytic disorder	02		PA18.1 –PA 18.2
Lymphoreticular system	05		PA19.1- PA 19.5
Plasma cell disorders	01		PA20.1
Haemorrhagic disorders	05		PA21.1 – PA 21.5
Blood Banking and Transfusion	06		PA22.1 – PA 22.6
Clinical Pathology	05		PA23.1 – PA 23.5
Gastrointestinaltract	07		PA24.1 – PA24.7
Hepatobiliary system	06		PA25.1 – PA25.6
Respiratory System	07		PA26.1 – PA 26.7
Cardiovascular system	06		PA27.1 – PA27.6
Urinary System	16		PA28-1 – PA 28-16
Male Genital System	05		PA29.1 – PA 29.5
FGT	09		PA30.1 –PA30.9
Breast	05		PA31-1 – PA31.5
Endocrine system	04		PA32-1 –PA32.4
Bone and soft tissue	05		PA33-1 – PA33.5
Skin	04		PA34-1- PA34-4
Genetic disorders	03		PA35.1 – PA35.3
Occular Pathology	01		PA36-1

COMPETENCIES, SPECIFIC LEARNING OBJECTIVES, TEACHING LEARNING AND ASSESSMENT METHODS

Topic: Introduction to Pathology Number of competencies: (03) Number of procedures that require certification: (NIL)							
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA 1.1	**Describe the role of a pathologist in the diagnosis and management of disease**	K	K	Y	Lecture 1 hour	Viva-Voce	
	1.1.1. Define pathology.						
	1.1.2. Describe the concept of disease.						
	1.1.3. Describe the subspecialties of pathology and their role in diagnosis and management of disease.						
PA 1.2	**Enumerate common definitions and terms used in Pathology.**	K	K	Y		Viva-Voce MCQs	
	1.2.1. Define Etiology, Pathogenesis and Pathology.						
PA 1.3	**Describe the history and evolution of Pathology**	K	K	N			
	1.3.1. Describe in brief the history and evolution of Pathology						

Topic: Cell Injury and Adaptation Number of competencies: (08) Number of procedures that require certification: (NIL)							
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA 2.1	**Demonstrate knowledge of the causes, mechanisms, types and effects of cell injury and their clinical significance.**	K	KH	Y	Lecture1 hr	Written, viva voce	
	2.1.1. Enumerate the causes of cell injury.						
	2.1.2 .Mention the types of cell injury and describe the mechanisms of cell injury.						
	2.1.3. Describe the effects of cell injury and the clinical significance of cell injury.						
PA 2.2	**Describe the etiology, mechanisms and morphology of cell injury. Distinguish between reversible-irreversible injury.**	K	KH	Y		Written, viva voce	
	2.2.1 .Describe the mechanisms and morphology of reversible cell injury.						
	2.2.2. Describe the mechanisms and morphology						

	of irreversible cell injury.						
	2.2.3. Enumerate the differences between reversible and irreversible cell injury.						
PA 2.3	**Intracellular accumulation of fats, proteins, carbohydrates, pigments**	K	KH	Y	Lecture	Written and Viva voce	
	2.3.1. Describe and discuss the mechanisms of Intracellular accumulation.						
	2.3.2. Describe and discuss the Intracellular accumulation of lipids and special stains used to demonstrate it.						
	2.3.3. Describe and discuss the etiology, mechanism, morphology of fatty change.						
	2.3.4. Describe and discuss the Intracellular accumulation of proteins in various clinical scenarios.						
	2.3.5 .Describe and discuss the Intracellular accumulation of various pigments and special stains used to demonstrate them.						
PA2.4	**Describe and discuss cell death- Types, mechanisms, necrosis, apoptosis (basic as contrasted with necrosis), autolysis.**	K	KH	Y	Lecture	Written and Viva voce	
	2.4.1. Define and classify cell death.						
	2.4.2. Define necrosis and enumerate the different types with examples.						

	2.4.3. Discuss the morphology of caseous, coagulative , liquefactive, fibrinoid and fat necrosis.						
	2.4.4. Discuss the pathogenesis and pathology of Apoptosis.						
	2.4.5. Describe the clinical significance of Apoptosis and Necrosis.						
	2.5.6. Difference between apoptosis and necrosis.						
	2.5.7. Define autolysis. Explain the mechanism with examples.						
PA 2.5	**Describe and discuss Gangrene and Pathological calcification.**	K	KH	Y	Lecture	Written and Viva voce	
	2.5.1 .Define gangrene. Enumerate types of gangrene with examples.						
	2.5.2. Define pathologic calcification. Enumerate the types with examples.						
	2.5.3 .Describe the mechanisms of the pathologic calcification.						
	2.5.4. Discuss the differences between dry and wet gangrene.						
PA 2.6	**Describe and discuss cellular adaptations: atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia**	K	KH	Y	Lecture	Written and Viva voce MCQs	
	2.6.1. Define and classify cellular adaptations.						

	2.6.2. Define atrophy with examples. Describe the mechanism of atrophy.						
	2.6.3 .Define hypertrophy with examples. Describe the mechanism of atrophy.						
	2.6.4. Describe hyperplasia with examples. Describe the mechanism of hyperplasia.						
	2.6.5. Describe metaplasia with examples. Describe the mechanism of metaplasia.						
	2.6.6. Describe dysplasia with examples. Describe the mechanism of dysplasia.						
PA 2.7	**Describe and discuss the mechanisms of cellular aging and apoptosis**	K	KH	N	Lecture	-	
	2.7.1. Discuss the mechanisms of cellular aging						
PA 2.8	**Identify and describe various forms of cell injuries, their manifestations and consequences in gross and microscopic specimens**	S	SH	Y	DOAP session	Identification of slides and specimen	
	2.8.1. Identify and describe gross and microscopic features of Coagulative necrosis.						
	2.8.2. Identify and describe gross and microscopic features of Caseating necrosis.						
	2.8.3. Identify and describe gross and microscopic features of Fatty change of liver.						
	2.8.4. Identify and describe gross and microscopic features of dystrophic calcification.						

Topic: Amyloidosis Number of competencies: (02) Number of procedures that require certification: (NIL)							
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA 3.1	**Describe the pathogenesis and pathology of amyloidosis**	K	KH	Y	Lecture	Written and Viva Voce MCQs	
	3.1.1 Define and classify amyloidosis. Describe physical and chemical nature of amyloid.						
	3.1.2. Discuss Pathogenesis of Amyloidosis.						
	3.1.3. Describe the pathology of amyloidosis.						
	3.1.4. Enumerate the special stains used to demonstrate amyloid.						
PA3.2	**Identify and describe amyloidosis in a pathology specimen**	S	SH	N	lecture		
	3.2.1. Describe the gross and microscopic features of kidney in amyloidosis.						
	3.2.2. Describe the gross and microscopic features of spleen in amyloidosis.						
	3.2.3. Describe Sago spleen and Lardaceous spleen.						

Topic: Inflammation Number of competencies: (04) Number of procedures that require certification: (NIL)							
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA 4.1	**Define and describe the general features of acute and chronic inflammation including stimuli, vascular and cellular events**	K	KH	Y	Lecture,	Written/ Viva MCQs	General Surgery
	4.1.1. Define Inflammation.						
	4.1.2 .Describe the cardinal signs of acute inflammation.						
	4.1.3. Describe the vascular reactions in acute inflammation.						
	4.1.4. Describe the cellular events in acute inflammation.						
	4.1.5. Mention the endothelial cell and leukocyte adhesion molecules.						
	4.1.6. Describe the steps in phagocytosis.						
	4.1.7. Mention the differences between transudate and exudates.						
	4.1.8. Describe the morphologic patterns of acute inflammation.						
	4.1.9. Describe the outcomes of acute inflammation.						
PA 4.2	**Enumerate and describe the mediators of acute inflammation**	K	KH	Y	Lecture,	Written/ Viva voce Written/ Viva MCQs	General Surgery
	4.2.1. Mention the source and actions of principal mediators of inflammation						
	4.2.2.Explain in detail the arachidonic acid metabolites						
	4.2.3.Enumerate the important cytokines and explain their action in acute inflammation						

PA 4.3	**Define and describe chronic inflammation including causes, types and enumerate non-specific and granulomatous lesions**	**K**	**KH**	**N**	Lecture,	Written/ Viva MCQs	Microbiology
	4.3.1. Define chronic inflammation and Describe the features of chronic inflammation						
	4.3.2. Describe the settings in which chronic inflammation arises.						
	4.3.3. Define granuloma and describe the pathogenesis and morphology of granuloma.						
	4.3.4. Enumerate some examples of granulomatous diseases.						
PA 4.4	**Identify and describe acute and chronic inflammation in gross and microscopic specimens**	**S**	**SH**	**Y**	**DOAP session**	**Skill assessment**	
	4.4.1. Describe the gross and microscopic features of acute inflammation(Acute appendicitis, Lobar Pneumonia)				Demonstration of Specimens and slides	Interpretation of Specimens Slides	
	4.4.2. Describe the gross and microscopic features of chronic granulomatous inflammation(tuberculosis).						

Topic: Healing and repair **Number of competencies: (01) Number of procedures that require certification: (NIL)**							
Number	**Competency** **The student should be able to**	**Domain K/S/A/ C**	**Level K/KH/S H/P**	**Core Y/N**	**Suggested Teaching Learning methods**	**Suggested Assessment methods**	Integration Vertical
PA 5.1	**Define and describe the process of repair and regenerationincluding wound healing and its types**	**K**	**KH**	**Y**	Lecture	Written viva MCQs	General Surgery

	5.1.1. Describe the role of regeneration in tissue repair						
	5.1.2. Describe fracture healing.						
	5.1.3. Mention the factors that influence tissue repair.						
	5.1.4. Describe cutaneous wound healing by primary intention.						
	5.1.5. Describe cutaneous wound healing by secondary intention.						
	5.1.6 .Describe pathological aspects of tissue repair.						

Topic: Hemodynamic disorders **Number of competencies: (07) & SLO** **Number of procedures that require certification :(NIL)**							
Number		Domain	Millers pyramid level	core	T&L Methods	Assessment methods	Integration
PA 6.1	**Define and describe edema, its types, pathogenesis and clinical correlations.**	K	KH	Y	Lecture,	Written/ Viva voce	General Medicine
	6.1.1. Explain fluid homestasis and define edema.						
	6.1.2. Enumerate the types of edema.						
	6.1.3. Describe the pathogenesis of edema(Renal, Cardiac, pulmonary, cerebral, nutritional and hepatic) with clinical features and consequences						
PA 6.2	**Define and describe hyperemia, congestion, hemorrhage.**	K	KH	Y	Lecture		

	6.2.1. Identify the difference between hyperemia, congestion and hemorrhage.						
	6.2.2 Enumerate the causes and identify the gross and microscopic features of Chronic venous congestion of Lung, Liver and Spleen.						
PA 6.3	**Define and describe shock, its pathogenesis and its stages.**	K	KH	Y	Lecture DOAP		
	6.3.1. Define shock.						
	6.3.2. Enumerate the different types of shock and explain the stages of shock.					Written/ Viva voce	General Surgery
	6.3.3. Explain the etiopathogenesis of Septic Shock.						
	6.3.4 .Describe the various stages of shock with their clinical manifestations and morphological changes in various organs.				Lecture, Lecture,		
PA 6.4	**Define and describe normal haemostasis and the etiopathogenesis and consequences of thrombosis.**	K	KH	Y			
	6.4.1. Define and describe normal haemostasis.						
	6.4.2 .Explain etiopathogenenesis of thrombosis.					Written/ Viva voce	
	6.4.3 .Describe the fate of thrombus and consequences of thrombosis.						
PA 6.5	**Define and describe embolism. Enumerate the causes and types of embolism.**	k	KH	Y		Written/ Viva voce	
	6.5.1. Define embolism.						
	6.5.2. Enumerate the types of embolism.						
	6.5.3 .Describe fat embolism.						
	6.5.4. Describe Air embolism.						
	6.5.5 .Describe amniotic fluid embolism.						
	6.5.6 .Describe thrombo embolism.						
PA 6.6	**Define and describe Ischaemia/infarction its types, etiology,morphologic changes and clinical effects.**	K	KH	y	Lecture,	Written/ Viva voce	

	6.6.1. Define and classify infarction						
	6.6.2 .Describe the morphology of clinical effects of infarction.						
PA 6.7	**Identify and describe the gross and microscopic features of infarction in a pathologic specimen**	S	KH	Y	DOAP session	Skill Assessment	
	6.7.1. Describe the gross and microscopy of infarction of lung.						
	6.7.2. Describe the gross and microscopy of infarction spleen.						
	6.7.3. Myocardial infarction.						

Topic: Neoplasia

Number of competencies: (05) & SLO **Number of procedures that require certification :(NIL)**

Number	Competency & SLO	Domain	Millers pyramid level	core	T&L Methods	Assessment methods	Integration
PA7.1	**Define and classify neoplasia. Describe the characteristics of neoplasia including gross, microscopy, biologic, behavior and spread. Differentiate between benign from malignant neoplasm**	K	KH	Y	Lecture Small group discussion Specimens and slide discussion	Knowledge: Long & short essay, Short answers MCQs Spotters, Specimen discussion, OSPE Viva-Voce	
	7.1.1. Define and classify neoplasm.						
	7.1.2. Describe the nomenclature of neoplasms.						
	7.1.3. Describe the differences between benign and malignant tumors.						
	7.1.4. Define differentiation and anaplasia.						
	7.1.5. Describe the rate of growth with reference to benign and malignant tumors.						
	7.1.6. Describe local invasion with reference to benign and malignant tumors.						

	7.1.7. Define metastasis and describe the various routes of spread of tumors.						
	7.1.8. Define dysplasia.						
	7.1.9. Define the terms hamartoma and choristoma.						
PA 7.2	**Describe the molecular basis of cancer.**	K	KH	Y	Lecture, Small group discussion	Knowledge: Long essay, Short essay, Short answers MCQs Viva-Voce	
	7.2.1. Describe the fundamental principles of cancer.						
	7.2.2. Name the normal cell regulatory genes.						
	7.2.3. Describe tumor progression.						
	7.2.4. Name the essential alterations for malignant transformation.						
	7.2.5. Define self-sufficiency in growth signals.						
	7.2.6. Describe normal cell and cell cycle.						
	7.2.7. Enumerate the cell cycle checkpoints and cell cycle inhibitors.						
	7.2.8. Describe oncogenes with examples of various cancers.						
	7.2.9. Describe insensitivity to growth inhibitory signals.						
	7.2.10. Enumerate and explain tumor suppressor genes.						
	7.2.11. Describe RB gene and Knudsons two hit hypothesis.						
	7.2.12. Describe P53 gene.						
	7.2.13. Define altered cellular metabolism and Describe Warburg effect and mechanisms of metabolic remodeling.						
	7.2.14 Describe evasion of apoptosis.						
	7.2.15. Define limitless replicative potential						

	and describe evasion of senescence, evasion of mitotic crisis and capacity of self –renewal.						
	7.2.16. Describe telomeres and the role of telomerase.						
	7.2.17. Define angiogenesis.						
	7.2.18. Describe the mechanism of angiogenesis and its role in tumor progression.						
	7.2.19. Define metastasis.						
	7.2.20. Describe the mechanism of metastatic cascade.						
	7.2.21. Enumerate cancers caused by DNA repair defects.						
PA7.3	**Enumerate carcinogens and describe the process of carcinogenesis.**	K	KH	N	Lecture,	Written MCQs Viva-Voce	Microbiology
	7.3.1. Enumerate the carcinogenic agents.						
	7.3.2. Describe radiation carcinogenesis.						
	7.3.3. Classify chemical carcinogens.						
	7.3.4.Describe the various steps of chemical carcinogenesis						
	7.3.5. Classify microbial carcinogens.						
	7.3.6.Describe the pathogenesis of microbial carcinogenesis with examples of cancers caused by them						
PA7.4	**Describe the effects of tumor on the host including paraneoplastic syndromes**	K	KH	Y	Lecture, Small group discussion	Knowledge: Long essay, Short essay, Short answers MCQs Viva-Voce	
	7.4.1. Enumerate the various effects of tumors on the host.						
	7.4.2. Define paraneoplastic syndrome.						
	7.4.3. Enumerate the paraneoplastic syndromes and cancers associated with them						
	7.4.4. Define grading and staging of cancers						

	7.4.5.Describe laboratory diagnosis of cancer						
	7.4.6. Discuss tumor markers.						
PA7.5	**Describe immunology and the immune response to cancer**	K	KH	N	Lecture		
	7.5.1. Describe the mechanisms of evasion of host defence.						
	7.5.2. Describe cancer-enabling inflammation.						

Topic: Basic diagnostic cytology **Number of competencies:(03)** **Number of procedures that require certification: Nil**							
Number	**Competency & SLO**	Domain	level	core	T&L Methods	Assessment methods	Integration
PA 8.1	**Describe the diagnostic role of cytology and its application in clinical care**	K	KH	Y	Small group discussion	Written viva voce	General surgery
	8.1.1. Enumerate the various diagnostic modalities in cytology and explain its application in clinical care.						
	8.1.2. Describe the procedure of FNAC and its advantages and limitations.						
	8.1.3. Mention the common sites of FNAC.						
PA 8.2	**Describe the basis of exfoliative cytology including the technique & stains used.**	K	KH	Y	Small group discussion	Written viva voce	General surgery
	8.2.1. Define exfoliative cytology.						
	8.2.2. Describe the uses of PAP smear.						
	8.2.3. Describe the technique of PAP smear/Cervical Cytology.						
	8.2.5. Enumerate the various body fluids analysed by exfoliative cytology.						
PA 8.3	**Observe a diagnostic cytology procedure and its staining and interpret the specimen.**	S	KH	Y	DOAP session,	Skill: interpretation of	

	8.3.1 Interpret the given chart of FNAC of lymph node.					charts, OSPE	
	8.3.2 Interpret the given chart of ascitic fluid.						
	8.3.3 Name the stains used in staining ascitic fluid.						

Topic: Immunopathology and AIDS Number of competencies: (07) Number of procedures that require certification: (NIL)							
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA 9.1	**Describe the principles and mechanisms involved in immunity.**	K	KH	Y	Small Group discussion	Written/ Viva voce	
	9.1.1. Define innate immunity.						
	9.1.2. Describe the components and mechanism of innate immunity.						
	9.1.3. Define and enumerate the types of adaptive immunity.						
	9.1.4. Describe the cells of the immune system and their role in immunity.						
	9.1.5. Describe the mechanism of humoral immunity.						
	9.1.6. Describe the mechanism of cell mediated immunity.						

	9.1.7. Define and describe the mechanism of Major Histocompatibility Complex (MHC).						
PA 9.2	**Describe the mechanism of hypersensitivity reactions.**	S	SH	Y	Small group discussion	Written/ Viva voce	
	9.2.1. Define and classify hypersensitivity reactions.						
	9.2.2. Describe the mechanism of Type I hypersensitivity reactions with schematic diagram and examples.						
	9.2.3. Describe the mechanism of Type II hypersensitivity reactions with schematic diagram and examples						
	9.2.4. Describe the mechanism of Type III hypersensitivity reactions with schematic diagram and examples						
	9.2.5. Describe the mechanism of Type IV hypersensitivity reactions with schematic diagram with examples.						
	9.2.6. Categorize the given clinical scenarios into different types of hypersensitivity reactions						
PA 9.3	Describe the HLA system and the immune principle in transplant and mechanism of transplant rejection.	K	KH	Y	Small group discussion	Written/ Viva voce	
	9.3.1. Define HLA system and Major Histocompatibility Complex molecules.						
	9.3.2. Describe the functions of MHC class I and class II molecules.						
	9.3.3. Describe the mechanism of recognition and rejection of allografts.						
	9.3.4. Describe the mechanism of rejection.						
	9.3.5. Describe the methods of increasing graft survival.						
	9.3.6. Describe the mechanism and types of Graft Versus Host Disease (GVHD).						
PA 9.4	Define autoimmunity. Enumerate autoimmune disorders.	K	KH	N	Small group	Written/ Viva voce	

	9.4.1. Define autoimmunity.				discussion		
	9.4.2. Enumerate autoimmune disorders.						
PA 9.5	Define and describe the pathogenesis of systemic Lupus Erythematosus				Small group discussion	Written/ Viva voce	
	9.5.1. Define the criteria for Classification of Systemic Lupus Erythematosus.						
	9.5.2. Describe the etiopathogenesis of Systemic Lupus Erythematosus.						
	9.5.3. Describe the spectrum of autoantibodies in SLE.						
PA 9.6	Define and describe the pathogenesis and pathology of HIV and AIDS.				Small group discussion	Written/ Viva voce	
	9.6.1. Describe the epidemiology of HIV.						
	9.6.2. Describe the etiology and pathogenesis of AIDS.						
	9.6.3. Describe the Major Abnormalities of Immune Function in AIDS.						
	9.6.4. Describe the AIDS-Defining Opportunistic Infections and Neoplasms in Patients with Human Immunodeficiency Virus (HIV) infection.						
PA 9.7	Define and describe the pathogenesis of other common autoimmune diseases.				Small group discussion	Written/ Viva voce	
	9.7.1. Define Sjцgren Syndrome.						
	9.7.2. Describe the etiopathogenesis of Sjцgren syndrome.						
	9.7.3. Describe the clinical features and morphological findings in Sjцgren syndrome.						
	9.7.4. Enumerate organ specific autoimmune diseases and systemic autoimmune diseases.						

Topic: Infections and Infestations Number of competencies: (04) Number of procedures that require certification: (NIL)							
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA 10.1	Define and describe the pathogenesis and pathology of malaria.	K	KH	Y	Small group discussion	Written/ Viva voce	
	10.1.1. Describe the life cycle of Malarial parasite						
	10.1.2. Describe the Pathogenesis and pathology of cerebral malaria clinical features of malaria						
	10.1.3. Describe the complications of Malaria						
PA 10.2	Define and describe the pathogenesis and pathology of cysticercosis.	S	SH	Y	Small group discussion	Written/ Viva voce	
	10.2.1. Describe the pathogenesis and pathology of cysticercosis						
PA 10.3	Define and describe the pathogenesis and pathology of leprosy	K	KH	Y	Small group discussion	Written/ Viva voce	
	10.3.1. Define and Classify Leprosy.						
	10.3.2. Discuss the pathogenesis of leprosy.						
	10.3.3. Differentiate morphology of tuberculoid and lepromatous leprosy.						
	10.3.4. Explain lepra reactions.						
PA10.4	Define and describe the pathogenesis and pathology of common bacterial, viral, protozoal and helminthic diseases	K	KH	N	Small group discussion	Written/ Viva voce	
	10.4.1. Describe general principle of microbial pathogenesis.						

Topic: Genetic and paediatric diseases Number of competencies: (03) Number of procedures that require certification: (NIL)							
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	T&L Methods	Assessment methods	Integration
PA11.1	**Describe the pathogenesis and features of common cytogenetic abnormalities and mutations in childhood**	k	KH	N	SDL		Pediatrics
	11.1.1. Define gene, mutation and the types of mutations.						
	11.1.2. Discuss the transmission patterns of single gene disorders with examples for each						
	11.1.3. Describe the normal Karyotype						
	11.1.4. Discuss the various structural abnormalities of chromosomes						
PA 11.2	**Describe the pathogenesis and pathology of tumor and tumour- like conditions in infancy and childhood**	k	KH	N	SDL		Pediatrics
	11.2.1. Describe the tumour like lesions in infancy and childhood with few examples for each.						
	11.2.2. Name some common benign tumours in children.						
	11.2.3. Enumerate the common childhood malignant tumours.						
	11.2.4. Discuss the molecular pathogenesis and syndromes associated with Wilm's tumour.						
	11.2.5. Enumerate the morphology and clinical features in Wilm's tumour.						
	11.2.6. Discuss the molecular pathogenesis and morphology of Retinoblastoma						
PA 11 .3	**Describe the pathogenesis of common storage disorders in infancy and childhood**	k	KH	N	SDL	**Knowledge:** Long and	Pediatrics

	11.3.1. Discuss the pathogenesis lysosomal storage diseases.					Short essay, Short answers, MCQ's. Written/ Viva voce	
	11.3.2. Describe the morphology of Niemann-Pick disease and Gaucher's disease.						
	11.3.3. Name the lysosomal storage diseases and associated enzyme deficiencies.						

Topic: Environmental and nutritional diseases Number of competencies: (03) Number of procedures that require certification: Nil							
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA 12.1	**Enumerate and describe the pathogenesis of disorders caused by air pollution, tobacco and alcohol**	K	KH	Y	Small group discussion	Knowledge: Short essay, Short answers, MCQs	Community medicine
	12.1.1 Describe health hazards and diseases due to outdoor and indoor air pollution.						
	12.1.2. Describe the effects of tobacco.						
	12.1.3. Describe the association of tobacco with various diseases.						
	12.1.4. Describe the metabolism of alcohol.						
	12.1.5. Describe the adverse health effects of alcohol.						
PA12.2	**Describe the pathogenesis of disorders caused by protein calorie malnutrition and starvation**	K	KH	Y	Small group discussion		Biochemistry Paediatrics
	12.2.1. Describe the pathogenesis of Kwashiorkar.						

	12.2.2. Describe the pathogenesis of Marasmus.						
	12.2.3. Describe the morphology and clinical features of Kwashiorkar and marasmus.						
	12.2.4. Describe the features and causes of cachexia						
	12.2.5. Describe the features of anorexia nervosa and bulimia.						
PA12.3	**Describe the pathogenesis of obesity and its consequences.**		KH	Y	Small group discussion	Written viva	General Medicine
	12.3.1. Describe the consequences of obesity.						
	12.3.2. Describe the pathogenesis of obesity.						
	12.3.3. Describe the association of obesity with various diseases.						

Topic: Introduction to haematology Number of competencies: (05) Number of procedures that require certification:(NIL

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching Learning methods	Suggested Assessment methods	Vertical integration
PA13.1	**Describe hematopoiesis and extramedullary Hematopoiesis** 13.1.1 Describe normal hematopoiesis 13.1.2 List sites of extra medullary hematopoiesis.	K	KH	Y	Lecture,	Written/ Viva voce	General Medicine
PA 13.2	**Describe the role of anticoagulants in Hematology** 13.2.1 List and write the mechanism of action of anticoagulants used in hematology. 13.2.2 Discuss the appropriate use of anticoagulants in hematology and blood bank.	S	SH	Y	DOAP	Skill Assessment	General Medicine
PA 13.3	**Define and classify anemia** 13.3.1 Define Anemia.	K	KH	Y	Lecture,	Written/ Viva voce	General Medicine

	13.3.2 Classify anemia based on morphology and etiopathology						
PA 13.4	**Enumerate and describe the investigation of anemia** 13.4.1.Describe the general investigations of anaemia 13.4.2.Describe the additional investigations required for confirmation of the underlying pathology	K	KH	Y	Lecture,	Written/ Viva voce	General Medicine
PA 13.5	**Perform, Identify and describe the peripheral blood picture in anemia** 13.5.1 Make a peripheral blood smear and stain the smear using Leishman stain 13.5.2 Write the principle of Romanowsky stains 13.5.3 Identify blood cells in a normal peripheral blood smear.	S	SH	Y	DOAP session	Skill Assessment	General Medicine

Topic: Microcytic anemia **Number of competencies: (03)** **Number of procedures that require certification:(NIL)**							
Number	**COMPETENCY SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA14.1	**Describe iron metabolism**	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	Biochemistry
	14.1.1.Describe the iron metabolism						
PA14.2	**Describe the etiology, investigations and differential diagnosis of microcytic hypochromic anemia**	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Medicine
	14.2.1. List the causes of microcytic hypochromic anemia. 14.2.2. Describe the investigations in a case of iron deficiency anemia. 14.2.3. Discuss the differential diagnosis of						

	microcytic hypochromic anemia. 14.2.4. Describe the peripheral blood and bone marrow findings in iron deficiency anemia						
PA14.3	**Identify and describe the peripheral smear in microcytic anemia**	S	SH	Y	DOAP session	Skill Assessment	General Medicine
	14.3.1 Identify and describe the peripheral blood picture of microcytic anemia						

Topic: Macrocytic anemia **Number of competencies: (04)**		**Number of procedures that require certification:(NIL)**					
Number	**COMPETENCY The student should be able to**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA15.1	**Describe the metabolism of Vitamin B12 and the etiology and pathogenesis of B12 deficiency**	K	KH	Y	Lecture,	Written/ Viva voce	Biochemistry General Medicine
	15.1.1 Describe the metabolism of vitamin B12. 15.1.2 Discuss the etiology and pathogenesis of vitamin B12 deficiency						
PA15.2	**Describe laboratory investigations of macrocytic anemia**	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Medicine
	15.2.1 List the causes of macrocytic anemia 15.2.2 Describe laboratory investigations of macrocytic anemia. 15.2.3 Describe the peripheral blood and bone marrow picture in megaloblastic anemia						
PA15.3	**Identify and describe the peripheral blood picture of macrocytic anemia**	S	SH	Y	DOAP session	Skill Assessment	
	15.3.1.Identify and describe the peripheral blood picture of macrocytic anemia						
PA15.4	**Enumerate the differences and describe the etiology**	K	KH	Y	Lecture,	Written/	General

	and distinguishing features of megaloblastic and non-megaloblastic macrocytic anemia				Small group discussion	Viva voce	Medicine
	15.4.1 Discuss the etiology of megaloblastic anemia 15.4.2 Describe the distinguishing features of megaloblastic and non megaloblastic macrocytic anemia. 15.4.3 Enumerate the differences between megaloblastic and non megaloblastic macrocytic anemia.						

Topic: Hemolytic anemia **Number of competencies: (06)**							
Number	**COMPETENCY The student should be able to**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA16.1	**Define and classify hemolytic anemia** 16.1.1. Define hemolytic anemia 16.1.2. Classify hemolytic anemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	Biochemistry General Medicine
PA16.2	**Describe the pathogenesis and clinical features and hematologic indices of hemolytic anemia** 16.2.1 Describe the pathogenesis of intravascular and extravascular hemolytic anemias 16.2.2 Enumerate clinical features in hemolytic anemia 16.2.3 Enumerate the laboratory investigations in haemolytic anaemia.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	Biochemistry General medicine
PA16.3	**Describe the pathogenesis, features, hematologic indices and peripheral blood picture of sickle cell**	K	KH	Y	Lecture,	Written/ Viva voce	Biochemistry

	anemia and thalassemia 16.3.1. Describe the pathogenesis, hematologic features and laboratory diagnosis of sickle cell anemia 16.3.2. Describe the pathogenesis, hematologic features and laboratory diagnosis of thalassemia. 16.3.3. List the features to distinguish thalassemia from iron deficiency anemia.						General medicine
PA16.4	**Describe the etiology pathogenesis, hematologic indices and peripheral blood picture of Acquired hemolytic anemia** 16.4.1 Explain the etiopathogenesis of acquired hemolytic anemia. 16.4.2 Describe the laboratory diagnosis of acquired hemolytic anemia	K	KH	Y	Lecture,	Written/ Viva voce	Biochemistry General medicine
PA16.5	**Describe the peripheral blood picture in different hemolytic Anaemias** 16.5.1. Describe the peripheral blood picture in different hemolytic anemias with respect to RBC morphology	K	KH	Y	Lecture,	Written/ Viva voce	General medicine
PA16.6	**Prepare a peripheral blood smear and identify hemolytic anaemia from it** 16.6.1 Prepare a peripheral smear 16.6.2 Stain the smear 16.6.3 Interpret the smear findings 16.6.4 Interpret the clinical and hematological features in the chart of hemolytic anemia	S	P	Y	DOAP	Skill Assessment	
PA16.7	**Describe the correct technique to perform a cross match** 16.7.1. Describe the steps of Major and minor crossmatching	S	SH	Y	Lecture, Small group discussion	Written/ Viva voce	

Topic: Aplastic anemia Number of competencies: (02)		Number of procedures that require certification: (NIL)					
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA17.1	**Enumerate the etiology, pathogenesis and findings in aplastic anemia**	K	KH	Y	Small group discussion	Written/ Viva voce	General medicine
	17.1.1. Enumerate the causes of aplastic anemia 17.1.2 Enumerate the pathogenesis of aplastic anemia 17.1.3 Enumerate the bone marrow findings in aplastic anemia						
PA17.2	**Enumerate the indications and describe the findings in bone marrow aspiration and biopsy**	S	SH	Y	Small group discussion	Written/ Viva voce	General medicine
	17.2.1. Enumerate the indications for bone marrow aspiration and biopsy 17.2.2. Describe the interpretation of bone marrow aspiration and biopsy						

Topic Leukocytic disorders Number of competencies: (02) Number of procedures that require certification: (NIL)							
Number	**Competency & SLO**	Domain	Millers pyramid level	core	T&L Methods	Assessment methods	Integration
PA18.1	**Enumerate and describe the causes of leucocytosis leucopenia lymphocytosis and leukemoid reactions**	K	KH	Y	Lecture Differential count on Peripheral smear	Written viva voce	
	18.1.1. Define leukocytosis.						
	18.1.2. Enumerate the causes of leukocytosis						
	18.1.3. Define leucopenia						
	18.1.4. Define agranulocytosis						
	18.1.5. Enumerate the causes of leucopenia						
	18.1.6. Enumerate the causes of neutrophilia						
	18.1.7. Enumerate the causes of eosinophilia						
	18.1.8. Enumerate the causes of Basophilia 18.1.9. Describe leukemoid reactions						
PA 18.2	**Describe the etiology, genetics, pathogenesis classification, features, hematologic features of acute and chronic leukemia**	K	KH	Y	Lecture DOAP	Written viva voce Skill Assessment	
	18.2.1. Classify acute leukemias						
	18.2.2. Explain the Basis for Classification of Acute Leukemias						
	18.2.3. Discuss haematological features of Chronic Myeloid Leukemia						
	18.2.4. Discuss haematological features of Acute Myeloid Leukemia						
	18.2.5. Mention the differences between myeloblast and a lymphoblast						
	18.2.6. Mention the similarities and differences between Chronic Myeloid leukemia and myeloid leukemoid reaction						
	18.2.7. Discuss Philadelphia chromosome						

Topic: Lympho reticular system Number of competencies: (05)		Number of procedures that require certification: (NIL)					
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
Pa19.1	**Enumerate the causes and describe the differentiating featuresof lymphadenopathy**	k	KH	Y	Lecture Small group discussion	Written Viva-Voce	General Surgery
	19.1.1. Enumerate causes of lymphadenopathy. 19.1.2. Describe the differentiating features of lymphadenopathy						
PA19.2	**Describe the pathogenesis and pathology of tuberculous lymphadenitis**	k	KH	y			
	19.2.1. Describe the pathogenesis and pathology of tuberculous lymphadenitis						
PA19.3	**Identify and describe the features of tuberculous lymphadenitis in a gross and microscopic specimen**	S	SH	Y			
	19.3.1. Describe the gross features of tuberculous lympadenitis						
	19.3.2. Describe the microscopic features of tuberculous lymphadenitis						
PA19.4	**Describe and discuss the pathogenesis, pathology and the differentiating features of Hodgkin's and non-Hodgkin's lymphoma**	K	KH	Y			
	19.4.1. Classify Lymphoid neoplasm (WHO) and enumerate the clinical features of Lymphoma 19.4.2. Classify Hodgkin’s lymphoma 19.4.3. Enumerate the clinical features of Hodgkin’s Lymphoma						

	19.4.4. Describe etiopathogenesis of Hodgkin's lymphoma						
PA19.5	**Identify and describe the features of Hodgkin's lymphoma in a gross and microscopic specimen** 19.5.1. Identify microscopic features of Hodgkins lymphoma	S	SH	Y			
PA19.6	**Enumerate and differentiate the causes of splenomegaly** 19.6.1. Enumerate the causes of splenomegaly	k	kH	y			General Surgery General medicine
PA 19.7	**Identify and describe the gross specimen of an enlarged spleen** 19.7.1. Identify and describe the gross specimen of an enlarged spleen	s	SH	Y	DOAP		

Topic: Plasma cell disorders **Number of competencies: (01)** **Number of procedures that require certification: (NIL)**							
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA20.1	**Describe the features of plasma cell myeloma**	K	KH	Y	DOAP	Skill Assessment	
	20.1.1. Describe clinical features and laboratory findings in plasma cell myeloma 20.1.2. Describe the complications of plasma cell myeloma						

Topic: Hemorrhagic disorders Number of competencies: (05) Number of procedures that require certification :NIL							
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA21.1	**Describe normal hemostasis**	K	KH	Y	Lecture, Seminars, Small group discussion	Knowledge: Long & short essay, Short answers MCQ's Skill: Charts, viva voce	
	21.1.1. Define hemostasis 21.1.2. Explain the role of vascular endothelium in hemostasis 21.1.3. Explain primary hemostasis 21.1.4. Explain coagulation cascade						
PA21.2	**Classify and describe the etiology, pathogenesis and pathology of vascular and platelet disorders including ITP and haemophilias**	K	KH	Y	Lecture, Seminars, Small group discussion	Knowledge:Long and Short essay, Short answers MCQ's Skill: Charts, Slide discussion, OSPE, Viva-Voce	Pediatrics
	21.2.1. Discuss the causes and consequences of vessel wall abnormalities						
	21.2.2. Define Thrombocytopenia						
	21.2.3. Classify platelet disorders						
	21.2.4. Describe quantitative platelet disorders						
	21.2.5. Describe qualitative platelet disorders						
	21.2.6. Describe the etiopathogenesis and laboratory features of ITP						
	21.2.7. Describe etiopathogenesis and laboratory findings in von Willebrand disease						
	21.2.8. Describe the clinical findings, inheritance and lab findings in haemophilia						
PA21.3	**Differentiate platelet from clotting disorders based on the clinical and hematologic features**	S	SH	Y	Lecture, small group	Knowledge: Short answers,	General Medicine

	21.3.1. Explain the investigations in a patient with bleeding disorder				discussion	MCQ's Skill: Charts, viva voce	
	21.3.2. Describe the clinical features to differentiate platelet and clotting disorders 21.3.3. Describe the laboratory findings to differentiate platelet and clotting disorders						
PA21.4	**Define and describe disseminated intravascular coagulation, its laboratory findings and diagnosis of disseminated intravascular coagulation**	K	KH	Y	Lecture, Seminar, Small group discussion	Knowledge: Long essay, Short essay, Short answers, MCQ's	General Medicine
	21.4.1. Define Disseminated Intravascular Coagulation (DIC)						
	21.4.2. Explain etiopathogenesis and consequences of DIC						
	21.4.3. Describe clinical features and laboratory findings in DIC						
PA21.5	**Define and describe disseminated intravascular coagulation, its laboratory findings and diagnosis of vitamin K deficiency**	K	KH	Y	Lecture, small group discussion	Short answers	General Medicine
	21.5.1. Enumerate the causes of vitamin K deficiency						
	21.5.2. Discuss laboratory findings in vitamin K deficiency						
	21.5.3. Enumerate vitamin K dependent factors						

Topic: Blood banking and transfusion Number of competencies: (06) Number of procedures that require certification: (NIL)							
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA22.1	**Classify and describe blood group systems (ABO and RH)**	K	KH	Y	Lecture, Small group discussion Written/ Viva voce DOAP	Lecture, Small group discussion Written/ Viva voce	
	22.1.1. Describe the basic genetics and biochemistry of ABO Blood group system						
	22.1.2. Describe Bombay Blood group system						
	22.1.3. Describe the subgroups of A, AB and B blood group						
	22.1.4. Describe the antibodies of ABO Blood group system						
	22.1.5. Describe the routine ABO blood grouping procedures						
	22.1.6. Describe the basic genetics of the Rh system						
	22.1.7. Describe the terminologies for Rh system						
	22.1.8. Describe the variants of D antigen						
PA22.2	**Enumerate the indications, describe the principles, enumerate and demonstrate the steps of compatibility testing**	S	SH	Y	Lecture Small group teaching DOAP	Viva	Obstetrics & Gynaecology
	22.2.1. Describe the procedures involved in compatibility testing						
	22.2.2. Describe the purpose of compatibility testing						
	22.2.3. the principle of compatibility testing						
	22.2.4. Describe the major cross matching techniques						
PA22.3	**Enumerate blood components and describe their clinical uses**	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Surgery, General Medicine
	22.3.1. Describe the principles of blood component preparation						

	22.3.2. List the various blood components and plasma derivatives						
	22.3.3. Advantages of blood components over whole blood						
	22.3.4. Enumerate the indications for red cell transfusion						
	22.3.5. Enumerate the indications for platelet concentrate						
	22.3.6. Enumerate the indications for fresh frozen plasma						
	22.3.7. Enumerate the indications for cryoprecipitate						
PA22.4	**Enumerate and describe infections transmitted by blood transfusion**	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	Microbiology
	22.4.1. Enumerate different infections transmitted through blood transfusion. 22.4.2. Enumerate diseases tested for before transfusion and mention the methods of testing.						
PA22.5	**Describe transfusion reactions and enumerate the steps in the investigation of a transfusion reaction**	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Medicine
	22.5.1. Classify and describe transfusion reactions						
	22.5.2. Explain the importance of Hemovigilance						
	22.5.3. Describe the workup of transfusion reactions						
PA22.6	**Enumerate the indications and describe the principles and procedure of autologous transfusion**	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	
	22.6.1. List the advantages and disadvantages of autologous transfusion						
	22.6.2. Describe the types of autologous transfusion						

Topic: Clinical Pathology Number of competencies: (05) Number of procedures that require certification: (NIL)							
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA 23.1	**Describe abnormal urinary findings in disease states and identify and describe common urinary abnormalities in a clinical specimen**	**S**	**SH**	**Y**	**DOAP session**	**Skill Assessment**	
	23.1.1. Mention different methods of collection of urine and preservation 23.1.2. Enumerate disease conditions associated with variation in total urine volume. 23.1.3. Enumerate disease conditions associated with variation in urine pH. 23.1.4. Enumerate disease conditions associated with variation in urine colour. 23.1.5. Enumerate disease conditions associated with variation in urine odour. 23.1.6. Enumerate disease conditions associated with variation in urine clarity/appearance. 23.1.7. Enumerate disease conditions associated with variation in urine specific gravity 23.1.8. Define glycosuria. Enumerate pathological conditions associated with glycosuria. Demonstrate the test for glycosuria. 23.1.9. Define ketonuria. Enumerate pathological conditions associated with ketonuria. Demonstrate the test for ketonuria, 23.1.10. Define proteinuria. Enumerate pathological conditions associated with proteinuria. Demonstrate the test for proteinuria. 23.1.11. Define haematuria, enumerate pathological conditions associated with haematuria. Demonstrate the test for haematuria. 23.1.12. Describe principles of chemical tests and Dipsticks tests for determination of Sugar, Ketone						

	bodies, Proteins and Blood in urine. 23.1.13. Describe urinary microscopic findings with reference to cells, crystals and casts in disease states. 23.1.14 Interpret urinary findings in Nephritic syndrome, Nephrotic syndrome, Diabetic ketoacidosis, Urinary tract infection.						
PA23.2	**Describe abnormal findings in body fluids in various disease states**	**K**	**KH**	**Y**	Small group Discussion.	Written/ Viva voce	
	23.2.1 Name the different body fluids, method of collection and preservation. 23.2.2 Enumerate the differences between transudate and exudate. 23.2.3 Describe changes in body fluid parameters in tuberculosis 23.2.4 Describe changes in body fluid parameters in malignancy 23.2.5 Describe changes in body fluid parameters in pyogenic infections.						
PA23.3	**Describe and interpret the abnormalities in a panel containing semen analysis, thyroid function tests, renal function tests of liver function tests**	**S**	**SH**	**Y**	Small group discussion DOAP session Charts	Skill Assessment	
	23.3.1. Describe the physical examination of semen						
	23.3.2. Interpret the count, motility and morphology of sperms						
	23.3.3. Interpretation of different parameters in liver function tests						
	23.3.4. Interpretation of different parameters in renal function tests						
	23.3.5. Interpretation of different parameters in thyroid function tests						

Topic: Gastrointestinal tract Number of competencies: (07) Number of procedures that require certification: (NIL)							
Number	**COMPETENCY- The student should be able to**	**Domain**	**Millers pyramid level**	**Core**	**T&L Methods**	**Assessment methods**	**Integration**
PA24.1	**Describe the etiology, pathogenesis pathology and clinical features of oral cancers**	K	KH	N	Lecture	Written/ Viva voce	Dentistry
	24.1.1Describe Leukoplakia and Erythroplakia. 24.1.2 Describe etiology and pathogenesis of squamous cell carcinoma of oral cavity. 24.1.3 Describe gross and microscopic features of squamous cell carcinoma of oral cavity 24.1.4 Classify salivary gland tumours 24.1.5 Describe Morphology & clinical features of Pleomorphic adenoma, Warthin tumour & Mucoepidermoid carcinoma.						
PA24.2	**Describe the etiology, pathogenesis, pathology, microbiology, clinical and microscopic features of peptic ulcer disease**	K	KH	Y	Lecture	Written/ Viva voce	General Medicine
	24.2.1Define Gastritis and discuss its types						
	24.2.2Define peptic ulcer disease (PUD) . 24.2.3 Describe etiology and pathogenesis of PUD 24.2.4 Describe gross and microscopic features of Peptic ulcer. 24.2.5 Describe clinical features and complications of PUD.						
PA24.3	**Describe and identify the microscopic features of peptic ulcer**	S	SH	Y	DOAP session	Skill Assessment	
	24.3.1 Describe and identify the microscopic features of peptic ulcer						
PA24.4	**Describe the etiology, pathogenesis and pathologic features of carcinoma of the stomach**	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Surgery
	24.4.1 Describe epidemiology, etiopathogenesis and clinical features of carcinoma stomach. 24.4.2. Describe gross and microscopy of Carcinoma						

	stomach. 24.4.3. Describe gross morphological differences between benign and malignant gastric ulcers. 24.4.4 Enumerate the complications of Peptic Ulcer						
PA24.5	**Describe the etiology, pathogenesis and pathologic features of Tuberculosis of the intestine**	K	KH	N	Small group discussion	Written/ Viva voce	General Surgery
	24.5.1 Describe the etiopathogenesis of tuberculosis intestine						
	24.5.2 Describe the morphological features of intestinal tuberculosis						
	24.5.3 Mention the ulcerative lesions of the intestine with their distinguishing features						
PA24.6	**Describe the etiology, pathogenesis and distinguishing features of Inflammatory bowel disease**	K	KH	Y	Lecture	Written/ Viva voce	General Surgery
	24.6.1 Define IBD 24.6.2 Describe epidemiology, etiology and pathogenesis of IBD. 24.6.3 Describe gross, microscopy, clinical features and complications of Crohn's disease. 24.6.4 Describe gross , microscopy, clinical features & complications of ulcerative colitis. 24.6.5 Enumerate the differences between Ulcerative Colitis and Crohn's disease						
PA24.7	**Describe the etiology, pathogenesis, pathology and distinguishing features of carcinoma of the colon**	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Surgery
	24.7.1 Classify polyps and adenomas of colon 24.7.2 Describe the various syndromes associated with intestinal polyps 24.7.3 Describe aetio pathogenesis of Carcinoma of colon 24.7.4 Describe gross and microscopy of Carcinoma of colon						

	24.7.5 Describe clinical features, staging and prognosis of carcinoma of colon. 24.7.6 Describe the distinguishing features between right sided and left sided colon cancer						

Topic: Hepatobiliary system Number of competencies:(06)					Number of procedures that require certification:(NIL)		
Number	**Competency & SLO**	**Domain**	**Level**	**Core**	**T&L Methods**	**Assessment methods**	**Integration**
PA25.1	**Describe bilirubin metabolism, enumerate the etiology and pathogenesis of jaundice, distinguish between direct and indirect hyperbilirubinemia**	K	KH	Y	Lecture, Small group discussion	Written viva voce	Biochemistry, General Medicine,
	25.1.1 Describe the pathway of bilirubin metabolism						
	25.1.2 Define jaundice and enumerate the causes of jaundice						
	25.1.3 Describe the etiology and pathogenesis of jaundice						
	25.1.4 Distinguish between direct and indirect hyperbilirubinemia						
PA25.2	**Describe the pathophysiology and pathologic changes seen in hepatic failure and their clincial manifestations, complications and consequences**	K	KH	Y	Lecture, Small group discussion (Vertical Integration)	Written viva voce	General Medicine, General Surgery
	25.2.1 Describe the pathogenesis of hepatic failure						
	25.2.2 Describe the clinical features of hepatic failure						
	25.2.3 Describe the complications of hepatic failure						
PA25.3	**Describe the etiology and pathogenesis of viral and toxic hepatitis: distinguish the causes of hepatitis based on the clinical and laboratory features. Describe the pathology, complications and consequences of hepatitis**	K	KH	Y	Lecture, Small group discussion	**Knowledge:** Long and Short essay, Short answers, MCQ's. **Skill**: OSPE,	General Medicine
	25.3.1 Enumerate the causes of viral hepatitis						

	25.3.2 Describe the laboratory evaluation of viral hepatitis					viva voce	
	25.3.3 Describe the risk factors and pathogenesis of Hepatitis B infection						
	25.3.4 Describe the clinical features and morphology of Hepatitis B infection						
	25.3.5 Describe the risk factors and pathogenesis of Hepatitis C infection						
	25.3.6 Describe the complications of viral hepatitis						
	25.3.7 Describe etiopathogenesis of toxic hepatitis						
PA25.4	**Describe the pathophysiology, pathology and progression of alcoholic liver disease including cirrhosis**	K	KH	Y	Lecture	Written viva voce	General Medicine, General Surgery
	25.4.1 Describe the etiopathogenesis and pathophysiology of Alcoholic liver disease 25.4.2.Describe the stages of alcoholic liver disease with progression to cirrhosis 25.4.3.Define cirrhosis 25.4.4.Describe the etiopathogenesis, classification and pathology of cirrhosis 25.4.5.Enumerate the clinical manifestations and complications of cirrhosis						
PA25.5	**Describe the etiology, pathogenesis and complications of portal hypertension**	K	KH	Y	Lecture, Small group discussion	**Knowledge:** Long and Short essay, Short answers, MCQ's.	General Medicine, General Surgery
	25.5.1 Describe the etiopathogenesis of portal hypertension						
	25.5.2 Enumerate the causes of portal hypertension						
	25.5.3 Describe the clinical consequences of portal hypertension						
PA25.6	**Interpret liver function and viral hepatitis serology panel. Distinguish obstructive from non-obstructive jaundice based on clinical features and liver function tests**	S	P	Y	DOAP session	Skill Assessment	General Medicine

	Case scenario with liver function tests reports: 25.6.1.To distinguish between obstructive from non-obstructive jaundice (Charts) 25.6.2. Interpret liver function tests with viral hepatitis serology panel. 25.6.3. Identify gross and microscopic feature of cirrhosis. 25.6.4. Enumerate and recognise different types of gall stones.						

Topic: Respiratory system
Number of competencies: (07) **Number of procedures that require certification: (NIL)**

Number	Competency & SLO	Domain	Miller s pyramid level	Core	T&L Methods	Assessment methods	Integration
PA 26.1	**Define and describe the etiology, types, pathogenesis, stages, morphology and complications of pneumonia**	K/S	SH	Y	Lectures	Written Viva voce	Microbiology, General medicine, Physiology
	26.1.1.Describe the etiological classification and pathogenesis of lobar pneumonia. 26.1.2.Describe the stages of lobar pneumonia 26.1.3.Describe the morphology of Lobar pneumonia. 26.1.4.Enumerate the complications of pneumonia 26.1.5.Distinguish between lobar and bronchopneumonia						
PA 26.2	**Describe the etiology, gross and microscopic appearance and complications of lung abscess.**						
	26.2.1 Explain the etiopathogenesis of lung abscess						
	26.2.2 Describe the gross and microscopic features of Lung abcess						
	26.2.3 Enumerate the complications of Lung Abscess						

PA 26.3	**Define and describe the etiology, types, pathogenesis, stages, morphology and complications and evaluation of Obstructive Airway Disease (OAD) and Bronchiectasis**						Microbiology, General Medicine, physiology
	26.3.1 Define emphysema. Explain the classification of emphysema						
	26.3.2 Describe the aetio pathogenesis of emphysema						
	26.3.3 Discuss the gross and microscopic findings of emphysema						
	26.3.4 Define chronic bronchitis						
	26.3.5 Describe the etiopathogenesis and morphology of chronic Bronchitis						
	26.3.6 Define bronchiectasis, and describe the etiopathogenesis 26.3.7 Describe the gross and microscopic features of bronchiectasis 26.3.8.Describe the etiopathogenesis of Bronchial Asthma						Microbiology, General Medicine
	26.3.9 Enumerate the Pulmonary function test findings and enumerate the complications of Obstructive airway disease						
PA 26.4	**Define and describe the etiology, types, pathogenesis, stages, Morphology, microscopic appearance and complications of tuberculosis**	K	KH	Y	Lecture, video demonstration	MCQ's OSPE Viva-Voce	
	26.4.1 Describe the types and etiopathogenesis of tuberculosis						
	26.4.2 Describe the morphology of primary and secondary tuberculosis						
	26.4.3 Describe the complications of pulmonary Tuberculosis						
PA 26.5	**Define and describe the etiology, types, exposure, environmental influence, pathogenesis, stages,**	K	KH	Y	Lecture, dissection,	Knowledge: Long essay	General

	morphology, microscopic appearance and complications of occupational lung disease				demonstration , Video demonstration	Short essay Short answers MCQ's Skill: Spotters OSPE of clinical case Viva-Voce	Medicine Community Medicine
	26.5.1 Define pneumoconiosis and list the types according to the etiological agents 26.5.2.Describe the risk factors and pathogenesis of pneumoconiosis. 26.5.3.Describe the gross and microscopy of common pneumoconiosis						
PA 26.6	**Define and describe the etiology, types, exposure, genetics environmental influence, pathogenesis, stages, morphology, microscopic appearance, metastases and complications of tumors of the lung and pleura.**						General medicine
	26.6.1 Classify lung carcinomas. 26.6.2 Describe the etiopathogenesis of lung carcinoma 26.6.3.Describe the gross and microscopic features of lung carcinoma 26.6.4.Describe the staging and spread of lung cance 26.6.5. Discuss complications of lung cancer						
	26.6.6 Describe the paraneoplastic syndromes associated with carcinoma of the lung						
	26.6.7 Enumerate the tumors of pleura						
PA 26.7	**Define and describe the etiology, types, exposure, genetics, environmental influence, pathogenesis, morphology, microscopic appearance and complications of mesothelioma**						General Medicine, Community Mrdicine
	26.7.1 Describe in brief the environmental influence and morphology of mesothelioma						
	26.7.2 Describe complications of mesothelioma						

Topic: Cardiovascular system Number of competencies:(06)		Number of procedures that require certification(NIL)					
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**Core**	**T&L Methods**	**Assessment methods**	**Integration**
PA27.1	**Distinguish arteriosclerosis from atherosclerosis. Describe the pathogenesis and pathology of various causes and types of arteriosclerosis** 27.1.1Define arteriosclerosis and distinguish between the types of arteriosclerosis 27.1.2.Discuss the epidemiology and the role of risk factors in the pathogenesis of atherosclerosis 27.1.3.Describe the pathogenesis of atherosclerosis 27.1.4.Describe the morphology and microscopy of atherosclerotic plaque and the complicated plaque 27.1.5.Enumerate the clinical consequences of atherosclerosis in different organs	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	Biochemistry, General Medicine
PA27.2	**Describe the etiology, dynamics, pathology types and complications of aneurysms including aortic aneurysms.** 27.2.1 Define aneurysm and enumerate the causes and types of aneurysms 27.2.2.Describe the dynamics and pathology of abdominal aortic aneurysm 27.2.3.Describe the clinical course and complications of aneurysms 27.2.4.Classify and describe the pathology of aortic dissection	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	Biochemistry Pediatrics General medicine
PA27.3	**Describe the etiology, types, stages pathophysiology, pathology and complications of**	K	KH	Y	Lecture, Small	Written/ Viva voce	Biochemistry

	heart failure. 27.3.1 Describe the etiology, types and stages of heart failure 27.3.2.Describe the pathology and complications of heart failure				group discussion		Pediatrics General medicine
PA27.4	**Describe the etiology, pathophysiology, pathology, gross and microscopic features, criteria and complications of rheumatic fever** 27.4.1 Describe the etiopathogenesis of rheumatic fever 27.4.2.Describe the gross and microscopic features of acute rheumatic carditis 27.4.3.Describe the gross and microscopic features of rheumatic valvular disease 27.4.4.Describe the clinical criteria and complications of acute rheumatic fever	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	Biochemistry General Medicine
PA27.5	**Describe the epidemiology, risk factors, etiology, pathophysiology, pathology, presentations, gross and microscopic features, diagnostic tests and complications of ischemic heart disease** 27.5.1 Describe the epidemiology and risk factors of IHD 27.5.2 .Descibe aetio pathogenesis of IHD 27.5.3 .Describe the gross and microscopic features of myocardial infarction 27.5.4 .Discuss the lab diagnosis and complications of Myocardial Infarction 27.5.5 Describe the complications of Myocardial Infarction	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	Biochemistry Pediatrics General medicine
PA27.6	**Describe the etiology, pathophysiology, pathology, gross and microscopic features, diagnosis and complications of infective endocarditis.** 27.6.1 Describe the etiology, pathogenesis and morphology of infective endocarditis 27.6.2.Describe and differentiate between the major	K	KH		Lecture, Small group discussion	Written/ Viva voce	Biochemistry Pediatrics General medicine

	forms of valvular vegetations						
PA27.7	**Describe the etiology, pathophysiology, pathology, gross and microscopic features, diagnosis and complications of pericarditis and pericardial effusion** 27.7.1 Describe the etiology, types and pathology of pericarditis 27.7.2.Describe the morphological patterns of pericarditis 27.7.3.Describe the etiology and types of pericardial effusions				Lecture		
PA27.8	**Interpret abnormalities in cardiac function testing in acute coronary syndromes** 27.8.1Interpret abnormalities in cardiac function tests in acute coronary syndromes. 27.8.2 Identify gross and microscopy of Atherosclerosis and Myocardial infarction				DOAP		
PA27.9	**Classify and describe the etiology, types, pathophysiology, pathology, gross and microscopic features, diagnosis and complications of cardiomyopathies** 27.9.1 Enumerate the etiology and types of cardiomyopathies 27.9.2.Enumerate the complications of cardiomyopathies			N			
PA27.10	**Describe the etiology, pathophysiology, pathology features and complications of syphilis on the cardiovascular system** 27.10.1 Describe the pathology of Syphilitic aneurysm.			N			

Topic: Urinary Tract Number of competencies: (16) Number of procedures that require certification: (NIL)							
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**Core**	**T&L Methods**	**Assessment methods**	**Integration**
PA28.1	**Describe the normal histology of the kidney**	**K**	**K**	**Y**	Lecture, Small group discussion	Knowledge: Written/ Viva voce short essay, Short answers MCQ's Viva-Voce	
	28.1.1 Describe the normal histology of glomerulus, tubulointerstitium and blood vessels						
PA28.2	**Define, classify and distinguish the clinical syndromes and describe the etiology, pathogenesis, pathology, morphology, clinical and laboratory and urinary findings, complications of renal failure**	**K**	**KH**	**Y**	Lecture Small group Discussion Interpretation of Charts	Knowledge Written/ Viva voce Short essay, Short answers MCQ's Interpretation Charts	General Surgery
	28.2.1 Define and classify renal failure						
	28.2.2 Describe etiopathogenesis of renal failure						
	28.2.3 Describe clinical and laboratory findings of renal failure						
	28.2.4 Enumerate the complications of renal failure						
PA28.3	**Define and describe the etiology, precipitating factors,**	**K,**	**KH**	**Y**	Lecture Small group	Knowledge Written/ Viva	General Medicine

	pathogenesis, pathology, laboratory urinary findings, progression and complications of acute renal failure				discussion	voce Short essay Short answers MCQs	
	28.3.1 Describe etiopathogenesis of acute renal failure						
	28.3.2 Describe morphology of kidneys in acute renal failure						
	28.3.3 Describe clinical manifestations of acute renal failure						
	28.3.4 Describe the laboratory findings in acute renal failure						
	28.3.5 Explain the complications of acute renal failure						
PA28.4	**Define and describe the etiology, precipitating factors, pathogenesis, pathology, laboratory urinary findings progression and complications of chronic renal failure**	**K**	**KH**	**Y**	Lecture, Small group discussion	Knowledge Written/ Viva voce Short essay Short answers MCQs	General Medicine
	28.4.1 Describe etiopathogenesis of chronic renal failure						
	28.4.2 Describe morphology of kidneys in chronic renal failure						
	28.4.3 Describe clinical manifestations of chronic renal failure						
	28.4.4 Describe the laboratory findings in chronic renal failure						
	28.4.5 Explain the complications of chronic renal failure						
PA28.5	**Define and classify glomerular diseases. Enumerate and describe the etiology, pathogenesis, mechanisms of glomerular injury, pathology, distinguishing features**	**K**	**KH**	**Y**	Lecture, Small group Discussion Interpretation	Knowledge Written/ Viva voce Long essay	Physiology, General Medicine

	and clinical manifestations of glomerulonephritis				of charts	Short essay Short answers MCQs Interpretation Charts	
	28.5.1 Classify glomerular diseases						
	28.5.2 Enumerate primary glomerular diseases 28.5.3 Describe the different immune mechanisms of glomerular injury 28.5.4 Describe nephritic and nephrotic syndromes						
	28.5.5 Describe the etiopathogenesis, light microscopic, immunofluoroscence, electron microscopic findings in acute postinfectious glomerulonephritis						
	28.5.6 Describe the laboratory findings in acute postinfectious glomerulonephritis						
	28.5.7 Describe the etiopathogenesis , gross, microscopic and immunofluroscence findings in Rapidly Progressive Glomerulonephritis						
	28.5.8 Describe the etiopathogenesis, light microscopic, immunofluoroscence and electron microscopic findings in minimal change disease						
	28.5.9 Describe the etiopathogenesis, light microscopic, immunofluoroscence and electron microscopic findings in membranous glomerulonephritis						
	28.5.10 Describe focal segmental glomerulosclerosis						
	28.5.11 Describe membranoproliferative glomerulonephritis						
	28.5.12 Enumerate hereditary glomerular diseases						
PA28.6	**Define and describe the etiology, pathogenesis, pathology, laboratory, urinary findings, progression and complications of IgA nephropathy**	**K**	**KH**	**Y**	Lecture, Small group discussion	Knowledge Written/ Viva voce Short essay Short answers	General Medicine
	28.6.1 Describe etiopathogenesis of IgA nephropathy						
	28.6.2 Describe, light microscopic,						

	immunofluoroscence and electron microscopic findings in Ig A Nephropathy					MCQs	
	28.6.3 Describe laboratory findings and complications in IgA nephropathy						
PA28.7	**Enumerate and describe the findings in glomerular manifestations of systemic disease**	**K**	**KH**	**Y**	Lecture, Small group discussion	Knowledge Written/ Viva voce Short essay Short answers MCQs	General Medicine
	28.7.1 Enumerate secondary glomerular diseases 28.7.2 Describe the microscopic findings of kidney in Diabetes mellitus						
	28.7.3 Describe the microscopic findings of kidney in systemic lupus erythematosus						
PA28.8	**Enumerate and classify diseases affecting the tubular interstitium**	**K**	**KH**	**Y**	Lecture, Small group discussion	Knowledge Written/ Viva voce Short essay Short answers MCQs	General Medicine
	28.8.1Enumerate and classify diseases affecting the tubular interstitium						
PA28.9	**Define and describe the etiology, pathogenesis, pathology, laboratory, urinary findings, progression and complications of acute tubular necrosis**	**K**	**KH**	**Y**	Lecture, Small group discussion	Knowledge Written/ Viva voce Short essay Short answers MCQs	General Medicine
	28.9.1 Define acute tubular necrosis						
	28.9.2 Describe the etio pathogenesis of acute tubular necrosis						
	28.9.3 Describe pathology of acute tubular necrosis						
	28.9.4 Describe laboratory, urinary findings, progression and complications of acute tubular necrosis						

PA28. 10	**Describe the etiology, pathogenesis, pathology, laboratory findings, distinguishing features progression and complications of acute and chronic pyelonephritis and reflux nephropathy**	**K**	**KH**	**Y**	Lecture, Small group Discussion. Discussion of Specimens, Slides, Charts	Knowledge Viva voce Long Essay Short essay Short answers MCQs Interpretation of Specimens Slides Charts	Human Anatomy General Surgery
	28.10.1. Discuss the etiopathogenesis of Acute pyelonephritis. 28.10.2. Describe the morphology in Acute pyelonephritis. 28.10.3. Enumerate the lab findings in Acute pyelonephritis. 28.10.4. Discuss the progression and complications of Acute pyelonephritis 28.10.5. Discuss the etiopathogenesis of Chronic pyelonephritis. 28.10.6. Describe the morphology of chronic pyelonephritis. 28.10.7. Enumerate the laboratory findings in chronic pyelonephritis. 28.10.8. List the complications of chronic pyelonephritis. 28.10.9. Enumerate the distinguishing features of acute and chronic pyelonephritis						
PA28.11	**Define classify and describe the etiology, pathogenesis pathology, laboratory, urinary findings, distinguishing features progression and complications of vascular disease of the kidney**	**K**	**KH**	**Y**	Lecture, Small group discussion	Knowledge Written/ Viva voce Short essay Short answers MCQs	General Medicine
	28.11.1Classify various vascular diseases of kidney. 28.11.2. Define Nephrosclerosis. 28.11.3. Mention types of nephrosclerosis. 28.11.4. Discuss the etiopathogenesis of benign						

	nephrosclerosis 28.11.5. Describe the morphology in benign nephrosclerosis. 28.11.6. Enumerate the laboratory findings in benign nephrosclerosis. 28.11.7. Discuss the etiopathogenesis of Malignant nephrosclerosis. 28.11.8. Describe the morphology in malignant nephrosclerosis 28.11.9. Enumerate the laboratory findings malignant nephrosclerosis. 28.11.10. Enumerate the complications in malignant nephrosclerosis. 28.11.11. Describe the distinguishing features of benign and malignant nephrosclerosis						
PA28.12	**Define classify and describe the genetics, inheritance, etiology, pathogenesis, pathology, laboratory, urinary findings, distinguishing features, progression and complications of cystic disease of the kidney**	**K**	**KH**	**Y**	Lecture, Small group Discussion. Discussion of Specimens	Knowledge Written/ Viva voce Short essay Short answers MCQs Interpretation of specimens	General Medicine Pediatrics
	28.12.1.Classify Cystic diseases of kidney. 28.12.2. Describe the genetic inheritance, pathogenesis and, pathology of APKD. 28.12.3. Enumerate the laboratory and urinary findings in APKD. 28.12.4. Describe the progression and complications of APKD 28.12.5.Describe the genetic inheritance, pathogenesis, and pathology of CPKD. 28.12.6. Mention the complications of CPKD.						

PA28.13	**Define classify and describe the etiology, pathogenesis, pathology, laboratory, urinary findings, distinguishing features progression and complications of renal stone disease and obstructive uropathy**	**K**	**KH**	**Y**	Lecture, Small group Discussion. Discussion of Specimens	Knowledge Written/ Viva voce Short essay Short answers MCQs Interpretation of specimens	General Surgery
	28.13.1Enumerate types of renal stones						
	28.13.2Describe etiopathogenesis of different types of renal stones						
	28.13.3Describe clinical course in renal stones						
	28.13.4Define hydronephrosis						
	28.13.5Enumerate the causes for unilateral and bilateral hydronephrosis						
	28.13.6Describe the gross appearance and microscopy of kidneys in hydronephrosis						
	28.13.7Describe the clinical course of unilateral and bilateral hydronephrosis						
PA28.14	**Classify and describe the etiology, genetics, pathogenesis, pathology, presenting features, progression and spread of renal tumors**	**K**	**KH**	**Y**	Lecture, Small group Discussion. Discussion of Specimens and slides	Knowledge Written/ Viva voce Short essay Short answers MCQs Interpretation of specimens and slides	Pediatrics
	28.14.1Classify tumors of kidney						
	28.14.2Describe the genetic features pathogenesis and pathology of renal tumors						
	28.14.3Describe the clinical features and spread of renal tumors						
	28.14.4Describe etiopathogenesis, gross, microscopic findings of Wilm's tumor						
PA28.15	**Describe the etiology, genetics, pathogenesis, pathology, presenting features and progression of thrombotic**	**K**	**KH**	**N**	Lecture, Small group discussion		General Medicine

	angiopathies						
	28.15.1 Define thrombotic microangiopathies						
	28.15.2Enumerate the causes for thrombotic microangiopathies						
PA28.16	**Describe the etiology, genetics, pathogenesis, pathology, presenting features and progression of urothelial tumors**	**K**	**KH**	**N**	Lecture, Small group discussion		General surgery
	28.16.1 Describe the etiology of urothelial carcinoma						
	28.16.2 Describe the grading of urothelial carcinoma						

Topic: Male Genital Tract **Number of competencies:(05)**					**Number of procedures that require certification:(NIL)**		
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA 29.1	**Classify testicular tumors and describe the pathogenesis, pathology, presenting and distinguishing features, diagnostic tests, progression and spread of testicular tumors**	K/S	SH	Y	Lectures, Seminars, gross specimen demonstration, slide demonstration and Small group discussion	Knowledge: Long & short essay, Short answers MCQ's Skill:Spotters, Specimen discussion, slide discussion and Viva-Voce	General Surgery
	29.1.1 Classify Testicular tumors 29.1.2.Describe the pathogenesis of germ cell tumors. 29.1.3. Describe the morphology of seminoma testis. 29.1.4. Discuss the presenting features, progression and spread of seminoma testis. 29.1.5. Distinguish seminoma and Non-						

	seminomatous germ cell tumors. 29.1.6. Enumerate various bio-markers used in the diagnosis of germ cell tumors.						
PA 29.2	**Describe the pathogenesis, pathology, presenting and distinguishing features, diagnostic tests, progression and spread of carcinoma of the penis**	K/S	SH	Y	Lectures, Seminars, Gross specimen demonstration , Slide demonstration and Small group discussion	Knowledge: Short essay, Short answers MCQ's Skill: Spotters, OSPE Viva-Voce	General surgery
	29.2.1Enumerate the premalignant lesions of the penis						
	29.2.2Describe the morphology of carcinoma penis 29.2.3. Describe the presenting features and spread of carcinoma penis 29.2.4. Distinguish Condyloma acuminatum, Bowens disease and carcinoma penis.						
PA 29.3	**Describe the pathogenesis, pathology, hormonal dependency presenting and distinguishing features, urologic findings & diagnostic tests of benign prostatic hyperplasia**	K	KH	N	Lectures, Gross specimen discussion, microscopic slide discussion, small group discussion.	Short assays, short answers, MCQ's, slide discussion	General Surgery
	29.3.1. Discuss the hormonal role in the pathogenesis of BPH. 29.3.2. Describe the morphological features of BPH. . 29.3.3. Enumerate the diagnostic tests in BPH.						
PA 29.4	**Describe the pathogenesis, pathology, hormonal dependency presenting and distinguishing features, diagnostic tests, progression and spread of carcinoma of the prostate**	K	KH	Y	Lecture, small group discussion	Short assays and short answers, MCQs	General surgery
	29.4.1. Describe the etiopathogenesis of Adenocarcinoma prostate emphasising the role of hormones. 29.4.2. Describe the morphological findings in adenocarcinoma prostate. 29.4.3. Describe the clinical features and spread of adenocarcinoma prostate. .						
	29.4.4Describe the role of serum PSA levels in						

	the diagnosis and management of carcinoma prostate.						
PA 29.5	**Describe the etiology, pathogenesis, pathology and progression of prostatitis**	K	KH	N	Lecture, small group discussions	Short answers,	General surgery
	29.5.1Enumerate the causes of prostatitis. 29.5.2. Discuss the pathogenesis of chronic prostatitis (most common) 29.5.3. Describe the morphology of chronic prostatitis. 29.5.4. Discuss the progression of chronic prostatitis. (Optional)						

Topic: Female Genital Tract **Number of competencies: 09** **Number of procedures that require certification :NIL**							
Number	**Competency & SLO**	Domain	Millers pyramid level	core	T&L Methods	Assessment methods	Integration
PA30.1	**Describe the epidemiology, pathogenesis, etiology, pathology, screening, diagnosis, and progression of carcinoma of the cervix**	K	KH	Y	Lecture, Seminars, Small group discussion	**Knowledge:** Long & short essay, Short answers MCQ's	Obstetrics and Gynaecology
	30.1.1Describe the epidemiology of Carcinoma Cervix. 30.1.2 Describe the etiopathogenesis of carcinoma-cervix. 30.1.3 Describe the Progression of CIN to carcinoma						

	cervix 30.1.4 Enumerate the morphological types of carcinoma cervix 30.1.5 Describe the morphology of Squamous cell carcinoma cervix 30.1.6 Describe the screening methods and diagnosis of carcinoma cervix 30.1.7 Describe the spread of carcinoma cervix					**Skill:**Spotters, Specimen discussion, chart, OSPE, Viva-Voce	
PA30.2	**Describe the pathogenesis, etiology, pathology, diagnosis, progression and spread of carcinoma of the endometrium**	K	KH	Y	Lecture, Seminars, Small group discussion	**Knowledge:** Long essay, short essay, Short answers MCQ's **Skill:**Spotters, slide discussion, OSPE Viva-Voce	Obstetrics and Gynaecology
	30.2.1 Describe the etiopathogenesis of carcinoma - endometrium 30.2.2 Describe the morphology of endometrial carcinoma. 30.2.3 Discuss the premalignant lesions and its progression to carcinoma endometrium 30.2.4 Describe the Clinical features and spread of carcinoma endometrium						
PA30.3	**Describe the pathogenesis, etiology, pathology, diagnosis and progression and spread of leiomyomas and leiomyosarcomas**	K	KH	y	Lecture, seminars, small group discussion	**Knowledge:** Short answers, short essay, MCQ's **Skill:** Spotters, Specimen and slide discussion, OSPE, Viva voce	Obstetrics and Gynaecology
	30.3.1 Describe the etiology and pathogenesis of leiomyoma -uterus 30.3.2 Enumerate the types of leiomyoma 30.3.3 Describe the gross and microscopic features of leiomyoma 30.3.4Describe the secondary changes of leiomyoma 30.3.5Enumerate the salient differences between leiomyoma with leiomyosarcoma uterus						
PA30.4	**Classify and describe the etiology, pathogenesis, pathology, morphology, clinical course, spread and**	K	KH	Y	Lecture ,	**Knowledge:**	Obstetrics and

	complications of ovarian tumors				seminars, small group discussion	Long and Short essay, Short answers, MCQ's. **Skill**:Spotters, Specimen and slide discussion, OSPE	Gynaecology
	30.4.1 Classify ovarian tumours 30.4.2 Describe the pathogenesis and morphology of surface epithelial tumours. 30.4.3 Define and describe pseudomyxoma peritonei 30.4.4 Describe the classification and morphological features of germ cell tumours of ovary . 30.4.5 Describe the morphology of sex cord stromal tumors. 30.4.6 Define and describe Krukenberg tumour and Struma ovarii. 30.4.7 Describe the clinical features, mode of spread and tumour markers used in ovarian tumour						
PA30.5	**Describe the etiology, pathogenesis, pathology, morphology, clinical course, spread and complications of gestational trophoblastic neoplasms**	K	KH	Y	Lecture, seminars, small group discussion	**Knowledge**:Long and short essay, Short answers, MCQ's. **Skill:** Spotters, Specimen and slide discussion, OSPE	Obstetrics and Gynaecology
	30.5.1 Define and classify gestational trophoblastic diseases						
	30.5.2 Describe the etiopathogenesis of Molar pregnancy, 30.5.3 Describe the gross and microscopy of complete/partial hydatidiform mole. 30.5.4 Describe the gross & microscopy of Invasive mole and gestational choriocarcinoma.						
PA30.6	**Describe the etiology and morphologic features of cervicitis**	K	KH	N	Lectures, Seminars, small group discussion	**Knowledge**:Short answers	
	30.6.1Describe the etiology and morphologic features of cervicitis. (Optional)						
PA30.7	**Describe the etiology, hormonal dependence, features and morphology of endometriosis**	K	KH	N	Lectures, small group	**Knowledge:**Short essay, short	Obstetrics and Gynaecology

					discussion	answers	
PA30.8	**Describe the etiology and morphologic features of adenomyosis**				Lectures, small group discussion	**Knowledge:** Short essay, short answers	Obstetrics and Gynaecology
	30.8.1Describe the etiology and morphologic features of adenomyosis.	K	KH	N			
PA30.9	**Describe the etiology, hormonal dependence and morphology of endometrial hyperplasia**	K	KH	N	Lectures, small group discussion	**Knowledge:** Short essay, short answers **Skill:** Spotters, Slide discussion	Obstetrics and Gynaecology
	30.9.1Discuss the etiopathogenesis, clinical features, morphology of endometrial hyperplasia						

Topic: Breast	**Number of competencies: (04)**				**Number of procedures that require certification: (NIL)**		
Number	**Competency & SLO**	**Domain**	**Millers pyramid level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA31.1	**Classify and describe the types, etiology, pathogenesis,Pathology and hormonal dependency of benign breast disease**	K	KH	Y	Lecture Small group discussion	Knowledge: Long & short essay, Short answers MCQ's Skill:Spotters, OSPE discussion Viva-Voce	Human Anatomy, General Surgery
	31.1.1. Classify the benign epithelial lesions of breast and discuss their clinical significance 31.1.2. Describe etiopathogenesis and morphology of fibrocystic disease 31.1.3. Define and classify Proliferative breast diseases (proliferative breast disease with atypia and proliferative breast disease without atypia). 31.1.4. List the fibroepithelial neoplasms, Discuss their clinical significance and morphology of fibroadenoma and phyllodes tumour						
PA31.2	**Classify and describe the epidemiology, pathogenesis, classification, morphology, prognostic factors, hormonal dependency, staging and spread of**	K	KH	Y	Lecture	Knowledge: Long & short essay,	General Surgery

	carcinoma of the breast						
	31.2.1Describe the epidemiology and etiopathogenesis of breast carcinoma					Short answers MCQ's Skill:Spotters, Specimen OSPE discussion Viva-Voce	
	31.2.2Classify breast carcinoma						
	Describe the molecular subtypes of Invasive Breast Cancer.						
	31.2.3Describe the morphology of carcinoma breast.						
	31.2.4Describe the prognostic and predictive Factors of breast carcinoma						
	31.2.5Describe the staging and spread of carcinoma of the breast						
	31.2.6Describe Paget disease of nipple.						
PA31.3	**Describe and identify the morphologic and microscopic features of carcinoma of the breast**	S	SH	N	DOAP session	Knowledge: Long & short essay, Short answers MCQ's Skill:Spotters, Specimen OSPE discussion Viva-Voce	General Surgery
	31.3.1Describe the gross appearance of breast carcinoma						
	31.3.2Describe the microscopic features of carcinoma of the breast						
PA31.4	**Enumerate and describe the etiology, hormonal dependency and pathogenesis of gynecomastia**	K	KH	N	Lecture Small group discussion	Knowledge: Short essay short answers MCQ's Viva-Voce	Pediatrics, General Medicine
	31.4.1Define and discuss the etiology of gynecomastia						
	31.4.2Describe the pathogenesis and morphology of gynecomastia						

Topic: Endocrine system Number of competencies: (09)				Number of procedures that require certification: Nil			
Number	**Competency & SLO**	**Domain**	**level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA32.1	**Enumerate, classify and describe the etiology, pathogenesis, pathology and iodine dependency of thyroid swellings**	k	KH	Y	Lecture, Small group discussion	**Knowledge:**,long and short essay, Short answers ,MCQ's Skill:Spotters, OSPE Discussion, Viva-Voce	Human Anatomy Physiology, General Medicine, General Surgery
	32.1.1Describe the aetiopathogenesis of simple and multinodular Goitre 32.1.2Describe the morphology of Goitre 32.1.3. Classify thyroid neoplasms 32.1.4 Describe the role of iodine in papillary thyroid carcinoma 32.1.5. Describe the pathogenesis and pathology of papillary thyroid carcinoma						
PA32.2	**Describe the etiology, cause, iodine dependency, pathogenesis, manifestations, laboratory and imaging features and course of thyrotoxicosis**	k	KH	Y	Lecture, Small group discussion	**Knowledge:** Long and Short essay, Short answers, MCQ's. Written/ Viva voce	Physiology, General Medicine
	32.2.1Define Thyrotoxicosis 32.2.2. Enumerate the causes of Thyrotoxicosis 32.2.3. Describe role of Iodine in Thyrotoxicosis 32.2.4Describe the etiopathogenesis and clinical features of Grave's disease 32.2.5. Describe the laboratory and imaging features of Thyrotoxicosis						
PA32.3	**Describe the etiology, pathogenesis, manifestations, laboratory and imaging features and course of hypothyroidism**	k	KH	Y	Lecture, Small group discussion	**Knowledge:** Long and Short essay, Short answers, MCQ's. Written/ Viva voce	Physiology, General Medicine
	32.3.1Define Hypothyroidism 32.3.2. Enumerate the causes of Hypothyroidism 32.3.3. Describe the pathogenesis of Hypothyroidism 32.3.4. Describe role of Iodine in Hypothyroidism 32.3.5. Describe the Clinical Features and the course						

	in Hypothyroidism 32.3.6. Describe the laboratory and imaging features of Hypothyroidism 32.3.7. Describe the etiopathogenesis and pathology of Hashimoto's thyroiditis						
PA32.4	**Classify and describe the epidemiology, etiology, pathogenesis, pathology, clinical laboratory features, complications and progression of diabetes mellitus**	k	KH	Y	Lecture,	**Knowledge:** Long and Short essay, Short answers, MCQ's. **Skill**: OSPE, viva voce, urine analysis	Physiology, General Medicine
	32.4.1 Enumerate the criteria for the diagnosis of diabetes mellitus						
	32.4.2 Classify diabetes mellitus						
	32.4.3 Describe the normal glucose homeostasis						
	32.4.4 Describe the Pathogenesis and pathology of type I diabetes						
	32.4.5 Describe the Pathogenesis and pathology of type II diabetes						
	32.4.6 Describe the Pathogenesis of acute metabolic complications of Type I and Type II diabetes mellitus						
	32.4.7 Describe the Pathogenesis of chronic complications of diabetes mellitus						
	32.4.8 Describe the Morphology of complications of diabetes mellitus						
PA32.5	**Describe the etiology, genetics, pathogenesis, manifestations, laboratory and morphologic features of hyperparathyroidism**	k	KH	N	Lecture, Small group discussion,	**Knowledge:** Long and Short essay, Short answers, MCQ's. Written/ Viva voce	Physiology, General Medicine
	32.5.1Classify hyperparathyroidism. Mention the causes of primary hyperparathyroidism						
	32.5.2Describe the pathogenesis and morphology of primary hyperparathyroidism						
	32.5.3Describe the laboratory and clinical features of primary hyperparathyroidism						
	32.5.4Describe the causes, morphology and clinical course of secondary hyperparathyroidism						
PA32.6	**Describe the etiology, pathogenesis, manifestations, morphologic features, complications and metastases of pancreatic cancer**				Lecture, Small group discussion	**Knowledge:** Long and Short essay,	General Surgery

	32.6.1Describe the etiopathogenesis and morphology of pancreatic cancer.					Short answers, MCQ's. Written/ Viva voce	
	32.6.2Describe the morphological features and complications of pancreatic cancer.						
PA32.7	**Describe the etiology, pathogenesis, manifestations, laboratory, morphologic features, complications of adrenal insufficiency**	k	KH	N	Lecture, Small group discussion	**Knowledge:**,long and short essay, Short answers ,MCQ's. Written/ Viva voce	Physiology, General Medicine
	32.7.1 Classify and list the etiology of adrenocortical insufficiency						
	32.7.2Describe the pathogenesis and morphology of Addison disease						
	32.7.3Enumerate clinical course and laboratory findings of Addison disease						
PA32.8	**Describe the etiology, pathogenesis, manifestations, laboratory, morphologic features, complications of Cushing's syndrome**	k	KH	N	Lecture, Small group discussion	**Knowledge:**,long and short essay, Short answers ,MCQ's. Written/ Viva voce	Physiology, General Medicine
	32.8.1 Describe the etiology and pathogenesis of Cushing's syndrome						
	32.8.2 Describe the clinical manifestations of Cushing's syndrome						
	32.8.3 Enumerate the laboratory test and complications of Cushing's syndrome						
PA32.9	**Describe the etiology, pathogenesis, manifestations, laboratory and morphologic features of adrenal neoplasms**	K	KH	N	Lecture, Small group discussion	**Knowledge:**,long and short essay, Short answers ,MCQ's, Written/ Viva voce	Human Anatomy, Physiology, General Medicine, General Surgery
	32.9.1 Describe the etiology and pathogenesis of adrenal neoplasms						
	32.9.2 Describe the clinical manifestations of adrenal neoplasms						
	32.9.3 Enumerate the laboratory test and complications of adrenal neoplasms						

Topic: Bone and soft tissue Number of competencies: (05) Number of procedures that require certification: Nil							
Number	**Competency & SLO**	**Domain**	**level**	**core**	**T&L Methods**	**Assessment methods**	**Integration**
PA33.1	**Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications of osteomyelitis**	k	KH	Y	Lecture, Small group discussion	**Knowledge:**,long and short essay, Short answers ,MCQ's **Skill:** specimen discussion, viva voce	Anatomy, Orthopaedics
	33.1.1 Define and classify osteomyelitis						
	33.1.2 Describe the aetiopathogenesis of Osteomyelitis						
	33.1.3 Describe the radiologic and morphologic features of osteomyelitis						
	33.1.4 Describe the complications of osteomyelitis						
PA33.2	**Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications and metastases of bone tumors**	k	KH	Y	Lecture, Small group discussion	**Knowledge:**Long and Short essay, Short answers, MCQ's. **Skill:** slide and specimen discussion, viva voce	Orthopaedics
	33.2.1 Classify bone tumors						
	33.2.2 Describe aetiopathogenesis of Bone tumors						
	33.2.3 Describe radiologic and morphologic features of Bone Tumors						
	33.2.4 Describe the clinical features , complications and metastases of bone tumors						
PA33.3	**Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications and metastases of soft tissue tumors**	k	KH	Y	Lecture, Small group discussion	**Knowledge:** Short essay, Short answers, MCQ's.	orthopaedics,
	33.3.1 Classify soft tissue tumors						
	33.3.2 Define and classify soft tissue tumors. 33.3.3. Describe aetiopathogenesis of soft tissue tumors. 33.3.4. Describe the morphological features of common (lipoma, liposarcoma, fibroma, fibrosarcoma rhabdomyoma and rhabdomyosarcoma 33.3.5 Describe the clinical and radiological features						

	of soft tissue tumors. 33.3.6 Describe the metastases of soft tissue tumors						
PA33.4	**Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications of Paget's disease of the bone**	k	KH	N	Lecture, Small group discussion	**Knowledge:** Short answers, MCQ's.	Orthopaedics
	33.4.1. Define Paget's disease of the bone 33.4.2. Describe the aetipathogenesis of Paget's disease of the bone 33.4.3. Describe the Morphological features of Paget's disease of the bone 33.4.4. Describe the Radiological Features of Paget's disease of the bone 33.4.5. Describe the complications of Paget's disease of the bone.						
PA33.5	**Classify and describe the etiology, immunology, pathogenesis, manifestations, radiologic and laboratory features, diagnostic criteria and complications of rheumatoid arthritis**	k	KH	N	Lecture, Small group discussion	**Knowledge:** Long and Short essay, Short answers, MCQ's.	General Medicine,
	33.5.1 Describe the etiopathogenesis of rheumatoid arthritis						
	33.5.2 Describe the clinical radiologic and laboratory features of rheumatoid arthritis						
	33.5.3 Describe the complications of Rheumatoid arthritis						

Topic: Skin Number of competencies: (04) Number of procedures that require certification: Nil							
Number	**Competency & SLO**	Domain	Millers pyramid level	core	T&L Methods	Assessment methods	Integration
PA34.1	**Describe the risk factors pathogenesis, pathology and natural history of squamous cell carcinoma of the skin**	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	Dermatology, Venereology & leprology
	33.4.1 Enumerate the preneoplastic lesions of the skin						
	33.4.2 Describe the aetiopathogenesis of Squamous cell carcinoma of the skin						
	33.4.3 Describe the clinical and morphological features of Squamous cell carcinoma						
PA34.2	**Describe the risk factors pathogenesis, pathology and natural history of basal cell carcinoma of the skin**	K	KH	Y			
	34.2.1 Describe the aetiopathogenesis of Basal Cell carcinoma						
	34.2.2 Describe the clinical and morphological features of Basal Cell Carcinoma						
PA34.3	**Describe the distinguishing features between a nevus and melanoma. Describe the etiology, pathogenesis, risk factors morphology clinical features and metastases of melanoma**	K	KH	N	Lecture, Small group discussion	Written/ Viva voce	Dermatology, Venereology & leprology
	34.3.1Define nevus 34.3.2. Define Melanoma 34.3.3. Describe the distinguishing features between a nevus and melanoma. 34.3.4 Describe the etiopathogenesis of melanoma 34.3.5. Describe the clinical and morphologic features of melanoma 34.3.6. Describe the metastasis of melanoma						
PA34.4	**Identify, distinguish and describe common tumors of the skin**	K	KH	Y	Lecture, Small group	Written/ Viva voce	Dermatology,

	34.4.1 Distinguish the morphologic features of Squamous cell carcinoma, Basal Cell Carcinoma, melanoma and Nevus				discussion		Venereology & leprology

Topic: Central Nervous System					**Number of competencies: (03)**		**Number of**
procedures that require certification: Nil							
Number	**Competency & SLO**	Domain	level	core	T&L Methods	Assessment methods	Integration
PA35.1	**Describe the etiology, types and pathogenesis, differentiating factors, CSF findings in meningitis**	k	KH	Y	Lecture, Small group discussion	**Knowledge:**,long and short essay, Short answers ,MCQ's. Written/ Viva voce	Microbiology, General Medicine
	35.1.1. Describe the etiopathogenesis of meningitis 35.1.2. Enumerate the types of meningitis 35.1.3. Distinguish between different types of meningitis 35.1.4. Describe the CSF findings in various types of meningitis.						
PA35.2	**Classify and describe the etiology, genetics, pathogenesis, pathology, presentation sequelae and complications of CNS tumors**	k	KH	Y	Lecture, Small group discussion	**Knowledge:** Long and Short essay, Short answers, MCQ's. Written/ Viva voce	Pediatrics
	35.2.1Classify CNS tumours 35.2.2. Describe the genetics of CNS tumours 35.2.3Describe the pathology of CNS tumours. 35.2.4. Describe the clinical features and complications of CNS tumors						
PA35.3	**Identify the etiology of meningitis based on given CSF parameter** Identify the etiology of meningitis based on given CSF parameters	S	P	Y	DOAP session Charts interpretation	**Skill Assessment** Charts interpretation	General Medicine, Microbiology

Topic: Occular Pathology Number of competencies: (01)		Number of procedures that require certification:(Nil)					
Number	**Competency & SLO**	Domain	Millers pyramid level	core	T&L Methods	Assessment methods	Integration
PA 36.1	**Describe the etiology, genetics, pathogenesis, pathology, presentation, sequelae and complications of retinoblastoma**	K	KH	N	Lecture, Small group discussion	Written/ Viva voce	Ophthalmology
	36.1.1 Describe the etiopathogenesis and pathology of retinoblastoma						
	36.1.2 Describe pathology and complications of retinoblastoma						

TOPICS FOR SELF DIRECTED LEARNING (SDL)

Sl.no	Competency	Topic	Hours
1.	PA 11.3	STORAGE DISORDERS IN INFANCY AND CHILDHOOD	1
2.	PA 24.5	TB INTESTINE	1
3.	PA 27.10	SYPHILIS IN CVS	1
4.	PA 21.2	THROMBOTIC MICROANGIOPATHY	1
5.	PA 31.3	MORPHOLOGICAL AND MICROSCOPIC FEATURES- CA BREAST	1
6.	PA 34.3 & 34.4	MELANOMA WITH COMMON TUMOURS OF SKIN	1
7.	PA 33.4	PAGET DISEASE OF BONE	1
8.	PA 32	PANCREATITIS	1
9.	PA 32.6	CA PANCREAS	1
10	PA 32.1	THYROID CANCER	1
11	PA 25	PRIMARY AND SECONDARY MALIGNANCIES OF LIVER	1
12	PA 26.7	MESOTHELIOMA	1

CERTIFIABLE COMPETENCIES

It should be certified that the student is competent to perform the below skills independently without supervision.

SI. NO	NUMBER	COMPETENCY
1	**PA-16.6**	Prepare peripheral blood smear. Identify hemolytic anaemia
2	**PA-25.6**	Interpret liver function and viral hepatitis serology panel. Distinguish obstructive from non-obstructive jaundice based on clinical features and liver function tests
3	**PA-35.3**	Identify the etiology of meningitis based on given CSF parameters

NOTE: The evaluation of charts on certifiable competencies should be completed in formative and internal assessment and duly documented in the log book.

TIME TABLE

OMPETENCY DISTRIBUTION IN EACH BLOCK

FIRST BLOCK

SI.NO		TOPIC
LECTURES AND SGDs TO BE COVERED IN FIRST BLOCK		
1.	PA 1	PA1.2 Enumerate common definitions and terms used in Pathology PA1.3 Describe the history and evolution of Pathology
2.	PA 2	PA2.1 Demonstrate knowledge of the causes, mechanisms, types and effects of cell injury and their clinical significance
3.	PA 2	PA2.2 Describe the etiology of cell injury. Distinguish between reversible-irreversible injury: mechanisms; morphology of cell injury
4.	PA 2	PA2.3 Intracellular accumulation of fats, proteins, carbohydrates, pigments
5.	PA 2	PA2.4 Describe and discuss Cell death- Apoptosis and autolysis
6.	PA 2	PA2.7 Describe and discuss the mechanisms of cellular aging and apoptosis
7.	PA 4	PA4.1 Define and describe the general features of acute and chronic inflammation including stimuli, vascular events
8.	PA 4	PA4.1 Define and describe the general features of acute and chronic Inflammation including stimuli, and cellular events
9.	PA 4	PA4.2 Enumerate and describe the mediators of acute inflammation
10.	PA 4	PA4.3 Define and describe chronic inflammation including causes, types, enumerate types, non-specific and granulomatous; and examples of each
11.	PA 5	PA5.1 Define and describe the process of repair and regeneration including wound healing and its types
12.	PA 6	PA6.1 Define and describe edema, its types, pathogenesis and clinical correlations
13.	PA 6	PA6.3 Define and describe shock, its pathogenesis and its stages
14.	PA 6	PA6.4 Describe the etiopathogenesis and consequences of thrombosis
15.	PA 6	PA6.5 Define and describe embolism and its causes and common types
16.	PA 7	PA7.1 Define and classify neoplasia, biologic behaviour and spread
17.	PA 7	PA7.1 Define and classify neoplasia, biologic behaviour and spread
18.	PA 7	PA7.2 Describe the molecular basis of cancer
19.	PA 7	PA7.2 Describe the molecular basis of cancer
20.	PA 7	PA7.3 Enumerate carcinogens and describe the process of carcinogenesis
21.	PA 7	PA7.3 Enumerate carcinogens and describe the process of carcinogenesis
22.	PA 9	PA9.3 HLA system and the immune principles. Describe the immune principles in transplant and mechanism of transplant rejection
23.	PA 9	PA9.4 Define autoimmunity. Enumerate autoimmune disorders

24.	PA 9	PA9.5 Define and describe the pathogenesis of Systemic Lupus Erythematosus
25.	PA 9	PA9.6 Define and describe the pathogenesis and pathology of HIV and AIDS
26.	PA 9	9.7 Define and describe the pathogenesis of other common autoimmune diseases
27.	PA 10	PA10.3 Define and describe the pathogenesis and pathology of leprosy
28.	PA 13	PA13.3 Define and classify anemia
29.	PA 13	PA13.4 Enumerate and describe the investigation of anemia
30.	PA 14	PA14.1 Describe iron metabolism PA14.2 Describe the etiology, investigations and differential diagnosis of microcytic hypochromic anemia
31.	PA 15	PA15.1 Describe the metabolism of Vitamin B12 and the etiology and pathogenesis of B12 deficiency PA15.2 Describe laboratory investigations of macrocytic anemia PA15.4 Etiology and Written/ Viva voce General Medicine distinguishing features of megaloblastic and non-megaloblasticmacrocytic anemia
32.	PA 16	PA16.1 Define and classify hemolytic anemia PA16.2 Describe the pathogenesis and clinical features and hematologic indices of hemolytic anemia PA16.5 Describe the peripheral blood picture in different hemolytic anaemias
33.	PA 16	PA16.3 Describe the pathogenesis, features, hematologic indices and peripheral blood picture of sickle cell anaemia and thalassemia
34.	PA 16	PA16.4 Describe the etiology, pathogenesis, hematologic indices and peripheral blood picture of Acquired haemolytic anaemia
35.	PA 17	PA 17.1 Enumerate the etiology, pathogenesis and findings in aplastic anemia PA17.2 Enumerate the indications and describe the findings in bone marrow aspiration and biopsy
36.	PA 18	PA 18.2 Describe the etiology, genetics, pathogenesis classification, features, hematologic features of acute leukemia
37.	PA 18	PA 18.2 Describe the etiology, genetics, pathogenesis classification, features, hematologic features of chronic leukemia
38.	PA 19	PA19.4 Describe and discuss the pathogenesis, pathology and the differentiating features of Hodgkin's and non-Hodgkin's lymphoma
39.	PA 21	PA21.1 Describe normal hemostasis and etiology, pathogenesis and pathology haemophilias
40.	PA 21	PA21.2 Classify and describe the etiology, pathogenesis and pathology of vascular and platelet disorders including ITP
41.	PA 21	PA21.4 Define and describe disseminated intravascular coagulation, its laboratory findings and diagnosis of DIC PA21.5 Define and describe disseminated intravascular coagulation, its laboratory findings and diagnosis of Vitamin K def.
42.	PA 22	PA22.4 Enumerate blood components and describe their clinical uses PA22.5 Enumerate and describe infections transmitted by blood transfusion
43.	PA 22	PA22.6 Describe transfusion reactions and enumerate the steps in the investigation of a transfusion reaction PA22.7 Enumerate the indications and describe the principles and procedure of autologous transfusion
44.	PA 11	PA11.1 Describe the pathogenesis and features of common cytogenetic abnormalities and mutations in childhood with

		laboratory diagnosis of Genetic disorder
45.	PA 11	PA11.2 Describe the pathogenesis and pathology of tumor and tumour like conditions in infancy and childhood (Nephroblastoma, Retinoblastoma, Neuroblastoma)
46.	PA 11	PA11.3 Describe the pathogenesis of common storage disorders in infancy and childhood
47.	PA 12	PA12.2 Describe the pathogenesis of disorders caused by protein calorie malnutrition and starvation
48.	PA 12	PA12.3 Describe the pathogenesis of obesity and its consequences
DOAP TOPICS TO BE COVERED IN FIRST BLOCK		
1	PA 2.5	Degeneration Specimens-Fatty liver Slides- Fatty liver, dystrophic calcification
2	PA 2.8	Necrosis Specimen- Gangrene Slides- Coagulative necrosis, Caseous necrosis.
3	PA 4.4	Acute Inflammation Specimen- Acute appendicitis, Lobar Pneumonia Slides- Acute appendicitis, Lobar Pneumonia
4	PA 4.4	Chronic Inflammation Specimens- TB lymph node Slide- TB lymph node, Actinomycosis, Rhinosporidiosis
5	PA 6.2, PA 6.7	CVC and Infarction Specimen- CVC Liver (Optional),Infarction- Spleen Slide- CVC lung, CVC liver (Optional), CVC Spleen (Optional), Infarction- Spleen
6	PA 7	Benign tumors Specimen – Lipoma, Leiomyoma Slide- Hemangioma, Lipoma, Leiomyoma
7	PA 7	Malignant tumors Specimen- Squamous cell carcinoma, Adenocarcinoma Slide- Squamous cell carcinoma, Basal cell carcinoma, Adenocarcinoma, Transitional cell carcinoma (Optional)
8	PA 13.2 PA 13.5	Anticoagulants-Different vacutainers OSPE-Prepare peripheral blood smear and reporting Slides- Normocytic normochromic blood picture, Eosinophilia.
9.	PA 14, 15	Anaemias Slides-Microcytic hypochromic anaemia and Macrocytic anaemia
10	PA 16.6	Hemolytic anaemia

		Slides- Sickle cell anaemia/ Thalassemia/ Autoimmune haemolytic anaemia
11	PA 18	Leukemias Slides- Chronic myeloid leukemia, Chronic lymphoid leukemia. Acute Myeloid leukemia (Optional), Acute Lymphoblastic Leukemia (Optional)
12	PA 22	Blood grouping: OSPE-Forward grouping -Slide/ tube method
13		Charts I

Note: Optional slides/ specimens should not be part of summative evaluation.

SECOND BLOCK

SI NO		TOPIC
LECTURES AND SGDs TO BE COVERED IN SECOND BLOCK		
1.	PA 19	PA19.1 Enumerate the causes and describe the differentiating features of lymphadenopathy. PA19.6 Enumerate and differentiate the causes of splenomegaly. PA19.7 Identify and describe the gross specimen of an enlarged spleen.
2.	PA 19	PA19.2 Describe the pathogenesis and pathology of tuberculous lymphadenitis.
3.	PA27.1	27.1.1Define arteriosclerosis and distinguish between the types of arteriosclerosis
4.	PA27.1	27.1.2.Discuss the epidemiology and the role of risk factors in the pathogenesis of atherosclerosis
5.	PA27.1	27.1.3.Describe the pathogenesis of atherosclerosis
6.	PA27.1	27.1.4.Describe the morphology and microscopy of atherosclerotic plaque and the complicated plaque
7.	PA27.1	27.1.5.Enumerate the clinical consequences of atherosclerosis in different organs
8.	PA27.2	27.2.1 Define aneurysm and enumerate the causes and types of aneurysms
9.	PA27.2	27.2.2 Describe the dynamics and pathology of abdominal aortic aneurysm
10.	PA27.2	27.2.3 Describe the clinical course and complications of aneurysms
11.	PA27.2	27.2.4Classify and describe the pathology of aortic dissection
12.	PA27.3	27.3.1 Describe the etiology, types and stages of heart failure
13.	PA27.3	27.3.2.Describe the pathology and complications of heart failure
14.	PA27.4	27.4.1 Describe the etiopathogenesis of rheumatic fever
15.	PA27.4	27.4.2 Describe the gross and microscopic features of acute rheumatic carditis
16.	PA27.4	27.4.3 Describe the gross and microscopic features of rheumatic valvular disease
17.	PA27.4	27.4.4 Describe the clinical criteria and complications of acute rheumatic fever
18.	PA27.5	27.5.1 Describe the epidemiology and risk factors of IHD
19.	PA27.5	27.5.2 Descibe aetio pathogenesis of IHD

20.	PA27.5	27.5.3 Describe the gross and microscopic features of myocardial infarction
21.	PA27.5	27.5.4 Discuss the lab diagnosis and complications of Myocardial Infarction
22.	PA27.5	27.5.5 Describe the complications of Myocardial Infarction
23.	PA27.6	27.6.1Describe the etiology, pathogenesis and morphology of infective endocarditis
24.	PA27.6	27.6.1Describe and differentiate between the major forms of valvular vegetations
25.	PA27.7	27.7.1 Describe the etiology, types and pathology of pericarditis
26.	PA27.7	27.7.2.Describe the morphological patterns of pericarditis
27.	PA27.7	27.7.3.Describe the etiology and types of pericardial effusions
28.	PA27.8	27.8.1Interpret abnormalities in cardiac function tests in acute coronary syndromes.
29.	PA27.8	27.8.2 Identify gross and microscopy of Atherosclerosis and Myocardial infarction
30.	PA27.9	27.9.1 Enumerate the etiology and types of cardiomyopathies
31.	PA27.9	27.9.2.Enumerate the complications of cardiomyopathies
32.	PA27.10	27.10.1 Describe the pathology of Syphilitic aneurysm.
33.	PA 27	PA27.1 Distinguish arteriosclerosis from atherosclerosis. Describe the pathogenesis and pathology of various causes and types
34.	PA 27	PA27.5 Describe the epidemiology, risk factors, etiology, pathophysiology, pathology, presentations, gross and microscopic features, diagnostic tests and complications of ischemic heart disease
35.	PA 24	PA24.1 Describe the etiology, pathogenesis, pathology and clinical features of oral cancers include salivary gland tumors
36.	PA 24	PA24.2 Describe the etiology, pathogenesis, pathology, microbiology, clinical and microscopic features of peptic ulcer disease PA24.3 Describe and identify the microscopic features of peptic ulcer
37.	PA 24	PA24.6 Describe and etiology and pathogenesis and pathologic and distinguishing features of Inflammatory bowel disease
38.	PA 24	PA24.7 Describe the etiology, pathogenesis, pathology and distinguishing features of carcinoma of the colon
39.	PA 25	PA25.2 Describe the pathophysiology and pathologic changes seen in hepatic failure and their clinical manifestations, complications and consequences PA25.3 Describe the etiology and pathogenesis of viral and toxic hepatitis: distinguish the causes of hepatitis based on the clinical and laboratory features. Describe the pathology, complications and consequences of hepatitis
40.	PA 25	PA25.4 Describe the pathophysiology, pathology and progression of alcoholic liver disease including cirrhosis PA 25.5 Describe the etiology, pathogenesis and complications of portal hypertension
41.	PA31	PA31.1 Classify and describe the types, etiology, pathogenesis, hormonal dependency of breast pathology and benign disease PA31.4 Enumerate and describe the etiology, hormonal dependency and pathogenesis of gynecomastia

42.	PA31	PA31.2 Classify and describe the epidemiology, pathogenesis, classification, morphology, prognostic factors, hormonal dependency, staging and spread of carcinoma of the breast
43.	PA32	PA32.2 Describe the etiology, cause, iodine dependency, pathogenesis, clinical manifestations, laboratory and imaging features and course of thyrotoxicosis PA32.3 Describe the etiology, pathogenesis, clinical manifestations, laboratory and imaging features and course of thyrotoxicosis/hypothyroidism with Thyroid function test.
44.	PA32	PA32.1 Enumerate, classify and describe the etiology, pathogenesis, pathology and iodine dependency of thyroid swellings with Thyroid neoplasms
45.	PA32	PA32.4 Classify and describe the epidemiology, etiology, pathogenesis, pathology, clinical laboratory features, complications and progression of diabetes mellitus
46.	PA33	PA33.3 Classify and describe the etiology, pathogenesis, clinical manifestations, radiologic and morphologic features, complications and metastases of soft tissue tumors
47.	PA33	PA33.1 Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications of osteomyelitis
48.	PA33	PA33.2 Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications and metastases of bone tumors
49.	PA 35	PA35.2 Classify and describe the etiology, genetics, pathogenesis, pathology, presentation sequelae and complications of CNS tumors
DOAP TOPICS TO BE COVERED IN SECOND BLOCK		
1.	PA 19	Lymph node / spleen Specimen- Enlarged spleen, TB lymph node Slide- TB lymph node, Hodgkin's lymphoma, Non Hodgkin's lymphoma
2.	PA 24.3	Gastrointestinal system Specimen- Peptic ulcer, Gastric carcinoma, Carcinoma colon, TB intestine (Optional). Slide- Pleomorphic adenoma, carcinoma colon, TB intestine (Optional), Gastric carcinoma (Optional).
3.	PA 25	Hepatobiliary system Specimen-Cirrhosis, Chronic cholecystitis with Gall stones Slide- Cirrhosis, Chronic cholecystitis
4.	PA 27	Cardiovascular system Specimen- Atherosclerosis, Myocardial infarction Slide- Atherosclerosis, Myocardial infarction
5.	PA 32	Endocrine System Specimen- Multinodular goitre, Papillary carcinoma Slide- Multinodular goitre, Hashimoto's thyroiditis, Papillary carcinoma thyroid.
6.	PA 31	Breast

		Specimen- Fibroadenoma, Carcinoma breast (Optional) Slide- Fibroadenoma, Carcinoma breast (Optional)
7.	PA 33	Bone tumors Specimen- Osteoclastoma, Osteosarcoma Slide- Osteoclastoma, Osteosarcoma (Optional)
8.	PA 35	Central nervous system Charts- Interpretation of CSF findings in various meningitis.

Note: Optional slides/ specimens should not be part of summative evaluation.

THIRD BLOCK

SI NO		TOPIC
LECTURES AND SGDs TO BE COVERED IN THIRD BLOCK		
1.	PA26	PA26.1 Define and describe the etiology, types, pathogenesis, stages, morphology and complications of pneumonia
2.	PA26	PA26.2 Describe the etiology, gross and microscopic appearance and complications of lung abscess
3.	PA26	PA26.3 Define and describe the etiology, types, pathogenesis, stages, morphology and complications and evaluation of Chronic Bronchitis and Emphysema
4.	PA26	PA26.4 Define and describe the etiology, types, pathogenesis, stages, morphology microscopic appearance and complications of tuberculosis – include other organs with Tuberculosis
5.	PA26	PA26.5 Define and describe the etiology, types, exposure, environmental influence, pathogenesis, stages, morphology, microscopic appearance and complications of Occupational lung disease
6.	PA26	PA26.6 Define and describe the etiology, types, exposure, genetics environmental influence, pathogenesis, stages, morphology, microscopic appearance, metastases and complications of tumors of the lung and pleura
7.	PA26	PA26.7 Define and describe the etiology, types, exposure, genetics environmental influence, pathogenesis, morphology, microscopic appearance and complications of mesothelioma
8.	PA 28	PA28.1 Describe the normal histology of the kidney PA28.5 Define and classify glomerular diseases. Enumerate and describe the etiology, pathogenesis, mechanisms of glomerular injury, pathology, distinguishing features and clinical manifestations of glomerulonephritis PA28.6 Define and describe the etiology, pathogenesis, pathology, laboratory, urinary findings, progression and complications of IgA nephropathy
9.	PA 28	PA28.8 Enumerate and classify diseases affecting the tubular interstitium PA28.9 Define and describe the etiology, pathogenesis, pathology, laboratory, urinary findings, progression and complications of acute tubular necrosis PA28.10 Describe the etiology, pathogenesis, pathology, laboratory findings, distinguishing features, progression and complications of acute and chronic pyelonephritis and reflux nephropathy

10.	PA 28	PA28.7 Enumerate and describe the findings in glomerular manifestations of systemic disease PA28.11 Define, classify and describe the etiology, pathogenesis, pathology, laboratory, urinary findings, distinguishing features, progression and complications of vascular disease of the kidney PA28.15 Describe the etiology, genetics, pathogenesis, pathology, presenting features and progression of thrombotic angiopathies
11.	PA 28	PA28.14 Classify and describe the etiology, genetics, pathogenesis, pathology, presenting features, progression and spread of renal tumors
12.	PA 29	PA29.1 Classify testicular tumors and describe the pathogenesis, pathology, presenting and distinguishing features, diagnostic tests, progression and spread of testicular tumors PA29.2 Describe the pathogenesis, pathology, presenting and distinguishing features, diagnostic tests, progression and spread of carcinoma of the penis
13.	PA 29	PA29.3 Describe the pathogenesis, pathology, hormonal dependency presenting and distinguishing features, urologic findings & diagnostic tests of benign prostatic hyperplasia PA29.4 Describe the pathogenesis, pathology, hormonal dependency presenting and distinguishing features, diagnostic tests, progression and spread of carcinoma of the prostate PA29.5 Describe the etiology, pathogenesis, pathology and progression of prostatitis
14.	PA 30	PA30.1 Describe the epidemiology, pathogenesis, etiology, pathology, screening, diagnosis and progression of carcinoma of thecervix PA30.6 Describe the etiology and morphologic features of cervicitis
15.	PA 30	PA30.2 Describe the pathogenesis, etiology, pathology, diagnosis and progression and spread of carcinoma of the endometrium PA30.7 Describe the etiology, hormonal dependence, features and morphology of endometriosis PA30.8 Describe the etiology and morphologic features of adenomyosis PA30.9 Describe the etiology, hormonal dependence and morphology of endometrial hyperplasia
16.	PA 30	PA30.4 Classify and describe the etiology, pathogenesis, pathology, morphology, clinical course, spread and complications of ovarian tumors
17.	PA 30	PA30.5 Describe the etiology, pathogenesis, pathology, morphology, clinical course, spread and complications of gestational trophoblastic neoplasms
DOAP TOPICS TO BE COVERED IN THIRD BLOCK		
1.	PA 28	Urinary system Specimen- Chronic pyelonephritis, Renal stones with hydronephrosis, Renal cell carcinoma, Wilm's tumor Slide- Chronic pyelonephritis, Renal cell carcinoma, Wilm's tumor
2.	PA 29	Male genital system Specimen- Seminoma testis, Carcinoma penis Slide-Seminoma testis, Benign prostatic hyperplasia

3.	PA 30	Female genital system Specimen-Leiomyoma, Carcinoma cervix, Benign Cystic Teratoma, Serous/Mucinous Cystadenoma, Hydatidiform mole (Optional). Slides- Leiomyoma, Proliferative phase, secretory phase, CGH, Serous/Mucinous Cystadenoma, Hydatidiform mole, Benign Cystic Teratoma (Optional)
4.	PA 26	Respiratory System Specimen-Pneumonia , Bronchiectasis, Emphysema, TB lung, Carcinoma lung Slide- Pneumonia, TB lung (Optional), Carcinoma lung
5.	PA 23.1	Urine examination Physical examination Chemical examination- Introduce strip methodology. Tests for Reducing substances, Protein, Blood, Ketone bodies, Bilirubin and Bile salts (Optional).
6.		Charts II
7.		Revision of Slides/Specimen/Charts
8.		Revision of Slides/Specimen/Charts

Note: Optional slides/ specimens should not be part of summative evaluation.

LIST OF INSTRUEMENTS, SPECIMENS, SLIDES AND CHARTS

LIST OF INSTRUMENTS

Sl .no	**Instruments**
1.	Lumbar Puncture Needle
2.	Liver Biopsy Needle
3.	Bone marrow Aspiration Needle
4.	Wintrobe's Tube
5.	Westergren's ESR Tube
6.	Urinometer
7.	R.B.C Pipette
8.	W.B.C Pipette
9.	Sahli's Haemoglobinometer
10.	Neubauer's Counting Chamber
11.	Hb Pipette
12.	EDTA Tube

13.	Sodium Citrate Tube
14.	Plain vacutainer
15.	Heparin tube
16.	Blood collection bag

LIST OF SPECIMENS

Sl.NO	NUMBER CODE	SPECIMEN
1	UG 1	Tubercular lymph node
2	UG 2	Gangrene intestine
3	UG 4	Acute appendicitis
4	UG 5	Lobar pneumonia
5	UG 6	Fatty liver
6	UG 7	CVC Spleen
7	UG 8	CVC Liver
8	UG 9	Infraction Spleen
9	UG 10	Infraction Lung
10	UG 11	Ileocaecal Tuberculosis
11	UG 12	Tuberculosis of Lung
12	UG 13	Lipoma
13	UG 14	Leiomyoma
14	UG 15	Squamous cell carcinoma – skin
15	UG 16	Squamous cell carcinoma – penis
16	UG 17	Squamous cell carcinoma – cervix
17	UG 18	Malignant melanoma
18	UG 19	Atherosclerosis
19	UG 20	Secondaries in Lung
20	UG 21	Bronchogenic carcinoma
21	UG 22	Carcinoma colon
22	UG 23	Carcinoma stomach
23	UG 24	Familial polyposis colon
24	UG 25	Cirrhosis
25	UG 26	Hepatocellular carcinoma

26	UG 27	Follicular adenoma – Thyroid
27	UG 28	Colloid Goitre
28	UG 29	Carcinoma Breast
29	UG 30	Teratoma – Ovary

LIST OF SLIDES

SL. NO.	Slides
1.	Fatty liver
2.	Monckeberg's medial calcific sclerosis
3.	Coagulative necrosis
4.	Caseous necrosis
5.	Acute appendicitis
6.	Lobar pneumonia
7.	TB lymph node
8.	Tuberculoid leprosy
9.	Lepromatous leprosy
10.	Actinomycosis
11.	Rhinosporidiosis
12.	CVC lung
13.	CVC Liver
14.	CVC Spleen
15.	Lipoma
16.	Leiomyoma
17.	Leiomyosarcoma
18.	Capillary hemangioma
19.	Cavernous hemangioma
20.	Squamous cell carcinoma
21.	Basal cell carcinoma
22.	Malignant melanoma
23.	Pleomorphic adenoma
24.	Juvenile Polyp
25.	Adenocarcinoma-colon
26.	Tuberculosis Lung

27.	Bronchogenic carcinoma
28.	Cirrhosis of Liver
29.	Hepatocellular carcinoma
24.	Atherosclerosis
25	Myocardial Infarction
26	Chronic pyelonephritis
27	Renal cell carcinoma
28	Wilm's tumor
29	Seminoma
30	Benign prostatic hyperplasia
31	Proliferative phase
32	Secretory Phase
33	CGH
34	Hydatidiform mole
35	Serous cystadenoma/ Mucinous cystadenoma
36	Teratoma
37	Fibroadenoma
38	Carcinoma breast
39	Osteoclastoma
40	Osteosarcoma
41	Chondrosarcoma
42	Multinodular goitre
43	Follicular adenoma
44	Papillary carcinoma thyroid
45	Hodgkin's lymphoma
46	Non Hodgkin's Lymphoma
Hematology	
1.	Microcytic hypochromic anaemia
2.	Macrocytic anemia
3.	Eosinophilia
4.	Acute Myeloblastc Leukemia
5.	Acute Lymphoblastic Leukemia
6.	Chronic lymphoid leukemia
7.	Chronic myeloid leukemia

LIST OF CHARTS

Sl. no	Charts
1.	Coulter Interpretation – Microcytic and macrocytic anemias
2.	Cytology – Malignant effusion
3.	Cytology: Malignant cells in Pap smear.
4.	Body fluids-Pleural/Ascitic (exudate/transudate), Tubercular Pleural Effusion
5.	Semen Analysis
6.	FNAC – Reactive lymphnode
7.	FNAC – Granulomatous inflammation
8.	FNAC- Non Hodgkins Lymphoma
9.	FNAC – Follicular neoplasm
10.	FNAC- Metastatic carcinoma
11.	FNAC- Duct carcinoma breast
12.	CSF analysis for Meningitis – Viral
13.	CSF analysis for Meningitis – Bacterial
14.	CSF analysis for Meningitis – Tubercular
15.	Viral hepatitis
16.	Chronic liver disease
17.	Obstructive jaundice
18.	Nephrotic syndrome
19.	Nephritic syndrome
20.	Acute Pyelonephritis
21.	Lower urinary tract infection
22.	Autoimmune hemolytic anaemia
23.	Sickle cell anaemia
24.	Thalassemia
25.	Malaria
26.	Hereditary Spherocytosis
27.	Hematolymphoid malignancies- AML
28.	Hematolymphoid malignancies- ALL
29.	Chronic Myeloid Leukemia

30.	Chronic Lymphocytic Leukemia
31.	Idipathic Thrombocytopenic Purpura
32.	Multiple Myeloma
33.	Diabeticketoacidosis
34.	Coagulation Disorder
35.	Rheumatic Fever

TOPICS FOR INTEGRATION

	Pathology	**Microbiology**	**Pharmacology**	**Forensic Medicine**	**Community Medicine**	**Concerned Clinical subjects**
BLOCK 1	Immunology Anaemia Wound healing Shock	Immunology Anaemia Shock Surgical practice Infective endocarditis & Rheumatic heart disease Immunisation	Immunology Anaemia Essential medicines Shock Toxicology	Wound healing Toxicology	Essential medicines	Shock Surgical practice Toxicology Infective endocarditis & Rheumatic heart disease Immunisation
BLOCK 2	Infective endocarditis & Rheumatic heart disease (Nesting) Myocardial infarction Atherosclerosis Tuberculosis Leprosy AIDS Malaria	Tuberculosis Leprosy AIDS Malaria Enteric fever Viral hepatitis Acid peptic disease Bone & Joint infection Meningitis Encephalitis STI	Tuberculosis Leprosy AIDS Malaria Acid peptic disease		Tuberculosis Leprosy AIDS Malaria	Myocardial infarction Atherosclerosis Tuberculosis Leprosy AIDS Malaria Enteric fever Viral hepatitis Acid peptic disease Bone & Joint infection Meningitis Encephalitis STI

BLOCK 3	Diabetes mellitus Hepatitis (Sharing / Nesting)	Zoonotic disease Hospital acquired infection National health programs of communicable diseases	Diabetes mellitus Endocrines		Diabetes mellitus Zoonotic disease Hospital acquired infection National health programs of communicable diseases	Diabetes mellitus Zoonotic disease Hospital acquired infection Endocrines

NOTE - National days of importance for AIDS, Leprosy, Tuberculosis, Malaria, Mental health, Breast feeding promotion, World health day, etc. can be used to conduct full day integration sessions for students

Beyond these topics, Institutions are free to integrate topics with concerned departments, wherever feasible within the MCI stipulations.

Minimum two of the suggested topic should be covered in each block.

DISTRIBUTON OF ATTITUDE ETHICS AND COMMUNICATION SKILLS (AETCOM) MODULE

SI NO	MODULE	TOPIC	DEPARTMENT					No. of hours	Formative assessment	Summative assessment
			PA	MI	PH	CM	FM			
1	2.1	Foundation of communication				✓		5	✓	-
2	2.2	Foundation of bioethics					✓	2	-	✓
3	2.3	Health care as a right				✓		2	-	✓
4	2.4	Working in a health care team	✓					6	✓	-
5	2.5	Bioethics- case studies on patient autonomy and decision making (patient rights and shared responsibility in health care)			✓			6	✓	✓

6	2.6	Bioethics-Case studies on patient autonomy and decision making (refusal of care including do not resuscitate and withdrawal of lifeSupport)			✓			5	✓	✓
7	2.7	Bioethics- Case studies on patient autonomy and decision making (consent for surgical procedures)		✓				5	✓	✓
8	2.8	What does it mean to be a family member of sick patient					✓	6	✓	✓

**PA-Pathology; MI- Microbiology; PH- Pharmacology; CM- Community medicine; FM- Forensic medicine.

EVALUATION METHODOLOGY

Summative Assessment - An assessment conducted at the end of instruction to check how much the student has learnt.

Formative Assessment - An assessment conducted during the instruction with primary purpose of providing feedback for improving learning.

Internal Assessment - Range of assessments conducted by the teachers teaching a particular subject with the purpose of knowing what is learnt. Internal assessment can have both formative and summative functions.

Note - Assessment requires specification of measurable and observable entities. This could be in the form of whole tasks that contribute to one or more competencies or assessment of a competency per se. Another approach is to break down the individual competency into learning objectives related to the domains of knowledge, skills, attitudes, communication etc. and then assess them individually.

Scheduling of Internal Assessment - Done once in three months preferably at the end of each block.

Theory IA can include: Written tests should have essay questions, short notes and creative writing experiences.

Practical IA can include: Practical tests, Objective Structured Practical Examination (OSPE), Directly Observed Procedural Skills (DOPS), records maintenance and attitudinal assessment.

Assessment of Log-book- Log book should record all activities like seminar, symposia, quizzes and other academic activities. It should be assessed regularly and submitted to the department. Up to ten(10) per cent IA Practicalmarks should be for Log book assessment.

Assessment of Practical Record book- Practical book should record all skills and other practical exercises done during the academic programme. It should be assessed regularly and submitted to the department. Up to ten (10) per cent IA Practical marks should be forPractical record book assessment0

Assessment for AETCOM will include: - Written tests comprising of short notes and creative writing experiences only in internal assessment.

SUMMATIVE ASSESSMENT/ UNIVERSITY EXAM

THEORY

GENERAL INSTRUCTIONS

1. The topics for the two papers are distributed
2. Questions in each paper should be as per distribution
3. Please refer to the SLO while setting the question paper
4. Repetition of questions from the same SLO should be avoided
5. Please adhere to the marks allotted to the different topics & sections
6. Questions to be covered from the different sections of Pathology

Sl no	Nature of question	Marks
1	Long Essay (LE)	2x10=20
2	Short Essay (SE)	10x5=50
3	Short Answer (SA)	10x3=30

Marks distribution across different sections

Sl no	Section	Paper	Marks distribution	Total
1	General Pathology (40 - 60) Hematology + Clinical Pathology + Cytology (40 - 60)	I	100	200
2	Systemic Pathology	II	100	

TOPIC-WISE MARKS DISTRIBUTION FOR THEORY EXAMINATION

SI NO	TOPICS	MARKS DISTRIBUTION		
GENERAL PATHOLOGY		Minimum	Maximum	Nature of question
1.	Introduction to pathology	0	3	Only SA
2.	Cell Injury and Adaptation	3	13	LE,SE,SA
3.	Amyloidosis	0	5	SE,SA
4.	Inflammation	3	13	LE,SE,SA
5.	Healing and repair	0	5	SE,SA
6.	Hemodynamic disorders	3	13	LE,SE,SA
7.	Neoplastic disorders	3	13	LE,SE,SA
8.	Basic diagnostic cytology	3	5	SE,SA
9.	Immunopathology and AIDS	3	8	SE,SA
10.	Infections and Infestations	0	8	SE,SA
11.	Genetic and paediatric diseases	Non-Core		
12.	Environmental and nutritional disease	0	6	SE,SA
HEMATOLOGY AND CLINICAL PATHOLOGY				
13.	Introduction to haematology	3	10	LE,SE,SA
14.	Microcytic anemia	0	10	LE,SE,SA

15.	Macrocytic anemia	0	10	LE,SE,SA
16.	Hemolytic anemia	0	10	LE,SE,SA
17.	Aplastic anemia	Non-Core		
18.	Leukocyte disorders	0	10	LE,SE,SA
19.	Lymph node and spleen	0	6	SE,SA
20.	Plasma cell disorders	0	6	SE,SA
21.	Hemorrhagic disorders	0	10	LE,SE,SA
22.	Blood banking and transfusion	0	6	SE,SA
23.	Clinical Pathology	3	6	SE,SA
SYSTEMIC PATHOLOGY				
24.	Gastrointestinal tract	3	11	LE,SE,SA
25.	Hepatobiliary system	3	11	LE,SE,SA
26.	Respiratory system	3	11	LE,SE,SA
27.	Cardiovascular system	3	15	LE,SE,SA
28.	Urinary Tract	3	11	LE,SE,SA
29.	Male Genital Tract	0	6	SE,SA
30.	Female Genital Tract	0	10	LE,SE,SA
31.	Breast	0	10	LE,SE,SA
32.	Endocrine system	0	10	LE,SE,SA
33.	Bone and soft tissue	0	10	LE,SE,SA
34.	Skin	0	6	SE,SA
35.	Central Nervous system	0	6	SE,SA
36.	Eye	Non-Core		

Note: '0' signifies there is an option of not asking any question from that particular topic

SUMMATIVE ASSESSMENT/ UNIVERSITY EXAM

PRACTICALS

Total Marks – 100 (Practical: 80 + Viva voce: 20)

Exercise 1- Spotters (10 x 2marks each) – 20 marks

Time allotted: 10mins
Specimens - 4
Histopathology Slides - 3
Haematology slides - 2
Instrument -1
Note: Students need to identify the spotter and write two relevant points
Exercise 2 – **OSPE (**Objective Structured Practical Examination**)** – 5 marks
Time allotted: 5mins, each will have to do either;

Blood group or **Preparation of peripheral smear**
Student needs to perform the following steps

Blood group		
Sl No	**Steps**	**Marks awarded**
1	Take 1 or 2 slides and mark the slides appropriately	0.5
2	Take anti-sera A, B and D and place according to the marking	1
3	Add a drop of blood to the anti-sera	0.5
4	Mix well	1
5	Look for the agglutination and interpret	2
Total		**5**

Preparation of peripheral smear		
Sl No	**Steps**	**Marks awarded**
1	Take a clean slide	0.5
2	Take a drop of blood and place it appropriately on the slide	0.5
3	The spreader slide is to be placed at an angle of 45^0 and moved back to make contact with the drop, spreading it evenly along the line of contact. Pull the spreader steadily to make a smear and label the slide	2
4	Smear needs to be tongue shaped and without any windows,	2
Total		**5**

Exercise 3:
Time allotted: 20mins
Urine Analysis – 15 Marks
Physical examination + Chemical examination (Detection of 2 abnormal constituents) based on history provided

Exercise 4:
Time allotted: 20mins
Histopathology slide – 15 Marks
Identify + draw a neat labelled diagram + write points in favour of identification

Exercise 5:
Time allotted: 20mins
Peripheral Smear – 15 Marks
Identify + draw a neat labelled diagram + write points in favour of identification

Exercise 6:

Time allotted: 10mins

Chart - 10 Marks, each student is given only one chart.

Interpret the chart and answer the given questions.

NOTE: The evaluation of charts on certifiable competencies should be completed in formative and internal assessment and duly documented in the log book.

Exercise 7:
Viva Voce (20 marks)

Time allotted: 20 to 30mins (5-6mins per candidate for each examiner)
Marks allotted for each examiner – 5

Subject allotted for each examiner:
1. Clinical Pathology and hematology
2. General Pathology
3. Systemic Pathology – I (CVS, RS, GIT, Hepatobiliary, Lymphoreticular and Spleen)
4. Systemic Pathology - II (Urinary system, Male and Female genital tract, Endocrines, Bone and Soft tissue, Central Nervous System,Skin)

INTERNAL ASSESSMENT

1. There will be 3 internal assessment examinations in Pathology. The structure of the internal assessment examinations should be preferably similar to the structure of University examinations.

2. It is mandatory for the students to appear for all the internal assessment examinations.

3. First internal assessment examination will be held after 3 months, second internal assessment examination will be held after six months and third internal assessment examination will be held after 9 months of Phase II curriculum.

4. Pattern of first and second Internal Assessment are left to the discretion of the individual institute. However third internal assessment has to be conducted in the same pattern of the University exam.

5. Additional internal assessment examination for absent students can be considered due to genuine reason after approval by the head of the department. It should be taken before the submission of internal assessment marks to the University.

6. Internal assessment marks allotment for theory and practical for the first and second internal assessment are left to the discretion of the respective institutes. Marks allotted in the third (final) Internal Assessment should be preferably for 100 marks each for Theory and Practical.

7. 20% of the internal assessment marks in either Theory and Practical should be from Formative Assessment.

8. **Feedback in Internal Assessment** - Feedback should be provided to students throughout the course so that they are aware of their performance and remedial action can be initiated well in time. The feedbacks need to be structured and the faculty and students must be sensitized to giving and receiving feedback.

9. The results of IA should be displayed on notice board within two weeks of the test and an opportunity provided to the students to discuss the results and get feedback on making their performance better.

10. It is also recommended that students should sign with date whenever they are shown IA records in token of having seen and discussed the marks.

11. **Internal assessment marks will not be added to University examination marks and will reflect as a separate head of passing at the summative examination.**

12. **Internal assessment should be based on competencies and skills.**

13. **Criteria for appearing in University examination:** Learners must secure at least 50% marks of the total marks (combined in theory and practical; not less than 40 % marks in theory and practical separately) assigned for internal assessment in order to be eligible for appearing at the final University examination.

14. **Average marks obtained in all three internal assessment should be calculated to 40 marks.**

15. A candidate who has not secured requisite aggregate in the internal assessment may be subjected to remedial assessment by the institution. If he/ she successfully complete the same, he/she is eligible to appear for University Examination. Remedial assessment shall be completed before submitting the internal assessment marks online to the University.

PROPOSED MARKS ALLOCATION FOR PRACTICAL IA

Sl No	Assessment	Marks allotted		
		First IA	Second IA	Third (Final) IA
1	Spotters	05	05	10
2	Exercises (3)	12	12	15x3 = 45
3	OSPE	05	05	5
4	Charts	05	05	10
5	Formative Assessment	08	08	20
6	Record book	05	05	10
	Total	**40**	**40**	**100**

NOTE:

1. The spotters, exercises and OSPE depends on the portion covered in the respective block.
2. Certifiable competencies/AETCOM should be completed in Formative/Internal assessment.

ANNEXURES

Annexure I- Log book format

Annexure II- Model question paper

Annexure-I

JSS ACADEMYOF HIGHER EDUCATION AND RESEARCH , MYSURU, KARNATAKA

PHASE II MBBS

LOG BOOK FORMAT

DEPARTMENT OF PATHOLOGY

NAME OF THE CANDIDATE :

NAME OF THE COLLEGE :

UNIVERSITY REGISTER NUMBER:

ACADEMIC YEAR :

INDEX

BONAFIDE CERTIFICATE

This is to certify that this log book is the bonafide record of Mr/Ms……..……whose particulars along is given above. His/ Her log of competencies acquired, are as noted in the entries in this log book in the subject of Pathology as per the Competency Based Undergraduate Medical Education Curriculum, Graduate Medical Regulation 2019, during the period ……. to…….

She / He will not be eligible / eligible to appear for the summative (University) assessment as on the date given below.

Signature with date

Head, Department of Pathology :

Signature with date

Principal/Dean :

BASIC PROFORMA OF THE STUDENT

Photo

PARTICULARS OF THE STUDENT:

Name of the student :

Date of Birth :

Father's name :

Mother's name :

Address :

Contact number :

Email ID :

Signature: .....

SUGGESTED GUIDELINES FOR LOG BOOK:
GENERAL INFORMATION:

1) The logbook is a record of the academic / co-curricular activities of the designated student, who would be responsible for maintaining his/her logbook.
2) The student is responsible for getting the entries in the logbook verified by the Faculty In-charge regularly.
3) Entries in the logbook will reflect the activities undertaken in the department & have to be scrutinized by the Head of the concerned department.
4) The logbook is a record of various activities by the student like:
    a. Overall participation & performance
    b. Attendance
    c. Participation in sessions
    d. Record of completion of pre-determined activities.
    e. Acquisition of selected competencies
5) The logbook is the record of work done by the candidate in that department / specialty and should be verified by the college before submitting the application of the students for the University examination.

SUMMARY OF ATTENDANCE

Phase	*Percentage of classes attended*		*Eligible for University examination (Yes / No)*	*Signature of student*	*Signature of teacher*
	Theory	*Practical*			
First Block			NA		
Second Block			NA		
Third Block			NA		
Attendance at the end of MBBS Phase II					

SUMMARY OF INTERNAL ASSESSMENT (IA)

Sl. No.	*Internal Assessment*	*Date of Assessment*	*Total marks*		*Marks scored*		*Signature of student*	*Signature of teacher*
			Theory	*Practical*	*Theory*	*Practical*		
	First							
	Second							
	Third							
	Remedial							

Note: A candidate who has not secured requisite aggregate in the internal assessment may be subjected to remedial assessment by the institution. If he/ she successfully complete the same, he/she is eligible to appear for University Examination. Remedial assessment shall be completed before submitting the internal assessment marks online to the University.

COMPETENCY ASSESSMENT

CERTIFIABLE SKILLS

Sl. No.	Certifiable competency	Attempt			Faculty decision		Rating			Date	Signature of student	Signature of faculty
		First	Repeat	Remedial	Completed	Not Completed	Below expectations C	Meets expectations B	Exceeds expectations A			
1.	PA 16.6 Prepare peripheral blood smear.Identify haemolytic anaemia											

Sl. No.	Certifiable competency	Attempt			Faculty decision		Rating			Date	Signature of student	Signature of faculty
		First	Repeat	Remedial	Completed	Not Completed	Below expectations C	Meets expectations B	Exceeds expectations A			
1.	PA-25.6 Interpret liver function and viral hepatitis serology panel. Distinguish obstructive from non-obstructive jaundice based on clinical features and Liver function tests.											

Sl. No.	Certifiable competency	Attempt			Faculty decision		Rating			Date	Signature of student	Signature of faculty
		First	Repeat	Remedial	Completed	Not Completed	Below expectations C	Meets expectations B	Exceeds expectations A			
3.	PA-35.3 Identify the etiology of meningitis based on given CSF parameters											

NON-CERTIFIABLE (SHOWS HOW) ACTIVITIES

# Competency	Name of Activity	Date completed	Rating Below Expectations (C) Meets Expectations (B) Exceeds Expectations (A)	Decision of faculty Completed Repeat Remedial	Initial of faculty and date	Feedback Received Initial of learner

- Duplicate of this template shall be made depending on the activities planned.
- Activities may be skill sessions, seminars, tutorials, projects, etc.

Format for documentation and feedback for Self-Directed Learning

Sl no	Date	Topic of SDL	Feedback	Signature of faculty/mentor
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

IX. Summary of formative assessment for the entire year

Sl. No.	*Type of Assessment*	*Total marks*	*Marks scored*	*Signature of student*	*Signature of teacher wuth date*
2	SGD/Tutorial/Seminars/ Other Activity	10			
7	Professionalism	10			
	TOTAL	20			

Rubric for assessing the professionalism

Phase	*Areas assessed*					*Signature of student*	*Signature of teacher*
	Regular for classes(5)	*Submission of records (5)*	*Behaviour in class and discipline(5)*	*Dress code and presentablility(5)*	*Total (20)*		
At the end of 1st IA							
At the end of 2nd IA							
At the end of 3rd IA							
Average score at the end of the year							

VIII. SMALL GROUP DISCUSSION/SELF DIRECTED LEARNING – ASSESSMENT AND FEEDBACK

Module #	Name of SGD/SDL Activity	Date completed	Score	Initial offaculty Anddate	Feedback Received Initial of learner

Small group discussions will be scored based on the following criteria. Marks to be given

Score	Criteria for assessment
5	Is a proactive participant showing a balance between listening, initiating, and focusing discussion. Displays a proactive use of the whole range of discussion skills to keep discussion going and to involve everyone in the group. Understands the purpose of the discussion and keeps the discussion focused and on topic. Applies skills with confidence, showing leadership and sensitivity.
4	Is an active participant showing a balance between listening, initiating, and focusing discussion. Demonstrates all the elements of discussion skills but uses them less frequently and with less confidence than the above level. Keeps the discussion going but more as a supporter than a leader. Tries to involve everyone in the group. Demonstrates many skills but lacks the confidence to pursue them so that the group takes longer than necessary to reach consensus. Demonstrates a positive approach but is more focused on getting done than on having a positive discussion.
3	Is an active listener but defers easily to others and lacks confidence to pursue personal point of view even when it is right. Participates but doesn't use skills such as summarizing and clarifying often enough to show confidence. Limits discussion skills to asking questions, summarizing, and staying on topic. Lacks balance between discussion and analytical skills. Either displays good analysis skills and poor discussion skills or good discussion skills and poor analysis skills.
2	Is an active listener but defers easily to others and tends not pursue personal point of view, lacking confidence. Limits discussion skills to asking questions, summarizing and staying on topic. Rarely demonstrates analysis skills because doesn't understand the purpose of the discussion, and as a result, offers little evidence to support any point of view.
1	Demonstrates no participation or effort. Participates only when prompted by the teacher. Only responds to others and initiates nothing. Provides limited responses that are often off topic. Participates minimally so that it is impossible to assess analysis skills or understanding of the issues.

Other academic/non-academic activities

CONFERENCE/CME/WORKSHOP ATTENDED

SL NO	DATE	PARTICULARS	REMARKS IF ANY	SIGNATURE OF STAFF

SCIENTIFIC PROJECT PRESENTATIONS/REPORTS/ OUTREACH ACTIVITIES

SL NO	DATE	PARTICULARS	SIGNATURE OF STAFF

ACHIEVEMENTS/ AWARDS /ANY OTHER ACTIVITIES

SL NO	DATE	PARTICULARS	SIGNATURE OF FACULTY

EXTRACURRICULAR ACTIVITIES

SL NO	DATE	PARTICULARS	SIGNATURE OF FACULTY

Annexure II -MODEL QUESTION PAPER

Subject Pathology

PAPER I

LONG ESSAY

1) 47 year old farmer cuts his right thumb. Next morning the thumb is sore and the skin surrounding the cut is red. The next day the thumb is swollen, throbbing and yellowish white pus is oozing out of the injured area. He also noticed two painful small swellings in his right armpit. He then experiences a shaking chill and becomes uncomfortable. On examination at the hospital his skin was cold to touch and his extremities were cold. There was bluish discoloration of his digits and lips. His pulse was feeble with a pulse rate of 110/min and a blood pressure was 90/60 mm of Hg.

a. What is your diagnosis? (2 marks)
b. What are the stages of the condition and discuss the pathophysiologic basis? (4 marks)
c. Discuss the pathologic changes in lung and kidney in the terminal stages of this condition?
(4 marks)

2) Describe the role of hematology laboratory in the differential diagnosis of hemolytic anemia's. Discuss clinical clues for suspecting hemolysis.
(6 + 4)

SHORT ESSAYS **Marks: 10x5**

3) Discuss the differences between apoptosis and necrosis with a special reference to clinical significance.

4) Discuss the factors affecting wound healing.

5) Describe the organ specific effects of tobacco smoke constituents.

6) Discuss the sequelae of acute inflammation. Enumerate morphological types with examples.

7) Define metastasis and discuss the routes of spread.

8) Enlist and write the mechanism of action of various anticoagulants used in haematology.

9) Describe the clinical picture, peripheral blood and bone marrow picture in megaloblastic anemia.

10) Define leukamoid reaction. List the differences between leukamoid reaction and chronic myeloid leukemia.

11) Describe gross and microscopic appearance of tubercular lymphadenitis.

12) List causes of thrombocytopenia. Discuss pathogenesis of idiopathic thrombocytopenic purpura.

SHORT ANSWERS Marks: 10x3

13) Classify tissues based on proliferative capacity of cells.

14) Define chemotaxis. Name some exogenous and endogenous chemo-attractants.

15) Mention one objective for pap smear screening. List the different stains used in pap stain.

16) Define paraneoplastic syndrome. Give two examples.

17) Enumerate AIDS defining opportunistic infections.

18) Classify anemia based on morphology.

19) Enumerate the causes for splenomegaly.

20) List the tests for detecting intrinsic and extrinsic coagulation pathway abnormalities. State their normal ranges.

21) List different methods of blood grouping.

22) Enumerate different infections transmitted through blood transfusion.

MODEL QUESTION PAPER

Subject Pathology

Paper II

LONG ESSAY

1) 55yr male presented with hematuria and pain in the right flank since 15 days. There is also history of significant weight loss, weakness and malaise. On examination a right flank mass was palpable on bimanual examination.
    1. What is the likely diagnosis? (2 marks)
    2. Discuss paraneoplastic syndrome associated with this condition. (2 marks)
    3. Discuss the gross and microscopy of the lesion. (4 marks)
    4. Enlist the various morphological types (2 marks)
2) Discuss the role of laboratory in the diagnosis of Ischemic Heart Disease. Add a note on approximate Time of Onset of Key Events in Ischemic Cardiac Myocytes (6 + 4)

SHORT ESSAY Marks: 10x5

3) Discuss the stages of alcoholic liver disease.

4) Discuss pathogenesis and morphology of Hashimoto thyroiditis

5) Interpret and assign to a group the following icteric patients with their urine and faecal findings. The groups to be assigned to are: pre-hepatic, hepatic and post hepatic causes of jaundice

	Patient 1	Patient 2	Patient 3
Urinary bilirubin	increased	absent	increased
Urinary urobilinogen	Low or absent	increased	decreased
Faecal colour	pale	dark	pale

6) Write the histological classification of malignant epithelial tumors of lung. Discuss in brief the etiopathogenesis of carcinoma lung.

7) Discuss the prognostic factors in carcinoma breast.

8) Describe in brief etiopathogenesis of carcinoma colon. Add a note on gross morphology of carcinoma colon.

9) Discuss pathogenesis of type II diabetes mellitus and List the complications

10) Define aneurysm. Enumerate the causes, types and complications of aneurysm.

11) Define and discuss etio-pathogenesis of bronchiectasis.

12) Discuss gross and microscopic morphology of any one benign and any one malignant bone tumors commonly arising in the metaphysis of long bones.

SHORT ANSWERS **Marks: 10x5**

13) List differences between malignantulcer and peptic ulcer in stomach.

14) List the complications of pneumonia.

15) List the risk factors for squamous cell carcinoma. Name the histological hallmark of well differentiated squamous cell carcinoma.

16) List laboratory findings in pyogenic meningitis.

17) Define and list the types of emphysema.

18) List characteristic microscopic findings of medullary carcinoma of breast.

19) List the types of endometrial hyperplasia

20) List the differences between a partial and complete hydatidiform mole.

21) List six complications of osteomyelitis.

22) List premalignant lesions of penis.

Annexure III -Recommended books:

Subject Pathology

RECOMMENDED BOOKS:

1. Kumar.V, Abbar.A.K, Aster.J.C. Robbins and Cotran Pathologic basis of Disease.10th ed, c.
2. Walter.J.B & Talbot.I.C. General Pathology.7th ed, Elsevier; 1996
3. Rubin.R, Strayer.D.S.Rubin'sPathology. 6th ed, Wolters Kluwer, Lippincott Williams and Wilkins; 2012.
4. O'Dowd G, Bell S & Wright S. Wheater's Pathology. 6th ed, Elsevier; 2020.
5. Saxena.R, Pati.H.P, Mahapatra.M, Firkin.F, Chesterman.C & Ponington.D et.al. DeGruchy`s Clinical Haematology in Medical Practice. 6th ed, Wiley India; 2012.
6. Nayak.R & Rai.S. Essentials in Haematology and Clinical Pathology. Jaypee Brothers; 2017.
7. Carman. H. R. Handbook of Medical Laboratory Technology. Christian Medical Association of India. 2013.
8. Singh T. Atlas and Text of Hematology. 4th ed Avichal Publishing Company 2018.
9. Reid R, Roberts F & Macduffe. Pathology Illustrated. 7th ed Churchill Livingstone, Elsevier; 2011.
10. Curran R C, Jones E L. Gross Pathology- A Color Atlas. 4th ed. Harvey Miller Publishers.
11. Underwood's pathology: a clinical approach 7thed,

REFERENCE BOOKS:

LEVEL 1:

1. McKenzie.S.B,Williams.J.L.Clinical laboratory Haematology.2ed, Pearson; 2009
2. Bain.J.B,Bates.I, Laffan.M.A.Dacie and Lewis PraticalHaematology, 12ed ,Elsevier; 2017
3. Damjanov.I,Linder.J.Anderson`s Pathology.10ed,Elsevier; 2019
4. McPherson.R.A.Henry`s Clinical Diagnosis and Management by Laboratory Methods. 23ed, Elsevier; 2016

LEVEL 2 :

1. Greer.J.P,Arber.D.A,Glader.B,List.A.F,Means.R.J,Paraskevas.F et.al. Wintrobe`s Clinical Haematology.13ed WoltersKluwer, Lippincott Williams and Wilkins, 2013
2. Rosai.J.Rosai and Ackerman`s Surgical Pathology. 11ed,Elsevier ; 2018
3. WHO Classification of Tumors Series
4. https://whobluebooks.iarc.fr/

MICROBIOLOGY

COURSE CONTENTS

MICROBIOLOGY

I. GOAL:

The broad goal of teaching of undergraduates in Microbiology aims at providing comprehensive knowledge of etiology, pathogenesis and laboratory diagnosis in order to efficiently treat, prevent and control the infectious diseases.

II. OBJECTIVES:

A. Knowledge

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

1. State the infective micro-organisms of the human body and describe the host parasite relationship.
2. Enumerate normal microbial flora and its importance in health and disease.
3. Describe the etiology and pathogenesis of common infectious diseases.
4. State or indicate the modes of transmission of pathogenic and opportunistic organisms and their sources, including insect vectors responsible for transmission of infection.
5. Describe the etiology and pathogenesis of opportunistic infections.
6. Choose appropriate laboratory investigations to support clinical diagnosis with respect to proper sample collection, timing and transport of the specimens.
7. Describe suitable anti-microbial agents for treatment.
8. Explain the importance of National health programmes for prevention of communicable diseases.
9. Describe the mechanisms of immunity to infection.
10. Acquire knowledge on suitable antimicrobial agents for treatment of infection and scope of immunotherapy and different vaccines available for prevention of communicable diseases.
11. Apply methods of disinfection and sterilization including biomedical waste management to control and prevent hospital and community acquired infections.
12. Recommend laboratory investigations regarding bacteriological examination of food, water, milk and air.

B. Skills:

1. Collect and transport appropriate clinical materials with necessary precautions for the laboratory diagnosis of infectious diseases.
2. To perform common laboratory techniques (Grams stain, ZN stain) for the direct demonstration of microorganisms from clinical materials and interpret their findings.
3. KOH preparation for the identification of fungal elements.
4. Saline and iodine preparations for parasites and demonstration of trophozoites, ova or cysts in stool samples.

5. Prepare a smear and perform Gram stain on body fluids, urine and pus specimens.
6. Prepare a smear and perform Ziehl – Nielsen stain for demonstration of Mycobacteria from sputum.
7. Interpret results of microbiological tests including antimicrobial testing for the diagnosis of common infectious diseases.
8. Perform simple standard rapid tests for diagnosis of infectious diseases.

C. To organize safe handling and disposal of infectious waste.

Affective:

1. Demonstrate self-awareness and personal development in routine conduct.
2. Practice selflessness, integrity, responsibility, accountability and respect.
3. Communicate effectively with peers, students and teachers in various teaching learning activities in a manner that encourages participation and shared decision-making.
4. Demonstrate ability to communicate adequately, sensitively, effectively and respectfully with all patients and their attenders.
5. Demonstrate due respect and follows the correct procedure while collecting the specimens.

III. COURSE OUTCOMES:

At the end of the course, the students should be able to

1. Understand the knowledge of pathogenic microorganisms, characterization, pathogenesis, clinical manifestations and management of microbial diseases.
2. Perform and interpret basic procedures including Gram stain, ZN stain and Stool microscopic examination.
3. Understand the principles and applications of various microbiological investigations including recent automated and molecular advancements.
4. Know the advanced concept of immunology and its role in diagnosis, prevention and control of diseases.
5. Defining and investigating outbreaks and common health problems in the community.

IV. SYLLABUS:

B. Number of teaching hours recommended by MCI:

Teaching method	Hours
Lecture	70
Small group discussion	110
Self-directed learning	10
Total	**190**

C. **Distribution of teaching hours for theory and practicals/ Small group discussion:**

Sl no	Topic	Lecture	Small group Discussion	Practical	Self directed learning
1.	General Microbiology and Immunity	24	14	12	2
2.	CVS and Blood	8	4	6	1
3.	Gastrointestinal and Hepatobiliary System	12	6	10	-
4.	Musculoskeletal system including Skin and Soft Tissue Infections	3	4	6	2
5.	Central Nervous System Infections	6	4	2	1
6.	Respiratory Tract Infections	5	4	10	1
7.	Genitourinary and Sexually Trasnmitted Infections	4	2	6	-
8.	Zoonotic Infections and Miscellaneous Infections	8	12	8	3
	Total as per CBME requirement	70	50	60	10
			110		

D. **Syllabus at a glance for MBBS Phase II Course**

Sl no	Topic	Description
1.	General Microbiology and Immunity	General Microbiology (MI 1.1 to 1.6); Immunology (1.7 to 1.11)
2.	CVS and Blood	CVS and Blood (MI 2.1 to 2.7)
3.	Gastrointestinal and Hepatobiliary System	Gastrointestinal system (MI 3.1 to 3.6) ; Hepatobiliary system (MI 3.7 & 3.8)
4.	Musculoskeletal system	Musculoskeletal system (MI 4.1 & 4.2) and Skin and Soft Tissue Infections

	&Skin and Soft Tissue Infections	(MI 4.3)
5.	**Central Nervous System Infections**	Central Nervous System Infections (MI 5.1 to 5.3)
6.	**Respiratory Tract Infections**	Respiratory system (MI 6.1 to 6.3)
7.	**Genitourinary and Sexually Trasnmitted Infections**	Genitourinary and Sexually Trasnmitted Infections (MI 7.1 to 7.3)
8.	**Zoonotic Infections and Miscellaneous Infections**	Zoonotic infections (MI 8.1); Oppurtunistic infections (MI 8.2); Oncogenic viruses (MI 8.3); Emerging infectious diseases (MI 8.4); Hospital infection control practices (MI 8.5 to 8.7); Microbiology of food, water and air (MI 8.8); Others (MI 8.9 to 8.15); National health programmes (MI 8.16)

THEORY:

1. **General Microbiology and Immunity**
   - Introduction to Microbiology
     - To define the term "Microorganism". To describe the scope of Microbiology and diversity of microbial world with specific reference to their role in health and disease of human being. To share important scientists contributed significantly to the development of Medical Microbiology
     - To enlist types of infectious pathogens (bacteria, fungi, parasite, virus) and common diseases caused by them
     - Brief explanation of taxonomical classification
   - Morphology of Bacteria, Virus and Fungi
     - Significance of Microbial morphology in diagnosis and pathogenesis of infection (bacteria, fungi, parasite, virus)
     - Differentiate between Prokaryotes and Eukaryotes
     - To describe the anatomy of Bacterial cell with special emphasis on all the Essential and Non Essential structures including bacterial cell wall, flagella, capsule and spores and their role in disease production and treatment of infections. Explain

pleomorphism, involution forms and L-forms and their clinical significance

- To describe unique properties of a Virus, including structural composition and organization of a virus; Differentiate between properties of Enveloped and Non enveloped virus
- Classification of Fungus of medical significance
- Classification of Parasites of medical significance and to describe morphology of a Protozoan and Helminth

- Physiology of microbes- Physiological and nutritional requirements of organisms for growth, factors affecting the growth of microbes, bacterial growth and cell division
- Microbial pathogenesis and infections - To explain the mechanism of pathogenesis and spectrum of disease produced by bacterial, viral, fungal and parasitic infections
- Sterilization and disinfection practices-
  - Definitions and general principle of various physical and chemical agents
  - Testing of disinfectants
  - Concept of Sterilization and Disinfection methods, working principles, controls and uses in various patient care setting
  - Concept of critical, semi critical and non critical items used in patient care along with methods used for their sterilization and disinfection
  - Central sterile supply department (CSSD)
- Culture media and culture methods- Basic concepts and definitions of various types of culture media, methods of aerobic and anaerobic culture.
- Samples collection & transportation
  - To enlist basic principles of sample collection including collection, storage and transport of various clinical specimens
  - To enlist common culture methods adopted for aerobic/anaerobic bacteria, fungus and viruses
  - To enlist common biochemical tests with their use and interpretation in identification of the organisms
- Normal flora and their role in health and disease
- Antimicrobial agents & Antimicrobial drug resistance

- Mechanisms of action and resistance of commonly used antimicrobial agents, transferable and non transferable drug resistance and laboratory methods to detect resistance
- Indications for performing AST with brief description on limitations of AST
- To enlist various methods of AST and their application with special emphasis on concept of MIC and its use

- Bacterial genetics - To describe significance of studying bacterial genetics, significance of chromosomal and extra chromosomal genetic material in a bacterial cell. Mechanisms of variation in genome like mutation, recombination, and gene transfer through conjugation, transduction and transformation. Concept of recombinant DNA techniques and their applications in various fields particularly for diagnosis

2. Immunology

- Immunity - To define and classify immunity, features and mechanisms of Innate and Acquired immunity. To differentiate between innate and acquired immunity, types of acquired immunity and its examples, difference between Active and Passive immunity including their clinical applications
- Antigen – Definitions, Antigenic determinants and their role in immune response. Biological classes of antigens and mechanism of action of Super antigens along with examples
- Antibody- To define and enumerate different classes of immunoglobulins. Structure of immunoglobulin and biological properties of each class of immunoglobulin
- Antigen antibody reactions- To describe the general features of antigen-antibody reactions including the principle/mechanism of antigen- antibody reaction commonly responsible for microbial pathogenesis and their uses in the diagnostic immunology like
  (a) Precipitation
  (b) Agglutination
  (c) Complement Fixation test
  (d) Neutralisation test
  (e) Opsonisation
  (f) Labelled assays like Enzyme Immuno Assays, CLIA, RIA, IF

(g) Rapid serological test like Flow through/ Immunochromatography test

- Complement system – To define and enumerate proteins of complement system. Pathway of Classical, Alternative and Lectin complement system. To explain on Complement pathways and biological effects of complement activation including diseases associated with complement system dysfunction
- Structure of immune system
  - Organization of the lymphoid system into lymphoid cells and Central and Peripheral lymphoid organs.
  - Concept of Humoral and Cell- mediated immunity and characteristics of T cells and B cells
  - Importance of phagocytic cells, null cells and other cells of immune system
  - Constitution and importance of Major Histocompatibility Complex
- Immune response –Cell mediated and Humoral immune response.
- Hypersensitivity – Definition and classification of Hypersensitivity reactions. Description of underlying mechanisms for hypersensitivity reactions with its clinical application.
- Autoimmunity - Concept of Autoimmunity, Theories of tolerance and autoimmune mechanisms. To differentiate between local and systemic autoimmune disease with clinical examples. Laboratory diagnosis of autoimmune diseases
- Immunodeficiency disorders – Definition and classification of immunodeficiency disorders with brief explanation on commonly encountered disorders.
- Transplant and tumor immunology - Immune basis in acceptance and rejection of a transplant and type of immunity that develops in malignancy with their application in early detection and treatment

3. CVS and Blood

- Infective Endocarditis and Acute Rheumatic Fever- Infective etiology, pathogenesis and lab diagnosis of rheumatic fever including description about Streptococcus pyogenes
- Pyrexia of unknown origin (Undifferentiated fever)
  - To define Pyrexia of unknown origin and its importance when dealing with a case of suspected IE. To describe the number, site & technique of blood culture collection and its significance in laboratory diagnosis

- Bloodstream Infections- Definition, etiology and laboratory diagnosis of BSI including sepsis
- Catheter related Bloodstream Infections

- Viral infections- Classification, structure, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention of HIV/AIDS
- Parasitic infections – Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention of Malaria, Babesiosis, Visceral Leishmaniasis,Trypanosomiasis, Schistosomiasis and Lymphatic Filariasis
- Fungal infections – Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention of Candidiasis and Systemic Mycoses

4. Gastrointestinal and hepatobiliary system

- Overview of infections in Gastrointestinal & hepatobiliary tract
- Food Poisoning: S aureus, Salmonella typhimurium, Bacillus cereus, Clostridium botulinum, C perfringens and others (Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents)
- Gastrointestinal Infections due to Enterobacteriaceae: Diarrheagenic Escherichia coli, Shigella, Non typhoidal Salmonella and Yersinia enterocolitica (Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents)
- Cholera, Halophilic Vibrio and Aeromonas Infections (Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents)
- Miscellaneous Bacterial Infections of Gastrointestinal System: Helicobacter, Campylobacter and Clostridium difficile infections including cholecystitis and liver abscess. (Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents)
- Viral Gastroenteritis: Rotaviruses and others (Classification, structure, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents)
- Parasitic Infections - Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment

and prevention aspects of all causative agents

- Intestinal Protozoan Infections: Intestinal Amoebiasis, Giardiasis, Coccidian Parasitic Infections, Balantidiasis, Blastocystosis, and others
- Intestinal Helminthic Infections
    - Intestinal Cestode Infections: Diphyllobothrium, Taenia, Hymenolepis and others
    - Intestinal Trematode Infections: Fasciolopsis buski, Schistosoma mansoni, S. japonicum and others
    - Intestinal Nematode Infections: Trichuris, Enterobius, Hookworm, Strongyloides, Ascaris and others

- Infective Syndromes of Hepatobiliary System - Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents
    - Viral Infections - Viruses causing Hepatitis - Hepatitis Viruses, Yellow Fever and others
    - Parasitic Infections - Amoebic Liver Abscess, Trematode Infections (Fasciola hepatica, Clonorchis and Opisthorchis) and others

5. Musculoskeletal system skin and soft tissue infections

- Infective Syndromes of Skin, Soft Tissue and Musculoskeletal Systems
- Bacterial Infections - Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents
    - Staphylococcal Infections
    - Beta-hemolytic Streptococcal Infections
    - Gas gangrene (Clostridium perfringens) and Infections due to Non-sporing Anaerobes
    - Leprosy (Mycobacterium leprae)
    - Miscellaneous Bacterial Infections of Skin and Soft Tissues: Anthracis, Actinomycosis, Nocardiosis, Non-venereal Treponematoses and abscess (Cerebral, liver, lung, spleen , renal and others)
- Viral Infections - Classification, structure, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents

- Viral Exanthems and other Cutaneous Viral Infections - Herpesviruses (Herpes simplex, Varicella-zoster and HHV-6 and 7 Infections), Poxviruses (Smallpox, Molluscum contagiosum), Parvovirus, Measles, Rubella, Coxsackie viruses and others

- Parasitic Infections - Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents - Cutaneous Leishmaniasis, Cysticercosis, Tissue Nematodes (Filarial Tissue Nematodes, Dracunculus medinensis, Trichinella spiralis) and Larva Migrans
- Fungal Infections of Skin, Soft Tissue and Musculoskeletal System- Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents - Superficial Fungal Infections, Subcutaneous Fungal Infections, Candidiasis (cutaneous and mucosal)

6. Central Nervous System infections

- Infective Syndromes of Central Nervous System
- Bacterial Infections- Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents
  - Bacterial Meningitis- Acute Bacterial (Pyogenic) Meningitis: Neisseria meningitidis, Streptococcus pneumoniae, Streptococcus agalactiae, Haemophilus influenzae and Listeria; Chronic Bacterial Meningitis: Tubercular Meningitis, Spirochetal Meningitis, Lyme disease and others
- Viral Infections - Classification, structure, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents
  - Viral Meningitis and Viral Myelitis : Poliomyelitis, Coxsackie virus infections and others
  - Viral Encephalitis and Encephalopathy - Rabies, HSV Encephalitis, Arboviral Encephalitis (Japanese Encephalitis and West Nile), Nipah and Hendra, Slow Virus and Prion Disease and others
- Parasitic and Fungal Infections - Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents
  - Parasitic Infections: Neurocysticercosis, Free-living Amoebae Infections, Toxoplasmosis and others
  - Fungal Infections: Cryptococcal Meningitis and others

7. **Respiratory tract infections**
    - Infective Syndromes of Respiratory Tract
    - Bacterial Infections - Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents
        - Bacterial Pharyngitis: Streptococcus pyogenes Pharyngitis, Diphtheria and others
        - Bacterial Lobar Pneumonia: Pneumococcal Pneumonia, Haemophilus influenza Pneumonia and others
        - Bacterial Atypical (Interstitial) Pneumonia: Mycoplasma Pneumonia, Chlamydia Pneumonia, Legionellosis, Nocardiosis and others
        - Tuberculous and Non-tuberculous Mycobacteria Infections
        - Pertussis
        - Infections due to Non-fermenting Gram-negative Bacilli: Pseudomonas, Acinetobacter, Burkholderia and others
    - Viral Infections - Classification, structure, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents
        - Myxovirus Infections of Respiratory Tract: Influenza, Parainfluenza, Mumps, Respiratory Syncytial Virus and others
        - Coronavirus Infections including COVID-19
        - Miscellaneous Viral Infections of Respiratory Tract: Rhinovirus, Adenovirus and Infectious Mononucleosis (Epstein-Barr Virus)
    - Parasitic and Fungal Infections of Respiratory Tract - Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents
        - Parasitic Infections: Paragonimiasis and others
        - Fungal Infections: Zygomycosis, Aspergillosis, Pneumocystosis and others
8. **Genitourinary & Sexually transmitted infections**
    - Infective Syndromes of Urinary Tract- Classification, morphology, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of all causative agents

- Bacterial Infections caused by: Enterobacteriaceae, Enterococcus and others
- Viral (BK Virus), Parasitic (Schistosoma haematobium) and Fungal Infections

- Infective Syndromes of Genital Tract or Sexually Transmitted Infections
  - Ulcerative Genital Disease: Syphilis, LymphogranulomaVenerum, Granuloma Inguinale, Soft Chancre and Genital Herpes
  - Gonorrhoea and Non-gonococcal Urethritis (Chlamydia trachomatis and others)
  - Vulvovaginitis (Trichomoniasis, Bacterial Vaginosis, Vaginal Candidiasis)

9. Zoonotic diseases and miscellaneous

- Overview of Zoonotic infections- To define zoonosis and enlist common zoonotic infections in India and also to identify the source, risk factors, modes of transmission, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of these zoonotic infections – Anthrax, Brucellosis, Leptospirosis, Plague, Rickettsial infections, Psittacosis, Rat-bite fever, Relapsing fever, Rabies, Toxoplasmosis, Trichinosis, Echinococcosis, Cysticercosis, Cryptosporidiosis, Toxocariasis, Balantidiasis, Arboviral infections – Dengue, Chikungunya, KFD & others.

- Overview of opportunistic infections- To define and enlist common opportunistic pathogens with clinical conditions that predispose to acquiring infection by these pathogens and also brief note on risk factors, modes of transmission, pathogenesis, epidemiology, clinical features, laboratory diagnosis, treatment and prevention aspects of these infections.
- Oncogenic viruses- To enlist oncogenic viruses commonly associated with malignancy in human beings and to explain properties of viruses that enable them to cause malignancy.
- Overview of Emerging Infectious diseases - Arboviral diseases like Dengue, Chikungunya, KFD, Zika, Nipah
- Health care associated infections and basics of Hospital Infection Control practices including Antibiotic Stewardship
- Methods of assessing Microbial contamination of food, water and air
- National Health Programs in prevention of common infectious diseases

PRACTICALS:

A. SPOTTERS: The list of Slides, Culture media, Instruments and Specimens are as follows

SLIDES			
Bacteriology	**Parasitology**	**Mycology**	**Virology**
Staphylococcus – Direct Smear- Pus	Malarial parasite- Ring form	Trichophyton rubrum	Molluscum Contagiosum
Staphylococci- Culture smear	Malarial parasite- Gametocyte- P.f	Microsporum gypseum	Negri body
Streptococci- Direct Smear	Tapeworm scolex	Mucor/Rhizopus	
Streptococci- Culture smear	Trichuris eggs in Appendix	Penicillium	
Pneumococci- Direct smear- Sputum	Enterobius worm	Aspergillus	
Pneumococci- Negative staining	Cyclops	Rhinosporidium seeberi	
Gonococci- Direct smear	Echinococcus granulosus worm	Mycetoma – HPE slide	
Mycobacterium tuberculosis	Hook worm	Candida	
Mycobacterium leprae	Oocyst of Isospora belli	Cryptococcus	
Bacillus	Microfilaria	Sporothrix schenkii	

CULTURE MEDIA			
Liquid media	**Solid media- Plain**	**Solid media-With growth**	**Biochemical media**
Nutrient broth	Nutrient Agar plate	Nutrient Agar with Staphylococci growth	Indole test
Selenite F Broth	Blood Agar plate	Antibiotic susceptibility plate	Urease test
Tetrathionate broth	Chocolate agar plate	Blood Agar plate with beta hemolysis	Citrate test

Robertsons cooked meat broth	Wilson & Blair plate	Blood Agar plate with alpha hemolysis	Triple Sugar Iron agar
Blood culture bottle	Mac Conkey agar plate	Lowenstein Jensen slant with growth	
	Lowenstein Jensen Media slant	Wilson & Blair with black colony	
	Loeffler's serum slant	Mac conkey -LF	
	TCBS plate	Mac conkey-NLF	
	SDA	Mac conkey- LF & NLF	
		TCBS with Yellow colonies	
		SDA with growth	

INSTRUMENTS	SPECIMENS
Bacteriological loop	Hydatid cyst
Sterile cotton swab	Tape worm
Seitz filter	Round worm
McIntoshFildes jar	
Tuberculin syringe	
VDRL slide	

B. DIRECTLY OBSERVED PROCEDURAL SKILLS

1. Gram staining
2. Zeihl Neelson staining
3. Stool Microscopic examination

C. CLINICAL MICROBIOLOGY (Charts with case scenarios)

1. **CVS & blood**

   - Rheumatic fever
   - Sepsis – Identification of causative agents & role of sepsis markers, CRBSI
   - Infective endocarditis
   - HIV –serodiagnosis
   - Peripheral blood smear examination – Identification of causative agents of Malaria & Filariasis

2. **GIT & Hepatobiliary**
   - Diarrhoeal disease – Cholera, Diarrheagenic E.coli
   - Food poisoning – Salmonella typhimurium
   - Dysentery –Bacillary and Amoebic
   - Viral gastro enteritis
   - Enteric fever
   - Viral Hepatitis- Hepatitis A, Hepatitis B, Hepatitis C, Hepatitis E

3. **Skin & soft tissue infections**

   - Surgical site infection - MRSA
   - Burns wound infection (Pseudomonas)
   - Osteomyelitis & Infective arthritis
   - Dermatophytoses–Tinea corporis - Trichophyton,
     Tinea capitis - Microsporum
   - Viral exanthematous fever
   - Mycetoma

4. **CNS infections**
   - Meningitis -Pyogenic, Neonatal, Cryptococcal meningitis
   - Rabies
   - Toxoplasma
   - Neurocysticercosis

5. Respiratory system infections

- URTI- Tonsillitis/Pharyngitis - Streptococcus pyogenes, Influenza
- Otitis media -Proteus
- Otomycosis – Penicillium, Aspergillus
- Pneumonia
    - Community Acquired Pneumonia – Klebsiella, Streptococcus pneumonia, Tuberculosis, Viral Pneumonia
    - Hospital Acquired pneumonia- Ventilator Associated Pneumonia–Acinetobacter

6. Genito urinary system infections

- STI
    - Ulcerative lesions in the external genitalia
    - Discharge per vagina
    - Urethral discharge
- UTI

7. Zoonotic & miscellaneous

- PUO (Undifferentiated fever)– serological diagnosis of
    - Brucellosis
    - Leptospirosis
    - Typhus fever
- Dengue
- Opportunistic infections
    - Candidiasis
    - Mucormycosis
    - Aspergillosis
    - Intestinal Coccidean parasitic infection
    - CMV

C. OSPE

- OSPE stations covered under respective topics/SLOs
- Hand hygiene
- Donning & doffing of PPE

- Segregation of Biomedical waste
- Sample collection in a simulated situation
    - Throat swab
    - Nasopharyngeal swab
    - Peripheral venous blood for culture
    - Wound swab/ Pus sample
    - Skin scraping, Hair clippings and Nail samples for Mycological examination

D. AETCOM

- Demonstrating respect for patient samples
- Confidentiality pertaining to patient identity in laboratory results
- Advice a HCW with needle stick injury in complete and correct sequence in a simulated setting
- Instructing a DTS staffer on - How to manage bio-spill in a simulated setting

Competencies & Specific Learning Objectives with, Integration, Teaching learning & Assessment methods

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Teaching-Learning Methods	Assessment Methods	Integration
TOPIC: GENERAL MICROBIOLOGY AND IMMUNITY							
MI1.1	Describe the different causative agents of Infectious diseases, the methods used in their detection, and discuss the role of microbes in health and disease	K	KH	Y	Lecture, Small group discussion with case	• Long essay • Short essay	

Sub competency / SLO	1. Describe structure and function of bacterial cell. 2. Classify bacteria causing infections in man. 3. Enumerate the commensal bacteria in Respiratory Tract, Gastrointestinal Tract, Genitourinary tract and Skin. 4. Discuss the role of Commensal bacteria in health & disease 5. Describe the principles and applications of different types of Culture media 6. Interpret & Identify bacteria using various biochemical tests 7. Describe the different Culture methods 8. Describe the classification & morphology of Virus 9. Describe general pathogenesis and laboratory diagnosis of viral infections 10. Describe the classification & morphology of Fungi 11. Describe general pathogenesis and laboratory diagnosis of fungal infections 12. Describe the classification & morphology of Parasites 13. Describe general pathogenesis and laboratory diagnosis of parasitic infections				scenarios	• Short answer • MCQs • Viva Voce • Attitude/communication - counsel the public on modes of transmission and prevention of infectious diseases.	
MI 1.2	**Perform and identify the different causative agents of Infectious diseases by Gram Stain, ZN stain and Stool routine microscopy**	S	P	Y	DOAP session Practical class	• Practical Exams • OSPE	
Sub competency / SLO	1. Classify Stains and discuss their applications 2. Discuss the principle of Gram staining 3. Perform the Gram stain and interpret the results with appropriate diagram 4. Discuss the principle of ZN staining 5. Perform ZN stain and interpret the results with appropriate diagram as per RNTCP guidelines 6. Describe the motility of bacteria by Hanging drop method. 7. Identify the parasitic egg/ ova/ cyst/ trophozoite in the stool sample with suitable diagram.						

MI1.3	**Describe the epidemiological basis of common infectious diseases**	K	KH	Y	• Lecture • Small group discussion	• Short essay • Short answer • MCQs • Viva Voce	Community Medicine
Sub competency / SLO	1. Define Epidemiology and discuss the various epidemiological patterns of infectious diseases 2. Discuss the various sources and reservoirs of infections. 3. List the pathogens transmitted by aerosals and their distribution across the globe. 4. List the pathogens transmitted by droplet nuclei and describe their distribution across the globe. 5. List the pathogens transmitted by faeco-oral methods and discuss their global distribution.						
MI1.4	**Classify and describe the different methods of sterilization and disinfection. Discuss the application of the different methods in the laboratory, in clinical and surgical practice.**	K	KH	Y	• Lecture • Small group discussion	• Long essay • Short essay • Short answer • MCQs • Viva Voce	General Surgery
Sub competency / SLO	1. Define: Sterilization, Disinfection, Asepsis, Antiseptics, and Decontamination. 2. Classify Sterilization and describe the dry heat method of sterilization & Sterilisation control. 3. Describe the moist heat method of sterilization. 4. Describe Pasteurization of milk. 5. Classify disinfectants and their mode of action. 6. Describe testing of disinfectants 7. Enumerate high level disinfectants, medium and low level disinfectants and their uses.						
MI 1.5	**Choose the most appropriate method of sterilization and disinfection to be used in specific situations in the laboratory, in clinical and surgical practice**	K	KH	Y	• Lecture • Small group discussion with case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce • Practical Exams • OSPE	General Surgery
Sub competency / SLO	1. Discuss the application of the different methods of sterilisation and disinfection in clinical and surgical practice. 2. Describe Spaulding's classification of Sterilisation of Medical equipments & devices 3. Identify the most appropriate method of sterilization / disinfection in the given case scenario						

MI 1.6	**Describe the mechanisms of drug resistance, and the methods of antimicrobial susceptibility testing and monitoring of antimicrobial therapy**	K	K	Y	• Lecture • Small group discussion with case scenarios	• OSPE • Long essay • Short essay • Short answer • MCQs • Viva Voce	Pharmacology
Sub competency / SLO	1. Describe the principles of Bacterial genetics and methods of gene transfer in bacteria 2. Describe genetic mechanisms of Bacterial drug resistance. 3. Describe the mechanism of action of antimicrobial agents 4. Describe the mechanism of drug resistance and methods of detection in MRSA, VRE, ESBL, CRE, MBL. 5. Discuss the treatment options in infections caused by MRSA, VRE, ESBL, CRE, MBL. 6. Describe intrinsic resistance in microbes and list the microbes intrinsically resistant to certain antimicrobials. 7. Describe different methods of antimicrobial susceptibility testing – Broth & Agar dilution 8. Describe Kirby-Bauer sensitivity testing of bacteria for antibiotics. 9. Describe the Stokes method of sensitivity testing. 10. Describe the automated antimicrobial susceptibility testing with MIC. 11. Interpretation of antimicrobial susceptibility testing as per CLSI/EUCAST guidelines 12. Describe principles of antibiotic selection and monitoring therapy 13. Describe Antimicrobial stewardship.						
MI 1.7	**Describe the immunological mechanisms in health**	K	KH	Y	• Lecture	• Long essay	Pathology

Sub competency / SLO	1. Define and classify Immunity 2. Describe various types of Immunity 3. Describe natural defence mechanisms in body 4. Describe specific immune mechanisms in the body – Humoral & Cell mediated Immunity 5. Discuss the role of Cytokines in CMI & their therapeutic applications 6. Define and classify Antigen 7. Describe characteristics of Antigens 8. Define and classify Antibody and describe each type of Antibody 9. Define and classify Antigen – Antibody reactions 10. Discuss the principle and applications of various Antigen – Antibody reactions 11. Describe components, general properties, cascade and role of Complement system in health and disease 12. Describe structure and functions of immune system 13. Describe Major Histocompatability complex				• Small group discussion	• Short essay • Short answer • MCQs • Viva Voce	
MI 1.8	**Describe the mechanisms of immunity and response of the host immune system to infections**	K	KH	Y	• Lecture • Small group discussion with case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce	Pathology Paediatrics
Sub competency / SLO	1. Define: Immune response 2. Describe humoral immune response and cell mediated immune response 3. Discuss the theories of immune response 4. Describe Immunological tolerance 5. Describe Monoclonal antibodies & their applications						
MI 1.9	**Discuss the immunological basis of vaccines and describe the Universal Immunisation schedule**	K	KH	Y	• Lecture • Small group discussion with case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce	Community Medicine Paediatrics
Sub competency / SLO	1. Classify different types of vaccines and describe their mechanism of action. 2. Describe the principles of vaccine preparation 3. Describe the latest National immunization schedule 4. Discuss advantages and disadvantages of different types of vaccines						

MI 1.10	**Describe the immunological mechanisms in immunological disorder (hypersensitivity, autoimmune disorders and immunodeficiency states) and discuss the laboratory methods used in detection.**	K	KH	Y	• Lecture • Small group discussion with case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce	Medicine Paediatrics
Sub competency / SLO	1. Define and classify hypersensitivity. 2. Describe the mechanism, clinical features, laboratory evaluation and prevention of Type I Hypersensitivity with clinical examples. 3. Describe the mechanism, clinical features, laboratory evaluation and prevention of Type II Hypersensitivity with clinical examples. 4. Describe the mechanism, clinical features, laboratory evaluation and prevention of Type III Hypersensitivity with clinical examples. 5. Describe the mechanism, clinical features, laboratory evaluation and prevention of Type IV & V Hypersensitivity with clinical examples. 6. Define and classify Autoimmune disorders. 7. Describe each autoimmune disorder with clinical examples. 8. Describe an approach for laboratory diagnosis of autoimmune diseases 9. Classify and describe various immunodeficiency disorders. 10. Discuss the laboratory methods used in detection of immunodeficiency diseases.						
MI 1.11	**Describe the immunological mechanisms of transplantation and tumor immunity**	K	KH	Y	• Lecture • Small group discussion with case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce	Oncology Department
Sub competency / SLO	1. Describe the immunological mechanisms of - a. Acute graft rejection. b. Hype acute graft rejection. c. Chronic graft rejection. 2. Describe Graft – versus-host reaction 3. Describe the immune mechanisms in preventing the						

	emergence of neoplastic disorders. 4. Describe the immunological methods useful in diagnosis and assessing the prognosis of cancer chemotherapy (Tumor antigens) 5. Discuss the immune modulators useful in clinical practice to manage malignancies. 6. Describe Immunological surveillance						
TOPIC: CVS AND BLOOD							
MI 2.1	**Describe the etiologic agents in rheumatic fever and their diagnosis**	K	KH	Y	• Lecture • Small group discussion with case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce	General Medicine Pathology
Sub competency / SLO	1. Describe the immunological basis of Rheumatic fever caused by Streptococci 2. Classify Streptococcus 3. Describe the morphology, pathogenesis, antigenic structure, toxin & virulence factors of Streptococcus pyogenes 4. Describe the clinical features and laboratory diagnosis of acute rheumatic fever. 5. Discuss the role of antibiotics in treatment and prevention of rheumatic fever.						
MI 2.2	**Describe the classification etio-pathogenesis, clinical features and discuss the diagnostic modalities of Infective endocarditis**	K	KH	Y	• Lecture • Small group discussion with case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce	General Medicine Pathology
Sub competency / SLO	1. Enumerate the etiological agents (Viridans Streptococci, Coagulase positive and negative Staphylococci, Haemophilus parainfluenzae, Fungi, Coxiella, Brucella, HACEK bacteria) 2. Describe Pathophysiology of the disease. 3. Discuss clinical features and laboratory methods of identification of causative organism. 4. Define sepsis, septicemia, bacteremia, fungemia,						

	viremia, parasitemia. 5. Describe etiology, pathogenesis, clinical features, lab diagnosis and treatment of septicaemia.						
MI 2.3	**Identify the microbial agents causing Rheumatic Heart Disease & infective Endocarditis**	S	SH	Y	DOAP session	• OSPE • Skin preparation • Procedure of venipuncture • Interpretation of Laboratory report	General Medicine Pathology
Sub competency / SLO	1. Describe the procedure for blood sample collection by venepuncture for Blood culture. 2. Discuss conventional & automated blood culture systems and their interpretation. 3. Identify the microbial agents causing Rheumatic Heart Disease 4. Identify the microbial agents causing infective Endocarditis						
MI 2.4	**List the common microbial agents causing anaemia. Describe the morphology, mode of infection, and discuss the pathogenesis, clinical course diagnosis and treatment of the common agents causing anaemia.**	K	KH	Y	• Lecture • Small group discussion with clinical cases	• Long essay • Short essay • Short answer • MCQs • Viva Voce • Demonstration of PBS with malarial parasites. • Spotters • Slides	General Medicine Pathology
Sub competency / SLO	1. Enumerate the microbial agents causing anemia 2. Enumerate parasites causing anemia (Ankylostoma, Plasmodium, Diphyllobothrium, Leishmania, Trichuris, Ehrlichia) 3. Describe morphology & lifecycle of hookworm & Diphyllobothrium latum 4. Discuss pathogenesis, clinical features, complications, lab diagnosis and management of infections caused by hookworm & Diphyllobothrium						
MI 2.5	**Describe the etio-pathogenesis and discuss the clinical evolution and the laboratory diagnosis of kalaazar, malaria, filariasis and other common parasites prevalent in India**	K	KH	Y	• Lectures • Small group discussion with clinical cases	• Long essay • Short essay • Short answer • MCQs • Viva Voce	General Medicine Pathology Community medicine
Sub competency / SLO	1. Classify parasites and enumerate parasites prevalent in India 2. Describe the morphology, life cycle, pathogenesis and clinical features of malarial parasite. 3. Describe the clinical features, complications, lab						

	diagnosis, treatment and prevention of malaria. 4. Describe the morphology, life cycle, pathogenesis and clinical features of leishmania &Trypanosoma. 5. Describe the lab diagnosis, treatment and prevention of kalaazar& sleeping sickness. 6. Describe the morphology, life cycle, pathogenesis and clinical features of Schistosomes 7. Describe the laboratory diagnosis, treatment and prevention of schistosomiasis 8. Describe Epidemiology of Malaria and Filariasis.						
MI 2.6	**Identify the causative agent of malaria and filariasis**	K/S	SH	Y	DOAP session	• Student should be able to identify and speciate malarial parasite and microfilaria of Wuchereriabancrofti	General Medicine
Sub competency / SLO	1. Observe the peripheral smear preparation - thick and thin smears. 2. Demonstrate/observe Leishman's staining of peripheral smear 3. Identify and describe the morphology of different stages of malarial parasite in the given smear 4. Identify and describe the morphology of microfilaria in the given smear						
MI 2.7	**Describe the epidemiology, the etio- pathogenesis, evolution, complications, opportunistic infections, diagnosis, prevention and the principles of management of HIV**	K	KH	Y	• Lectures • Small group discussion with observation of microscopic slides of Cryptococcus, Candida, Cryptosporidium, Isospora and Toxoplasma.	• Long essay • Short essay • Short answer • MCQs • Viva Voce • Slide / Spotters	General Medicine Pathology
Sub competency / SLO	1. Describe morphology, epidemiology& pathogenesis of HIV 2. Enlist clinical presentation, classification, opportunistic infections (bacterial, fungal, viral and parasitic) in AIDS with special reference to systemic mycosis and candidiasis 3. Describe the immunological abnormalities in HIV infection 4. Discuss laboratory diagnosis and monitoring of HIV and opportunistic infections.						

	5. Discuss NACO guidelines, strategies, pre-test and post-test counselling 6. Describe the various modalities of prevention and treatment of HIV 7. Outline National AIDS control programme 8. Discuss recent advances including vaccine initiatives						
	GASTROINTESTINAL AND HEPATOBILIARY SYSTEM						
MI 3 1	**Enumerate the microbial agents causing diarrhea and dysentery. Describe the epidemiology, morphology, pathogenesis, clinical features and diagnostic modalities of these agents.**	K	KH	Y	• Lecture • Small group discussion with case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce Stool Examination	General Medicine Paediatrics Pathology
Sub competency / SLO	1. Define diarrhea and dysentery 2. Enumerate the microbial agents(bacterial, viral, protozoal) causing diarrhea 3. Describe the source of infection, pathogenesis, clinical features, epidemiology, laboratory diagnosis, complications, treatment and prevention of cholera. 4. Describe the morphology, pathogenesis, clinical features, epidemiology and laboratory diagnosis of diarrhoea caused by Diarrhoegenic E.coli. 5. Describe the morphology, pathogenesis, clinical features, epidemiology and laboratory diagnosis of diarrhoea caused by Campylobacter jejuni. 6. Describe the morphology, pathogenesis, clinical features, epidemiology and laboratory diagnosis of diarrhoea caused by Yersinia enterocolitica. 7. Describe the source of infection, pathogenesis, clinical features, epidemiology, laboratory diagnosis, complications, treatment and prevention of diarrheacaused by viruses (Rotavirus, Adenovirus, Astrovirus, Norovirus, Coronavirus, Calcivirus, Norwalk virus) 8. Describe the morphology, life cycle, pathogenesis,						

	clinical features, complications and laboratory diagnosis of diarrhoea caused by parasites (Giardia lamblia, Enterobious, Hookworm, Ascaris, Trichuris, Strongyloides Taenia, Hymenolepis, Fasciolopsis buski, Schistosoma mansoni, S. japonicum) 9. Describe the source of infection, pathogenesis, clinical features, epidemiology, laboratory diagnosis, complications, treatment and prevention of diarrhoea caused by enteric coccidian parasites 10. Enumerate the microbial agents (bacterial, viral, protozoal) causing dysentery 11. Describe the source of infection, pathogenesis, clinical features, epidemiology, laboratory diagnosis, complications, treatment and prevention of bacillary dysentery. 12. Describe the source of infection, pathogenesis, clinical features, epidemiology, laboratory diagnosis, complications, treatment and prevention of amoebic dysentery 13. Describe the source of infection, pathogenesis, clinical features, epidemiology, laboratory diagnosis, complications, treatment and prevention of ciliary dysentery						
MI 3.2	**Identify the common etiologic agents of diarrhea and dysentery**	S	SH	Y	• DOAP session • Small group discussion with clinical case scenario	• Identification of Etiological agent based on culture media and biochemical tests • Performance of wet mount of the stool • OSPE	General Medicine Paediatrics
Sub competency / SLO	1. Perform Stool wet mount preparation, focus, screen and identify the various parasitic forms 2. Describe Hanging drop preparation 3. Discuss the given case scenario and choose the appropriate laboratory diagnostic tests for the provisional diagnosis. 4. Interpret the displayed culture media and biochemical tests and identify the etiological agent.						

MI 3.3	**Describe the enteric fever pathogens and discuss the evolution of the clinical course and the laboratory diagnosis of the diseases caused by them**	K	KH	Y	• Lecture • Small group discussion with case scenario	• Long essay • Short essay • Short answer • MCQs • Viva Voce	General Medicine Pharmacology Pathology
Sub competency / SLO	1. Enumerate the agents causing enteric fever. 2. Describe the source, pathogenesis, epidemiology, clinical features, complications and laboratory diagnosis of enteric fever. 3. Discuss the detection of carrier state in enteric fever. 4. Discuss the treatment, vaccination and prevention of enteric fever.						
MI 3.4	**Identify the different modalities for diagnosis of enteric fever.Choose the appropriate test related to the duration of illness**	S	KH	Y	• DOAP session • Small group discussion with clinical case scenario	• Case discussion- Identification of etiological agent. • Serology - Widal test. • OSPE	General Medicine Pathology
Sub competency / SLO	1. Discuss the various tests performed for the diagnosis of enteric fever in relation to the duration of illness 2. Describe the procedure of sample collection for blood culture and stool culture. 3. Discuss widal test 4. Describe other serological test done for the diagnosis of enteric fever.						
MI 3.5	**Enumerate the causative agents of food poisoning and discuss thepathogenesis, clinical course and laboratory diagnosis**	K	KH	Y	• Lecture • Small group discussion	• Long essay • Short essay • Short answer • MCQs • Viva Voce • Identification of etiological agent • OSPE	General Medicine Pharmacology
Sub competency / SLO	1. Define, classify and enumerate the agents causing food poisoning. 2. Describe the pathogenesis, clinical features, laboratory diagnosis of Salmonella food poisoning. 3. Describe the pathogenesis, clinical features, laboratory diagnosis of Staphylococcal food poisoning. 4. Describe the pathogenesis, clinical features, laboratory diagnosis of food poisoning due to Bacillus cereus. 5. Describe the pathogenesis, clinical features, laboratory diagnosis of food poisoning due to Clostridium botulinum. 6. Describe the pathogenesis, clinical features, laboratory diagnosis of food poisoning due to Clostridium						

	perfringes. 7. Describe the pathogenesis, clinical features, epidemiology and laboratory diagnosis of food poisoning due to Vibrio parahaemolyticus. 8. Describe the pathogenesis, clinical features, laboratory diagnosis, treatment and prophylaxis of pseudomembranous colitis						
MI 3.6	**Describe the etio-pathogenesis of Acid peptic disease (APD) and the clinical course. Discuss the diagnosis and management of the causative agent of APD**	K	KH	Y	• Lecture • Small group discussion	• Short essay • Short answer • MCQs • Viva Voce	General Medicine Pharmacology Pathology
Sub competency / SLO	1. Describe the morphology, pathogenesis, clinical features, complications, epidemiology and laboratory diagnosis of acid peptic disease caused by Helicobacter pylori. 2. Discuss the management of acid peptic disease caused by the Helicobacter pylori						
MI 3.7	**Describe the epidemiology, the etio-pathogenesis and discuss the viral markers in the evolution of Viral hepatitis. Discuss the modalities in the diagnosis and prevention of viral hepatitis**	K	KH	Y	• Lecture • Small group discussion with case scenario	• Long essay • Short essay • Short answer • MCQs • Viva Voce • OSPE	General Medicine Pathology
Sub competency / SLO	1. Enumerate agents causing viral hepatitis. 2. Describe the morphology, antigens, modes of transmission, complications, epidemiology, pathogenesis, clinical features of hepatitis A,B,C,D and E 3. Discuss the lab diagnosis of Hepatitis A,B,C,D and E. 4. Discuss the treatment aspects and prevention of viral hepatitis 5. Describe the morphology, antigens, modes of transmission, complications, epidemiology, pathogenesis, clinical features of hepatitis caused by yellow fever virus						
MI 3.8	**Choose the appropriate laboratory test in the diagnosis of viral hepatitis with emphasis on viral markers**	K	KH	Y	• Lecture	• Long essay	General Medicine

Sub competency / SLO	1. Enumerate the various laboratory tests available for the diagnosis of viral hepatitis 2. Discuss the importance of the various viral markers				• Small group discussion with case scenario	• Short essay • Short answer • MCQs • Viva Voce • OSPE	Pathology
MUSCULOSKELETAL SYSTEM SKIN AND SOFT TISSUE INFECTIONS							
MI 4.1	**Enumerate the microbial agents causing anaerobic infections. Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of anaerobic infections**	K	KH	Y	• Lecture • Small group discussion	• Long essay • Short essay • Short answer • MCQs • Viva Voce	General Medicine
Sub competency / SLO	1. Describe the commensal anaerobes and aerobes in the body. 2. Classify anaerobic bacteria and enumerate the disease caused by them. 3. Describe sample collection, transport and culture of clinical samples for anaerobic culture 4. Classify Clostridia and describe their morphology 5. Describe the pathogenesis, clinical features, laboratory diagnosis, treatment and prophylaxis of Gas gangrene 6. Describe the pathogenesis, clinical features, laboratory diagnosis, treatment and prophylaxis of Tetanus 7. Describe the classification, pathogenesis, clinical features, laboratory diagnosis and treatment of infections caused by non sporing anaerobes 8. Describe the pathogenesis, clinical features, laboratory diagnosis and treatment of Actinomycosis and nocardiosis						
MI 4.2	**Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of bone & joint infections**	K	KH	Y	• Lecture • Small group discussion with case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce	Orthopaedics
Sub competency / SLO	1. Enumerate the etiology, pathogenesis clinical feature, lab diagnosis and treatment of a) Osteomyelitis. b) Infective arthiritis						

	c) Implant associated infections					• Case scenarios	
MI 4.3	**Describe the etio-pathogenesis of infections of skin and soft tissueand discuss the clinical course and the laboratory diagnosis**	K	KH	Y	• Lecture • Small group discussion with case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce • Case scenarios	Dermatology Venereology & Leprosy General Surgery
Sub competency / SLO	1. Enumerate the skin and soft tissue infections (folliculitis, furuncle, carbuncle, macule, papule, nodule, pustule, vesicle, scales, ulcer, bullae). 2. Enumerate the etiological agents causing these infections (Bacteria, Viruses, Fungi, Parasites). 3. Discuss the pathogenesis, clinical course and laboratory diagnosis of infections caused by Staphylococcus. 4. Describe the etiological agents, clinical course and laboratory diagnosis of post operative wound infection and burns wound infection 5. Describe the pathogenesis, clinical course and laboratory diagnosis of Leprosy 6. Describe the pathogenesis, clinical course and laboratory diagnosis of Atypical mycobacterial infections 7. Describe the pathogenesis, clinical course and laboratory diagnosis of cutaneous Anthrax 8. List the antibiotics useful in treating skin and soft tissue infections. 9. Enumerate fungi causing Superficial mycosis. 10. Describe the pathogenesis, clinical features, lab diagnosis and treatment of Superficial mycosis. 11. Enumerate the agents causing Subcutaneous mycosis. 12. Describe the clinical features, lab diagnosis and treatment of Subcutaneous mycosis. 13. Enumerate parasites causing skin and soft tissue lesions with their clinical course and laboratory diagnosis (Cutaneous leishmaniasis, Cysticercosis, Tissue nematode infections, Larva migrans) 14. Enumerate viruses causing skin and soft tissue lesions with their clinical course and laboratory diagnosis						

	15. Describe the clinical features, lab diagnosis and treatment of infections caused by Herpes viruses, Pox viruses, Measles, Coxsackie, Rubella, Ebstein Barr viruses.						
CENTRAL NERVOUS SYSTEM INFECTIONS							
MI 5.1	**Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of meningitis**	K	KH	Y	• Lecture • Small group discussion with case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce • Case scenarios	General Medicine Paediatrics Pathology
Sub competency / SLO	1. Define meningitis. Classify meningitis based on age, duration and etiological agents. 2. Describe the etio pathogenesis, clinical course and laboratory diagnosis of meningitis caused by Meningococci, Pneumococci, Haemophilus influenzae, Listeria and Streptococcus agalactiae. 3. Describe pathogenesis, lab diagnosis, prevention and treatment of bacterial meningitis caused by Gram negative bacilli 4. Describe pathogenesis, lab diagnosis, prevention and treatment of tubercular meningitis 5. Describe pathogenesis, lab diagnosis, prevention and treatment of meningitis caused by Spirochetes 6. Describe pathogenesis, lab diagnosis, prevention and treatment of meningitis caused by fungi - Cryptococcus neoformans, Coccidioides, Histoplasma, Candida 7. Describe pathogenesis, lab diagnosis, prevention and treatment of meningitis caused by free living amoebae 8. List the organisms causing aseptic meningitis and describe the pathogenesis, lab diagnosis, prevention and treatment of viral meningitis (coxsackie virus, mumps virus, Enterovirus etc.) 9. Describe pathogenesis and clinical features of Polio. 10. Discuss the laboratory diagnosis and prevention of Poliomyelitis. 11. Discuss the various Vaccines available for prevention of						

	meningitis.						
MI 5.2	**Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of encephalitis**	K	KH	Y	• Lecture • Small group discussion with case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce	General Medicine Paediatrics Pathology
Sub competency / SLO	1. Define encephalitis. List the organisms causing encephalitis 2. Describe the morphology of rabies virus. Discuss the pathogenesis, clinical features, lab diagnosis and prevention of rabies 3. Describe etiology, pathogenesis, clinical features, lab diagnosis and prevention of Herpes simplex viral encephalitis 4. Describe etiology, pathogenesis, clinical features, lab diagnosis and prevention of slow viral infections 5. Describe etiology, pathogenesis, clinical features and laboratory diagnosis of encephalitis caused by Arboviruses (Japanese encephalitis, West nile , Nipah and Hendra, Slow virus & Prion disease) 6. Discuss the etiopathogenesis, clinical features and approach to diagnosis of parasitic meningitis and Encephalitis (Neurocysticercosis, Free-Living amoebae, Toxoplasmosis)						
MI 5.3	**Identify the microbial agents causing meningitis**	S	SH	Y	• DOAP session • Small group discussion with case scenarios	• OSPE - Case scenarios • Viva Voce	General Medicine Paediatrics
Sub competency / SLO	1. Clinical case scenario • Interpretation of CSF Direct smear Gram staining • Interpretation of culture plate, biochemical reactions and identification of organisms • Interpretation of Antiobic susceptibility plate						

RESPIRATORY TRACT INFECTIONS							
MI 6.1	**Describe the etio-pathogenesis, laboratory diagnosis and prevention of Infections of upper and lower respiratory tract**	K	KH	Y	• Lecture • Small group discussion	• Long essay • Short essay • Short answer • MCQs • Viva Voce • OSPE - Case scenarios	General Medicine
Sub competency / SLO	1. List the etiological agents (Bacterial, viral, fungal and parasitic) causing Upper respiratory tract infections. 2. List the etiological agents (Bacterial, viral, fungal including Dimorphic fungi and parasitic) causing Lower respiratory tract infections. 3. Describe the etiopathogenesis, clinical features, complications, laboratory diagnosis and management of various Upper respiratory tract infections (rhinitis, otitis, sinusitis, pharyngitis, tonsillitis & laryngitis) caused by Group A Streptococci, Bordetella, Haemophilus influenzae, Legionella, Orthomyxoviruses, Paramyxoviruses, Rhinoviruses, Adenoviruses, EBV. 4. Describe the etiopathogenesis, clinical features, complications, laboratory diagnosis and management of diptheria 5. Describe the etiopathogenesis, clinical features, complications, laboratory diagnosis and management of various Lower respiratory tract infections – bronchitis, bronchiolitis and pneumonia 6. Describe the etiopathogenesis, clinical features, complications, laboratory diagnosis and management of community acquired and hospital acquired pneumonia 7. Describe the etiopathogenesis, clinical features, complications, laboratory diagnosis and management of Ventilator associated pneumonia (Pseudomonas, Acinetobacter, Burkholderia) 8. Describe the etiopathogenesis, clinical features, complications, laboratory diagnosis, treatment, drug resistance and prophylaxis of Pneumococcal pneumonia 9. Describe the etiopathogenesis, clinical features,						

	complications, laboratory diagnosis, treatment and prophylaxis of Pertusis 10. Describe the etiopathogenesis, epidemiology, clinical features, complications, laboratory diagnosis, treatment, drug resistance and prophylaxis of Pulmonary tuberculosis 11. Describe the pathogenesis, clinical features, complications, laboratory diagnosis and management of pneumonia caused by Atypical mycobacterium 12. Describe the etiopathogenesis, clinical features, complications, laboratory diagnosis and management of Atypical pneumonia caused by Mycoplasma, Legionella and Chlamydia. 13. Describe the pathogenesis, clinical features, laboratory diagnosis and treatment of nocardiosis 14. Describe the etiological agents, epidemiology, pathogenesis, clinical features, diagnosis and prophylaxis of viral pneumonia (Paramyxoviruses, Corona viruses (SARS-COV 2), SARS, MERS) 15. Describe the etiopathogenesis, clinical features, complications, laboratory diagnosis and management of pulmonary mycosis (Dimorphic fungi – Histoplasma, Blastomyces, Paracoccidiodes, Coccidiodes, Aspergillus, Zygomycetes, Pneumocystis jerovicii) 16. Describe the etiopathogenesis, life cycle, clinical features, complications, laboratory diagnosis and management of parasitic lung infections caused by Paragonimus westermani						
MI 6.2	**Identify the common etiologic agents of upper respiratory tractinfections (Gram Stain)**	S	P	Y	Demonstration& Performing of Gram stain procedure	• Short answer • MCQs • Viva Voce • To perform Gram stain, focus the slide and report the	General Medicine
Sub competency / SLO	1. Describe the method of Upper respiratory sample (Throat swab, Nasopharyngeal swab) collection and transportation 2. Describe the principle, procedure, interpretation and uses of Gram stain. 3. Perform Gram stain on the given smear, focus the slide						

	and report. 4. Identify the etiological agent causing Upper respiratory infection based on case history, colony morphology, biochemical reactions and interpret the antibiotic susceptibility testing.					smear. • OSPE • Case scenario	
MI 6.3	**Identify the common etiologic agents of lower respiratory tractinfections (Gram Stain & Acid fast stain)**	S	P	Y	Demonstration& Performing of Gram and ZN stain procedure	• Short answer • MCQs • Viva Voce • To perform Gram stain and ZN stain, focus the slide and report the smear. • OSPE • Case scenario	General Medicine
Sub competency / SLO	1. Describe the method of Lower respiratory sample (Sputum, BAL, Endotracheal tube aspirate) collection and transportation 2. Describe the principle, procedure, interpretation and uses of Gram stain and Zeihl Neelson(ZN) stain 3. Perform Gram and Acid fast staining on the given sputum smear. Focus the slide and write the observations. 4. Identify the etiological agent causing Lower respiratory infection based on case history, colony morphology, biochemical reactions and interpret the antibiotic susceptibility testing.						
GENITOURINARY & SEXUALLY TRANSMITTED INFECTIONS							
MI 7.1	**Describe the etio-pathogenesis and discuss the laboratory diagnosis of infections of genitourinary system**	K	KH	Y	• Lecture • Small group discussion with Case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce • OSPE - Case scenarios	General Surgery
Sub competency / SLO	1. Enumerate the etiological agents causing various Genitourinary tract infections. 2. Describe the pathogenesis, clinical features, complications and management of Genitourinary tract infections. 3. Discuss the laboratory diagnosis of Genitourinary infections with respect to (a) Sample collection and transport. (b) Enumerate the different diagnostic modalities available. (c) Describe the methodology, advantages and disadvantages of each diagnostic test. (d) Interpretation of Laboratory reports.						

MI 7.2	**Describe the etio-pathogenesis and discuss the laboratory diagnosis of sexually transmitted infections. Recommend preventive measures**	K	KH	Y	• Lecture • Small group discussion with case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce • OSPE - Case scenarios	Dermatology Venereology & Leprosy Obstetrics & Gynaecology
Sub competency / SLO	1. Enumerate the bacterial, viral, fungal and parasitic agents causing Sexually transmitted infections. 2. Describe the pathogenesis, clinical features, laboratory diagnosis, prevention and treatment of each etiological agent causing ulcerative lesions of genital tract (Treponema pallidum, Haemophilus ducreyi, LGV, Calymmatobacterium granulomatis, Mycoplasma, Klebsiella granulomatis, Herpes virus). 3. Discuss the pathogenesis, clinical features, laboratory diagnosis, prevention and treatment of non ulcerative lesions of genital tract (gonorrhoea, candidiasis, trichomoniasis, bacterial vaginosis) 4. Describe the etiological agents, pathogenesis, clinical features, laboratory diagnosis and management of nongonococcal urethritis. 5. List the infective causes of Pelvic Inflammatory disease. Discuss their clinical features and laboratory diagnosis. 6. Discuss the importance of confidentiality in reporting sexually transmitted diseases 7. Discuss the role of counselling in management of Sexually transmitted diseases 8. Enumerate the pathogens causing congenital infections. Discuss the pathogenesis, lab diagnosis, prophylaxis, prevention and treatment of these infections.						
MI 7.3	**Describe the etio-pathogenesis, clinical features, the appropriate method for specimen collection, and discuss the laboratory diagnosis of Urinary tract infections**	K	KH	Y	• Lecture • Small group discussion with case scenarios	• Long essay • Short essay • Short answer • MCQs • Viva Voce • OSPE - Case	General Medicine
Sub competency / SLO	1. Enumerate the organisms causing ascending and descending urinary tract infection (Enterobacteriaceae, Enterococcus, Schistosoma haematobium). 2. Discuss the predisposing factors and pathogenesis of Urinary tract infection.						

	3. Describe the clinical features of upper and lower Urinary Tract Infection. 4. Discuss the laboratory diagnosis of Urinary tract infection with special reference to (a) Appropriate methods of sample collection and transport in infants, adult men and women and catheterised patients. (b) Methodology (c) Interpretation of laboratory reports. 5. Discuss the preventive measures and treatment of Urinary tract infections 6. Discuss the concepts of Asymptomatic bacteruria, Sterile pyuria, Kass concept of significant bacteruria 7. Define CAUTI. Describe the predisposing factors, clinical features, laboratory diagnosis, prevention and treatment of CAUTI					scenarios	
	ZOONOTIC DISEASES AND MISCELLANEOUS						
MI 8.1	**Enumerate the microbial agents and their vectors causing Zoonoticdiseases. Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course laboratory diagnosis and prevention**	K	KH	Y	• Lecture • Small group discussion	• Long essay • Short essay • Short answer • MCQs • Viva Voce	General Medicine
Sub competency / SLO	1. Define Zoonotic infections 2. List the microorganisms causing zoonosis. 3. List vectors transmitting zoonotic infections and their mode of transmission. 4. Describe the etiological agent, mode of transmission, pathogenesis, clinical manifestations, laboratory diagnosis, prevention and management of following zoonotic infections • Anthrax • Brucellosis • Leptospirosis • Plague • Rickettsial infections						

	• Miscellaneous bacterial- Psittacosis, Rat-bite fever, Relapsing fever • Rabies • Arboviral infections – Dengue, Chikungunya, KFD & others • Toxoplasmosis, Trichinosis, Echinococcosis, Cysticercosis, Cryptosporidiosis, Toxocariasis, Balantidiasis						
MI 8.2	**Describe the etio-pathogenesis of opportunistic infections (OI) and discuss the factors contributing to the occurrence of OI and the laboratory diagnosis**	K	KH	Y	• Lecture • Small group discussion with clinical case scenario	• Long essay • Short essay • Short answer • MCQs • Viva Voce • OSPE - Case scenarios	General Medicine Pathology
Sub competency / SLO	1. Define Opportunistic infections 2. List the microorganisms causing opportunistic infections 3. Describe the various predisposing factors contributing to the development of Opportunistic infections 4. Describe the pathogenesis, clinical features, laboratory diagnosis, prevention and management of following disease a) Aspergillosis, Penicillosis, Zygomycosis, Candidiasis, Cryptococcosis, Dimorphic fungal infections b) Toxoplasmosis, Strongyloidiasis, intestinal coccidian parasitic infections, Pneumocystosis c) Tuberculosis, Salmonellosis d) Herpes zoster, CMV						
MI 8.3	**Describe the role of oncogenic viruses in the evolution of virus associated malignancy**	K	KH	Y	• Lecture	• Long essay • Short essay • Short answer • MCQs • Viva Voce	General Medicine Pathology
Sub competency / SLO	1. Define and Classify oncogenic viruses 2. List viruses associated with human cancer 3. Define and give examples of oncogenes and antioncogenes 4. Describe mechanism of viral oncogenesis 5. Describe laboratory diagnosis of oncogenic viral infections						

	6. Describe methods of prevention of oncogenic viral infections						
MI 8.4	**Describe the etiologic agents of emerging Infectious diseases.Discuss the clinical course and diagnosis**	K	KH	Y	• Lecture • Small group discussion	• Long essay • Short essay • Short answer • MCQs • Viva Voce	General Medicine Community Medicine
Sub competency / SLO	1. Define and list emerging Infectious diseases 2. Enumerate various factors responsible for Emerging Infectious diseases 3. Describe the clinical course and laboratory diagnosis of common Emerging Infectious diseases seen in India 4. Describe the approach for controlling emerging Infectious diseases						
MI 8.5	**Define Healthcare Associated Infections (HAI) and enumerate the types. Discuss the factors that contribute to the development of HAI and the methods for prevention**	K	KH	Y	• Lecture • Small group discussion with clinical case scenario	• Long essay • Short essay • Short answer • MCQs • Viva Voce • OSPE - Case scenarios	General Medicine Community Medicine
Sub competency / SLO	1. Define Healthcare Associated Infections (HAI) 2. Enumerate common Healthcare Associated Infections (HAI) 3. List common microorganisms causing Healthcare Associated Infections (HAI) 4. Enumerate routes of transmissions of Healthcare Associated Infections (HAI) 5. Discuss the factors that contribute to the development of Healthcare Associated Infections (CAUTI, CLABSI, VAP, SSI) 6. Describe the methods implemented in prevention of Healthcare Associated Infections (CAUTI, CLABSI, VAP, SSI)						
MI 8.6	**Describe the basics of Infection control**	K	KH	Y	• Lecture • Small group discussion	• Long essay • Short essay • Short answer • MCQs • Viva Voce	Community Medicine
Sub competency / SLO	1. Define Standard precautions and list the components of Standard precautions 2. Describe different modes of transmission of infectious agents, the chain of infection and how to break it 3. Describe the steps of hand hygiene						

	4. List the five moments of hand hygiene 5. Describe what are standard precautions and transmission based precautions 6. Describe segregation, packing, transportation, treatment and disposal of biomedical waste 7. Describe how to manage the biospill 8. Describe appropriate management of needle stick injury in healthcare setting 9. Describe the constitution and functions of HICC 10. Describe vaccines that are useful in preventing infections in healthcare workers						
MI 8.7	**Demonstrate Infection control practices and use of Personal Protective Equipments (PPE)**	S	P	Y	• DOAP session • To perform Steps of hand hygiene • Segregation of Biomedical waste • To perform independently cleaning of blood spillage on the floor in a simulated situation	• MCQ's • Viva-voce • OSPE • Perform independently different steps of hand wash/rub • Demonstrate segregation of following items into appropriate color coded bags a) glove b) Bacterial stock culture c) Disposable syringe d)Broken glass slide e) Soiled cotton swab	General Surgery Community medicine
Sub competency / SLO	1. Demonstrate different steps of hand wash/rub 2. Demonstrate application of five moments of Hand hygiene in a simulated situation 3. Choose appropriate PPE for a given procedure or simulated patient care scenario 4. Demonstrate segregation of different biomedical waste into appropriate color coded bags 5. Perform donning & doffing PPE appropriately and in correct order 6. Demonstrate blood spillage management on the floor 7. Document steps taken following accidental needle prick injury						
MI 8.8	**Describe the methods used and significance of assessing themicrobial contamination of food, water and air**	K	KH	Y	• Lecture	• Long essay	

Sub competency / SLO	1. Describe the methods of testing and analysis for water contamination. 2. List the organisms that contaminate the water. 3. Describe the procedure of collection and methods employed for bacteriological examination of water. 4. Describe the significance of testing of water. 5. Describe the methods andindications for air testing or air surveillance. 6. List the importance of air testing. 7. Describe the purpose of surface cleaning in wards and ICUs. 8. List the organisms contaminating the food. 9. Describe the methods and procedure to identify the food borne pathogens.				• Small group discussion with clinical case scenario	• Short essay • Short answer • MCQs • Viva Voce • Interpret the reports of air/water/food testing report.	
MI 8.9	**Discuss the appropriate method of collection of samples in the performance of laboratory tests in the detection of microbial agents causing infectious diseases**	K	KH	Y	• Lecture • Small group discussion with clinical case scenarios	• Short essay • Short answer • MCQs • Viva Voce • OSPE	
Sub competency / SLO	1. Enumerate the samples to be collected for diagnosis of infectious condition according to organ system involved (Respiratory system, CVS, CNS, Gastrointestinal system, Skin & soft tissue, Musculoskeletal, Genitourinary tract). 2. Describe the methods, procedure for collection, transportation & storage of various samples collected for diagnosis of infectious condition. 3. Describe the reasons for rejection of samples sent for testing.						
MI 8.10	**Demonstrate the appropriate method of collection of samples in the performance of laboratory tests in the detection of microbial agents causing Infectious diseases**	S	SH	Y	• DOAP session • Small group discussion with clinical case scenarios	• Demonstrate Blood collection technique. • OSPE Case scenarios	
Sub competency / SLO	1. Demonstrate the sample collection for the following clinical samples. a) Blood collection for serological tests b) Blood collection for blood culture c) Genitourinary samples d) Sputum						

	e) Throat swab & Nasopharyngeal swab f) Pus and exudates g) CSF, pleural fluid, ascitic fluid for bacterial and fungal culture h) Skin scraping, hair, nail and tissue specimens collection for fungal infections i) Stool sample						
MI 8.11	**Demonstrate respect for patient samples sent to the laboratory for performance of lab tests in the detection of microbial agents causing infectious diseases.**	A	SH	Y	• DOAP session • Small group discussion with clinical case scenarios	• OSPE Case scenarios	
Sub competency / SLO	1. List the steps involved in respecting the sample. 2. How to creating a unique id and prevent mislabelling of samples andto maintain confidentiality. 3. Discuss the information/s that shall be written in the request form and the sample container 4. How to preserve and transport the specimens without external contamination, spillage/breakage of containers. 5. Discuss the importance of prioritizing the specimen as relevant 6. How and where to collect the reports of a test. 7. Discuss judicious application of sample rejection criteria in the best interest of patient care						
MI 8.12	**Discuss confidentiality pertaining to patient identity in laboratory results**	A	KH	Y	• Lecture • Small group discussion with case scenarios.	• OSPE • Viva voce	**AETCOM**
Sub competency / SLO	1. Counsel the patient for consent before taking sample for testing. 2. Counsel the patient about method of collection of sample 3. Describe the procedure for generating a unique identification number; label the sample before testing the specimens. 4. Discuss the rights and responsibility of laboratory with respect to confidentiality of laboratory results 5. Discuss the ethical issues involved in confidentiality pertaining to patient identity. 6. Describe the method of dispatching report pertaining						

	to tests like HIV, STDs. 7. Discuss the medicolegal consequences of breach in confidentiality						
MI 8.13	**Choose the appropriate laboratory test in the diagnosis of theinfectious disease**	K	KH	Y	• Small group discussion with case scenarios	• Short essay • Short answer • MCQs • Viva Voce • OSPE	
Sub competency / SLO	1. Identify the organism causing the infection based on displayed culture media, biochemical tests and serological tests for following clinical case scenarios. • Enteric fever • Wound infections • Cholera • Bacillary dysentery • Food poisoning • Meningitis • Pharyngitis / URTI/ LRTIs • Tuberculosis • STIs • Dermatophytoses • Subcutaneous infections • Systemic mycoses • Opportunistic mycosis - Candidiasis, Cryptococcosis, Aspergillosis, Zygomycosis, Penicillosis • Hepatitis • HIV with Opportunistic infections • Influenza • Dengue • Malaria • Round worm / Hook worm infection 2. Choose the appropriate laboratory tests in the diagnosis of given infectious disease. 3. Justify why a particular laboratory test was chosen to diagnose a given infectious disease						

MI 8.14	**Demonstrate confidentiality pertaining to patient identity inlaboratory results**	A	SH	Y	• DOAP session • Case scenarios discussion	• OSPE	AETCOM
Sub competency / SLO	1. Demonstrate the understanding of importance of confidentiality with respect to patient's laboratory test results 2. List the steps involved in maintaining confidentiality 3. Document the procedure of taking consent before testing. 4. Demonstrate confidentiality pertaining to patient identity in laboratory results 5. Demonstrate the process of generating a unique identification number, labelling, testing the specimens by appropriate test and to know method of dispatching a report pertaining to tests like HIV, STDs						
MI 8.15	**Choose and Interpret the results of the laboratory tests used indiagnosis of the infectious diseases**	K/S	SH	Y	• Small group discussion • Case scenarios discussion	• OSPE • Viva voce	
Sub competency / SLO	1. Choose appropriate laboratory test(s) in the diagnosis of the infectious disease based on the case scenario and the order in which they need to be performed, if applicable 2. Interpret the results of the displayedlaboratory tests used in the diagnosis of infectious disease condition a. Microscopic slide examination b. Biochemical reactions with appropriate culture medium with Blood culture bottle c. Antimicrobial susceptibility test plate d. Serological tests e. Fungal culture media and focussed slide						
MI 8.16	**Describe the National Health Programs in the prevention of common infectious disease (for information purpose only as taught in CM)**	K	K	Y	• Lecture	• Short essay • Short answer • MCQs • Viva Voce	Community Medicine
Sub competency / SLO	1. List the national health programmes related to infectious diseases in India. 2. Describe laboratory diagnostic tools used in the National Programs related to infectious diseases 3. Describe general immunoprophylactic and						

	chemoprophylactic measures used in the National Programs related to infectious diseases 4. Describe goals and functions of following programs a. National vector borne disease control programme (NVBDCP) b. Revised national Tuberculosis control programme (RNTCP) c. National AIDS Control organisation (NACO) d. National Malaria control programme e. Integrated disease surveillance programme (IDSP) f. National Leprosy eradication programme						

TOPICS FOR SKILL CERTIFICATION

Sl No.	Number	Topic
1	MI1.2	Perform and identify the different causative agents of Infectious diseases by Gram Stain, ZN stain and stool routine microscopy
2	MI6.2	Identify the common etiologic agents of upper respiratory tract infections (Gram Stain)
3	MI6.3	Identify the common etiologic agents of lower respiratory tract infections (Gram Stain & Acid fast stain)
4	MI8.7	Demonstrate Infection control practices (Hand hygiene, BMW) and use of Personal Protective Equipments (PPE)

VII. ASSESSMENT

C. Formative assessment

- Assessment of students shall be based on day-to-day assessment pertaining to their performance with respect to assignments, preparation for seminar, involvement in discussion in small group teaching & other academic activities
- Minimum of three examinations shall be conducted & average of three is taken into consideration.
- Theory: 100 marks (Theory:70 & Continuous assessment:30)
- Practical: 100 Marks (Practical:70 & Continuous assessment:30)

- Third internal assessment should be Preliminary / Pre University examination & Compulsory
- Students must secure 50% combined in theory and practical (not less than 40% in each) for eligibility for appearing for University Examinations
- Internal assessment marks will reflect as a separate head of passing at the summative examination and will not be added to the University marks

Formative assessment marks distribution pattern

Theory (100)		Practical (100)	
Internal assessment (70)	**Continuous assessment (30)**	**Internal assessment(70)**	**Continuous assessment (30)**
• MCQ's 20*01= 20 • Long essay 1*10 = 10 • Short essay 5*5= 25 • Short answers 5*3 = 15	• Unit test = 20 • Assignment = 10	• Spotters= 10 • Staining = 20 • Stool examination= 10 • Case scenario=20 • OSPE/AETCOM=10	• Practical Record =10 • Skill certification =10 • Professionalism & Ethics (Punctuality, seminar, extracurricular activities, Funded projects, etc) = 10

D. **University Examinations:**

4. **Theory: 200 marks**

Two papers of 100 marks each and duration of each paper will be 3 hours. Each paper candidate has to score 40% and aggregate of 2 papers is 50% to pass.

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

Paper–I						Paper -II					
Topics	**Marks**	**MCQ**	**Long essay**	**Short essay**	**Short answers**	**Topics**	**Marks**	**MCQ**	**Long essay**	**Short essay**	**Short answers**
General Microbiology	15	✓	✓	✓	✓	CNS infections	25	✓	✓	✓	✓
Immunology	10	✓	✓	✓	✓	Respiratory tract infections	20	✓	✓	✓	✓
CVS & Blood	25	✓	✓	✓	✓	Genitourinary & Sexually transmitted infections	20	✓	✓	✓	✓
GIT &Hepatobiliary system	30	✓	✓	✓	✓	Zoonotic diseases	20	✓	✓	✓	✓
Musculoskeletal system & Skin and soft tissue infections	20	✓	✓	✓	✓	Miscellaneous	15	✓		✓	✓
Total	**100**					**Total**	**100**				

Distribution of Marks for Different Sections in Paper I & Paper II

Paper–I		Paper -II	
Topics	**Marks**	**Topics**	**Marks**
General Microbiology	15	Bacteriology	35
Immunology	10	Virology	35

Bacteriology	25	Parasitology	20
Virology	20	Mycology	10
Parasitology	20	**Total**	**100**
Mycology	10		
Total	**100**		

Theory question paper pattern:

Sl no	Type of question	No of questions	Marks allotted per question	Marks
1	MCQ's	20	01	20
2	Long essay (Case based/ Structured)	2	10	20
3	Short essay	6	05	30
4	Short answers	10	03	30
Total				**100**

5. **Practicals – 100 marks**

Practical examination: 80 marks

Viva-voce: 20 marks

Candidate has to score 50% to pass.

Practical examination pattern:

Sl No.	Exercise		Marks	Marks alloted
1	Spotters	Culture Media	03	10
		Instruments	02	
		Specimens	01	
		Slides	04	
2	Directly Observed Procedural skills	Gram staining	10	30
		ZN staining	10	

		Stool examination	10	
3	Case scenarios	Bacteriology/ Virology	15	30
		Parasitology/Mycology	15	
4	OSPE & AETCOM stations	OSPE/ AETCOM	10	10
5	Total			80

6. **Viva- Voce Examination:**

The Viva- Voce Examination shall carry 20 marks and all examiners with conduct of examination. It will be added to practical exam marks.

- Tables 1: General Microbiology & Immunology – 05 marks
- Tables 2: Bacteriology - 05 marks
- Tables 3: Virology & Mycology - 05 marks
- Tables 4: Parasitology - 05 marks

VIII. LEARNING RESOURCE MATERIALS

Recommended books: Recent Editions

1. Essentials of Medical Microbiology by DrApurbaSastry&DrSandhyaBhat (As per CBME curriculum).
2. Essentials of Practical Microbiology by DrApurbaSastry&DrSandhyaBhat (As per CBME curriculum).
3. Text book of Microbiology by Ananthanarayan&Paniker (As per CBME curriculum).
4. Text book of Microbiology by CP Baveja.
5. Paniker's Textbook of Medical Parasitology by SougataGhosh (As per CBME curriculum).

Reference Books

1. Bailey & Scott's Diagnostic Microbiology, 14th Edition
2. Gillespie's Medical Microbiology and Infection at a Glance, 4th Edition.
3. Harrison's Principles of Internal Medicine, 20th Edition.

4. Jawetz Melnick and Adelbergs' Medical Microbiology, 28th Edition.
5. Koneman's Color Atlas and Textbook of Diagnostic Microbiology, 7th Edition.
6. Abbas' Cellular and Molecular Immunology, 8th Edition.
7. Kuby's Immunology, 8th Edition.
8. Mackie and McCartney's Practical Medical Microbiology, 14th Edition
9. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, 9th Edition
10. Patrick R Murray's Medical Microbiology, 9th Edition.
11. Prescott's Microbiology, 10th Edition.
12. Revised National Tuberculosis Control Program (RNTCP), India.
13. Centers for Disease Control and Prevention, Atlanta, USA.
14. Indian Council of Medical Research, New Delhi, India
15. National AIDS Control Organisation (NACO), India
16. National Center for Disease Control (NCDC) Guidelines, India.
17. National Vector Borne Disease Control Program (NVBDCP), India.
18. Various national and international journals

FORENSIC MEDICINE AND TOXICOLOGY

PREAMBLE

Forensic Medicine and Toxicology is considered as an interface of medicine, Science and Law. It thus bridges the gap between scientific evidence of medical origin and its interpretation at the Court of Law. Hence a proper understanding of Forensic Medicine and Toxicology is crucial for medical practice. The chief goal of undergraduate teaching of Forensic Medicine have always been to provide a concrete framework for the description and interpretation of scientific facts so as to provide students with knowledge of its application in the ultimate administration of Justice. The understanding of the Legal aspects of Medicine is so vital for practice of medicine that its teaching needs to be integrated throughout the medical course.

The new Graduate Medical Education Regulations provides for an outcome driven undergraduate curriculum, to provide the orientation and the skills necessary for life-long learning, to enable proper care of the patient. The undergraduate medical curriculum has thus evolved from being teacher-centered to student centered, from discipline-based to integrated core and options-based and from passive acquisition of knowledge imparted by teachers to active problem-based learning. Skill acquisition is an indispensable component of the learning process in modern medicine. However the need for development of professional attitude, behaviour and communication skills befitting a medical practitioner is well perceived and emphasized by the new curriculum with incorporation of AETCOM sessions.

While the Undergraduate Teaching of Forensic Medicine and Toxicology has always been perceived as fact-based, the present CBME curriculum has evolved the Forensic Medicine and Toxicology into clinical oriented specialty and has been expanded to Phase II, Part I of MBBS. The key elements of the curriculum such as integrating with other subjects, clinical oriented learning, direct faculty feedback, interactive with experiential learning and competency-based student assessments will bring in remarkable changes in the teaching and learning of Forensic Medicine and Toxicology. These changes will provide the Indian Medical Graduate a strong foundation in the Medical Jusrisprudence and Legal Medicine, which is critical to the formation of a competent clinician.

CURRICULUM OF FORENSIC MEDICINE & TOXICOLOGY FOR PHASE II MBBS

Topics and outcomes of forensic Medicine in second professional year.

Subject	Number of Topics	Outcomes
Forensic Medicine& Toxicology	10	62

Couse content

i. **Goal**

The goal of teaching the undergraduate student in forensic medicine is to impart such knowledge and skills that may enable them to identify and manage common medico-legal problems in day-to-daymedical practice. Toacquire competence to draw conclusions from autopsy, issuing various medico-legal certificates, understanding ethics, etiquette, negligence to medical practice and basic law system of India for medical practice.

ii. **Objectives**

At the end of the second year MBBS the students should be able to accomplish the following objectives

A. Cognitive domain

- Discuss on the guiding principles of Forensic Medicine course
- Discuss death and its various medico-legal aspects
- Explain principles and objectives of post-mortem examination
- Describe crime scene investigation
- Describe the establishment of identity of the individual
- Describe role of DNA profile and its application in medico-legal practice.

- Discuss the formalities and procedure of preparing medico-legal reports
- Discuss the laws relating to poisons, drugs, cosmetics, narcotic drugs and psychotropicsubstances
- Describe general principles and basic methodologies in recognising and treatment of poisoning
- Describe the principles of the techniques used in toxicological laboratory

B. Affective domain

- Demonstrate self-awareness and personal development in the routine conduct.
- Communicate effectively with peers and teachers in various teaching learning activities.
- Demonstrate ability to communicate adequately, sensitively, effectively, respectfully to follow the ethical principles in dealings with patients, corpses, police personnel, relatives and other health personnel.
- Demonstrate ability to function as a part of a team member.

C. Psychomotor domain

- To identify and discharge all legal responsibilities in medico-legal cases.
- To prepare medico-legal reports in various medico legal situations.
- To demonstrate the skills for the establishment of identity of the individual.
- To demonstrate to diagnosing the death of an individual and to fulfil the medico-legal formalities.
- To collect, preserve and dispatch of various samples and trace evidences to the concerned authorities in appropriate manner.
- To Interpret histopathological, microbiological, radiological, chemical analysis, DNA profile and other investigative reports for medico-legal purposes.
- To acquire skills to draw conclusions from the medico-legal autopsy independently and to prepare a report.

- To manage medico-legal responsibilities in mass disasters involving multiple deaths like fire,traffic accident, aircraft accident, rail accident and natural calamities.
- To demonstrate the diagnosing and managing with competence of basic poisoning conditions in the community.

iii. Course outcome of second professional year

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

- Understanding the medico legal duties of a medical practitioner.
- Assisting effectively the police personnel in solving medico-legal issues.
- Understanding death and its related aspects.
- Comprehensive knowledge for establishing the identity of an individual.
- To have competence for diagnosing and managing of basic poisoning conditions in the community.

iv. Syllabus

Teaching Method	**Hours**
Lecture	19
Small group Discussion	25
Self-directed learning	06
Total	**50**

Distribution of teaching hours for theory and practical's/ small group teaching is as follows

Sl No	Topic	Lecture	Small group discussion	SDL	Total
1.	General Information	2 h	-	-	2 h
2.	Forensic Pathology	4 h	10 h (7 h Theory + 3 h practical's)	3 h	17 h
3.	Clinical Forensic Medicine	3 h	3 h practical's		6 h
4.	General Toxicology	4 h	2 h (skills)	2 h	8 h
5.	Chemical Toxicology	3 h	6 h Theory		9 h
6.	Pharmaceutical Toxicology	1 h		1 h	2 h
7.	Biotoxicology	-	2 h	-	2 h
8.	Environmental Toxicology	1 h	-	-	1 h
9.	Sociomedical Toxicology	1 h	2 h practical's	-	3 h
10.	Skills (The time allotted for SDL will be utilised for skill demonstration)	-	-	-	-
Total		**19 h**	**25 h**	**6 h**	**50 h**

Syllabus at glance for MBBS Phase II Course

Theory

Sl No	Topic Number	Name of the topic	Description of competencies
1	1	General Information	FM1.1 Demonstrate knowledge of basics of Forensic Medicine like definitions of Forensic medicine, Clinical Forensic Medicine, Forensic Pathology, State Medicine, Legal Medicine and Medical Jurisprudence
			FM1.2 Describe history of Forensic Medicine
			FM 1.3 Describe legal procedures including Criminal Procedure Code, Indian Penal Code, Indian Evidence Act, Civil and Criminal Cases, Inquest (Police Inquest and Magistrate's Inquest), Cognizable and Non-cognizable offences.
			FM 1.4 Describe Courts in India and their powers: Supreme Court, High Court, Sessions court, Magistrate's Court, Labour Court, Family Court, Executive Magistrate Court and Juvenile Justice Board
			FM 1.6Describe Offenses in Court including Perjury; Court strictures vis-a-vis Medical Officer.
2	2	Forensic Pathology	FM2.1 Define, describe and discuss death and its types including somatic/clinical/cellular, molecular and brain-death, Cortical Death and Brainstem Death

			FM2.2 Describe and discuss natural and unnatural deaths
			FM2.3Describe and discuss issues related to sudden natural deaths
			FM2.4 Describe salient features of the Organ Transplantation and The Human Organ Transplant (Amendment) Act 2011 and discuss ethical issues regarding organ donation.
			FM 2.5 Discuss moment of death, modes of death - coma, asphyxia and Syncope
			FM 2.6 Discuss presumption of death and survivorship
			FM 2.7 Describe and discuss suspended animation
			FM 2.8 Describe and discuss post mortem changes including signs of death, cooling of body, post-mortem lividity, rigor mortis, cadaveric spasm, cold stiffening and heat stiffening
			FM2.9 Describe putrefaction, mummification, adipocere and maceration
			FM 2.10 Discuss estimation of time since death
			FM 2.11 Describe and discuss autopsy procedures including post-mortem examination, different types of autopsies, aims and objectives of post-mortem examination
			FM 2.12 Describe the legal requirements to conduct post-mortem examination and procedures to conduct medico-legal post-mortem examination
			FM 2.13 Describe and discuss obscure autopsy
			FM 2.14 Describe and discuss examination of clothing, preservation of viscera on post mortem examination for chemical analysis and other medico-legal

			purposes, post-mortem artefacts
			FM 2.15 Describe special protocols for conduction of medico-legal autopsies in cases of death in custody or following violation of human rights as per National Human Rights Commission Guidelines
			FM 2.17 Describe and discuss exhumation
			FM 2.18 Crime Scene Investigation: Describe and discuss the objectives of crime scene visit, the duties & responsibilities of doctors on crime scene and the reconstruction of sequence of events after crime scene investigation
			FM 2.19 Investigation of anaesthetic, operative deaths: Describe and discuss special protocols for conduction of autopsy and for collection, preservation and dispatch of related material evidences
			FM 2.31 Demonstrate ability to work in a team for conduction of medico-legal autopsies in cases of death following alleged medical negligence, dowry death, death in custody or following violation of human rights as per National Human Rights Commission Guidelines on exhumation
			FM 2.32 Demonstrate ability to exchange information by verbal or nonverbal communication to the peers, family members, law enforcing agency and judiciary
			FM 2.33 Demonstrate ability to use local resources whenever required like in mass disaster situations
			FM 2.35 Demonstrate professionalism while conducting autopsy in medico legal situations, interpretation of findings and making inference/opinion, collection, preservation and dispatch of biological or trace evidences

3	3	Clinical Forensic Medicine	FM3.1 IDENTIFICATION: Define and describe Corpus Delicti, establishment of identity of living persons including race, Sex, religion, complexion, Stature, age determination using morphology, teeth-eruption, decay, bite marks, bones-ossification centres, medico legal aspects of age
			FM3.2 IDENTIFICATION: Describe and discuss identification of criminals, unknown persons, dead bodies from the remains-hairs, fibers, teeth, anthropometry, dactylography, foot prints, scars, tattoos, poroscopy& superimposition
4	8	Toxicology: General Toxicology	FM8.1 Describe the history of Toxicology
			FM8.2Define the terms Toxicology, Forensic Toxicology, Clinical Toxicology and poison
			FM8.3 Describe the various types of poisons, Toxicokinetics, and Toxicodynamics and diagnosis of poisoning in living and dead.
			FM8.4 Describe the Laws in relations to poisons including NDPS Act, Medico-legal aspects of poisons
			FM8.5 Describe Medico-legal autopsy in cases of poisoning including preservation and dispatch of viscera for chemical analysis
			FM8.6 Describe the general symptoms, principles of diagnosis and management of common poisons encountered in India
			FM8.7 Describe simple Bedside clinic tests to detect poison/drug in a patient's body fluids
			FM8.8 Describe basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination

			FM8.9 Describe the procedure of intimation of suspicious cases or actual cases of foul play to the police, maintenance of records, preservation and despatch of relevant samples for laboratory analysis
			FM8.10 Describe the general principles of Analytical Toxicology and give a brief description of analytical methods available for toxicological analysis: Chromatography – Thin Layer Chromatography, Gas Chromatography, Liquid Chromatography and Atomic Absorption Spectroscopy
5	9	Toxicology: Chemical Toxicology	FM9.1 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to: Caustics Inorganic – sulphuric, nitric, and hydrochloric acids; Organic-Carbolic Acid (phenol), Oxalic and acetylsalicylic acids
			FM9.2 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Phosphorus, Iodine, Barium
			FM9.3 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Arsenic, lead, mercury, copper, iron, cadmium and thallium
			FM9.4 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Ethanol, methanol, ethylene glycol
			FM9.5 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Organophosphates, Carbamates, Organochlorines, Pyrethroids, Paraquat, Aluminium and Zinc phosphide

			FM9.6 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Ammonia, carbon monoxide, hydrogen cyanide & derivatives, methyl isocyanate, tear (riot control) gases
6	10	Toxicology: Pharmaceutical Toxicology	FM10.1 Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhancedelimination with regard to: i. Antipyretics – Paracetamol, Salicylates ii. Anti-Infectives (Common antibiotics – an overview) iii. Neuropsychotoxicology Barbiturates, benzodiazepine, phenytoin, lithium,haloperidol, neuroleptics, tricyclics iv. Narcotic Analgesics, Anaesthetics, and Muscle Relaxants v. Gastro-Intestinal and Endocrinal Drugs – Insulin vi. Cardiovascular Toxicology Cardiotoxic plants – oleander, odollam, aconite, digitalis
7	11	Topic: Toxicology: Bio toxicology	FM11.1 Describe features and management of Snake bite, scorpion sting, bee and waspsting and spider bite
8	12	Topic: Toxicology: Sociomedical Toxicology	FM12.1 Describe features and management of abuse/ poisoning with following substances: Tobacco, cannabis, amphetamines, cocaine, hallucinogens, designer drugs &solvent
8	13	Topic: Toxicology: Environmental Toxicology	FM13.1 Describe toxic pollution of environment, its medico-legal aspects & toxic hazards of occupation and industry
			FM13.2 Describe medico-legal aspects of poisoning in Workman's Compensation Act
9	14	Skills in Forensic Medicine & Toxicology	FM14.5 Conduct & prepare post-mortem examination report of varied aetiologies (at least15) in a simulated/ supervised environment.

Practical's

Sl. No	Topic Number	Name of the topic	Description of competencies
1	2	Forensic Pathology	FM2.16 Describe and discuss examination of mutilated bodies or fragments, charred bones and bundle of bones
2	14	Skills in Forensic Medicine & Toxicology	FM14.2 Demonstrate the correct technique of clinical examination in a suspected case of poisoning & prepare medico-legal report in a simulated/ supervised environment
			FM14.3 Assist and demonstrate the proper technique in collecting, preserving and dispatch of the exhibits in a suspected case of poisoning, along with clinical examination
			FM14.4 Conduct and prepare report of estimation of age of a person for medico-legal and other purposes & prepare medico-legal report in a simulated/ supervised environment.
			FM14.6 Demonstrate and interpret medico-legal aspects from examination of hair (human & animal) fibre, semen & other biological fluids.
			FM14.7 Demonstrate & identify that a particular stain is blood and identify the species of its origin.
			FM14.8 Demonstrate the correct technique to perform and identify ABO & RH blood group of a person.

			FM14.9 Demonstrate examination of & present an opinion after examination of skeletal remains in a simulated/ supervised environment.
			FM14.16 To examine & prepare medico-legal report of drunk person in a simulated/supervised environment
			FM14.17 To identify & draw medico-legal inference from common poisons. e.g., datura, castor, cannabis, opium, aconite copper sulphate, pesticides compounds, marking nut, oleander, Nux vomica, abrus seeds, Snakes, capsicum, calotropis, lead compounds & tobacco.
			FM 14.18 To examine & prepare medico-legal report of a person in police, judicial custodyor referred by Court of Law and violation of human rights as requirement of NHRC, who has been brought for medical examination.

Forensic Medicine & Toxicology

Competencies for 2nd MBBS

No.	COMPETENCY The student should be able to	Specific Learning Objectives	Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Teaching-Learning Methods	Assessment Method	Integration
Topic: General Information								
FM1.1	Demonstrate knowledge of basics of Forensic Medicine like definitions of Forensic medicine, Clinical Forensic Medicine, Forensic Pathology, State Medicine, Legal Medicine and Medical Jurisprudence	**At the end of the session, learner shall be able to:** 1.1.1:Define Forensic Medicine and Medical Jurisprudence. 1.1.2:Describe different branches of Forensic medicine like Clinical Forensic Medicine, Forensic Pathology, Forensic Odontology and Forensic Psychiatry. 1.1.3:Discuss on Forensic Medicine practice in different parts of the world.	K	KH	N	Lecture – 1 hr	**No assessment**	

FM1.2	Describe history of Forensic Medicine	**At the end of the session, learner shall be able to:** 1.2.1:Describe the etymology of Forensic Medicine. 1.2.2:Describe how knowledge of medicine was applied to aid in the administration of justice from ancient time and its evolution to the recent times. 1.2.3:Enumerate the important people and events related to Forensic Medicine.	K	KH	N		**No assessment**	
FM 1.3	Describe legal procedures including Criminal Procedure Code, Indian Penal Code,Indian Evidence Act, Civil and Criminal Cases, Inquest (Police Inquest andMagistrate's Inquest), Cognizable and Non-cognizable	**At the end of the session, learner shall be able to:** 1.3.1:Describe the meaning of Criminal Procedure Code, Indian Penal Code, and Indian Evidence Act. 1.3.2:Differentiate between civil and criminal cases and their proceedings in the court of law. 1.3.3:Define inquest.	K	KH	N	Lecture – 1 h	**No assessment**	

	offences.	1.3.4:Describe the types of inquest practiced in India. 1.3.5:Discuss the meaning of cognizable and non-cognizable offence with examples.						
FM 1.4	Describe Courts in India and their powers: Supreme Court, High Court, Sessionscourt, Magistrate's Court, Labour Court, Family Court, Executive Magistrate Courtand Juvenile Justice Board.	**At the end of the session, learner shall be able to:** 1.4.1:List various civil and criminal courts in India. 1.4.2:Describe the location, presiding officer and powers of various courts in India	K	KH	N		**No assessment**	
FM 1.6	Describe Offenses in Court including Perjury; Court strictures vis-a-vis Medical Officer.	**At the end of the session, learner shall be able to:** 1.6.1: Explain the meaning of perjury and its punishment. 1.6.2:Mention the various offences that could be charged upon medical officer by the court of law and its	K	KH	N		**No assessment**	

		punishment.						
Topic: Forensic Pathology								
FM2.1	Define, describe and discuss death and its types including somatic/clinical/cellular, molecular and brain-death, Cortical Death and Brainstem Death	**At the end of the session, learner shall be able to:** 2.1.1:Define death. 2.1.2:Describe the types of death (somatic, molecular, brain-death, cortical death and brainstem death). 2.1.3:Describe the procedure of declaring death with specific reference to brain stem death	K	KH	Y	Lecture – 1 hr	Written, Viva voce	Pathology
FM2.2	Describe and discuss natural and unnatural deaths	**At the end of the session, learner shall be able to:** 2.2.1:Describe the manner of death and cause of death	K	KH	Y		Written, Viva voce	Pathology
FM2.3	Describe and discuss issues related to sudden natural deaths	**At the end of the session, learner shall be able to:** 2.3.1:Define sudden natural death. 2.3.2:Enumerate the causes for	K	KH	Y		Written, Viva voce	Pathology

		sudden natural death. 2.3.3:Describe the medicolegal importance of sudden natural death. 2.3.4:Discuss the autopsy procedure in case of sudden natural death						
FM2.4	Describe salient features of the Organ Transplantation and The Human Organ Transplant (Amendment) Act 2011 and discuss ethical issues regarding organ donation	**At the end of the session, learner shall be able to:** 2.4.1:Discuss the ethical and legal issues related to organ donation and transplantation. 2.4.2:Describe the salient features of The Human Organ Transplant Act, 1994 with amendments till date.	K	KH	Y	SDL – 1 hr	Written, Viva voce	AETCOM
FM2.5	Discuss moment of death, modes of death - coma, asphyxia and syncope	**At the end of the session, learner shall be able to:** 2.5.1:Describe the modes of death (coma, syncope, asphyxia).	K	KH	Y	Lecture – 1 hr	Written, Viva voce	Psychiatry, Pathology
FM2.6	Discuss presumption of death and survivorship	**At the end of the session, learner shall be able to:** 2.6.1:Discuss the importance of presumption of death (Sec. 107 &	K	KH	Y		Written, Viva voce	

		108 IEA)						
FM2.7	Describe and discuss suspended animation	**At the end of the session, learner shall be able to:** 2.7.1:Define suspended animation. 2.7.2:Enumerate the causes for suspended animation. 2.7.3:Discuss the medicolegal importance of suspended animation.	K	KH	Y		Written, Viva voce	
FM 2.10	Discuss estimation of time since death	**At the end of the session, learner shall be able to:** 2.10.1:Enumerate the various factors which help in determination of time since death. 2.10.2:Discuss on Forensic entomology	K	KH	Y	SGD – 2 h	Written, Viva voce	

FM2.8	Describe and discuss post-mortem changes including signs of death, cooling of body, post-mortem lividity, rigor mortis, cadaveric spasm, cold stiffening and heat stiffening	**At the end of the session, learner shall be able to:** 2.8.1:Classify post-mortem changes (immediate, early, late). 2.8.2:Describe post-mortem cooling and its medicolegal importance. 2.8.3:Define post-mortem lividity. 2.8.4:Describe post-mortem lividity and its medico legal importance. 2.8.5:Define rigor mortis. 2.8.6:Describe rigor mortis and its medico legal importance. 2.8.7:Enumerate the conditions simulating rigor mortis. 2.8.8:Define cadaveric spasm. 2.8.9:Differentiate between cadaveric spasm and rigor mortis. 2.8.10:Discuss on cold stiffening, heat stiffening, chemical stiffening and gas stiffening.	K	KH	Y		Written, Viva voce	
FM2.9	Describe putrefaction, mummification,	**At the end of the session, learner shall be able**	K	KH	Y	SGD – 2 h	Written,	

	adipocere and maceration	**to:** 2.9.1:Describe the various changes seen in the body due to putrefaction. 2.9.2:Define adipocere. 2.9.3:Describe adipocere and its medico legal importance. 2.9.4:Define mummification. 2.9.5:Describe mummification and its medico legal importance.					Viva voce	

FM2.11	Describe and discuss autopsy procedures including post-mortem examination, different types of autopsies, aims and objectives of post-mortem examination	**At the end of the session, learner shall be able to:** 2.11.1:Describe the types of autopsy. 2.11.2:Enumerate the objectives of medico legal autopsy. 2.11.3:Enumerate the objectives of foetal autopsy. 2.11.4:Enumerate the objectives of skeletal remains examination	K	KH	Y	Lecture – 1 hr	Written, Viva voce	Pathology
FM2.12	Describe the legal requirements to conduct post-mortem	**At the end of the session, learner shall be able to:**	K	KH	Y		Written, Viva voce	Pathology

	examination and procedures to conduct medico-legal post-mortem examination	2.12.1:Describe the rules for conducting medicolegal autopsy. 2.12.2:Enumerate the skin incisions in medicolegal autopsy. 2.12.3:Enumerate the methods of evisceration in medicolegal autopsy. 2.12.4:Describe the external and internal examination in medicolegal autopsy. 2.12.5:Explain the special techniques used in medicolegal autopsy (demonstration of pneumothorax, air embolism, etc).						
FM2.13	Describe and discuss obscure autopsy	**At the end of the session, learner shall be able to:** 2.13.1:Discuss on obscure autopsy with examples. 2.13.2:Discuss on negative autopsy with examples.	K	KH	Y		Written, Viva voce	Pathology

FM2.14	Describe and discuss examination of clothing, preservation of viscera on post-mortem examination for chemical analysis and other medico-legal purposes, post-mortem artefacts	**At the end of the session, learner shall be able to:** 2.14.1:Describe the method of preservation and dispatch of viscera and body fluids for chemical analysis. 2.14.2:Describe the method of preservation and dispatch of viscera and body fluids for histopathology and microbiological investigations. 2.14.3:Describe the method of preservation and dispatch of clothes in a medicolegal case. 2.14.4:Discuss on post mortem artefacts and their medicolegal importance.	K	KH	Y	Lecture – 1 hr	Written, Viva voce	
FM2.17	Describe and discuss exhumation	**At the end of the session, learner shall be able to:** 2.17.1:Define exhumation. 2.17.2:Enumerate the objectives of exhumation. 2.17.3:Describe the rules and procedure of exhumation	K	KH	Y		Written, Viva voce	
FM2.16	Describe and discuss examination of	**At the end of the session, learner shall be able to:**	K	KH	Y	SGD – 2 h	Written,	

	mutilated bodies or fragments, charred bones and bundle of bones	2.16.1:Describe the procedure of examination of mutilated bodies / fragments. 2.16.2:Describe the procedure of examination of skeletal remains (including charred bones)				(Practical)	Viva voce	

FM14.9	Demonstrate examination of & present an opinion after examination of skeletal remains in a simulated/ supervised environment	**At the end of the session, learner shall be able to:** 14.9.1:Enumerate the objectives of skeletal remains examination. 14.9.2:Demonstrate the procedure of examination of skeletal remains in a simulated/ supervised environment. 14.9.3:Draft a medicolegal report and opinion after examination of skeletal remains.	S	SH	Y		OSPE – Demonstration of skeletal remains examination. Practical book/ Log book Viva voce	
FM2.18	**Crime Scene Investigation** Describe and discuss the objectives of crime scene visit, the duties & responsibilities of doctors on crime scene and the reconstruction	**At the end of the session, learner shall be able to:** 2.18.1:Enumerate the objectives of crime scene visit by an autopsy surgeon. 2.18.2:Describe the procedure of examination of crime scene and preservation of evidentiary material.	K	KH	Y	SGD – 1 hr	Written, Viva voce	

	of sequence of events after crime scene investigation	2.18.3:Explain the reconstruction of a case after the crime scene visit.						
FM2.31	Demonstrate ability to work in a team for conduction of medico-legal autopsies in cases of death following alleged medical negligence, dowry death, death in custody or following violation of human rights as per National Human Rights Commission Guidelines on exhumation	**At the end of the session, learner shall be able to:** 2.31.1:Demonstrate the benefit of team work in a medicolegal autopsy of alleged medical negligence. 2.31.2:Demonstrate the benefit of team work in a medicolegal autopsy of alleged dowry death. 2.31.3:Demonstrate the benefit of team work in a medicolegal autopsy of alleged custodial death. 2.31.4:Demonstrate the benefit of team work in a medicolegal autopsy of death due to violation of human rights. 2.31.5:Demonstrate the benefit of team work in exhumation	A	KH	Y	SGD – 1 hr	Viva voce	
FM2.19	Investigation of anaesthetic, operative deaths: Describe and discuss special protocols for conduction of autopsy	**At the end of the session, learner shall be able to:** 2.19.1:Explain the significance of autopsy in operative deaths. 2.19.2:Describe the procedure of autopsy in	K	KH	Y	SDL – 1 hr	Written, Viva voce	Anaesthesiology General

	and for collection, preservation and dispatch of related material evidences	operative deaths. 2.19.3:Describe the procedure of preservation and dispatch of evidentiary material for investigation in deaths associated with anaesthesia and surgery.						Surgery
FM2.15	Describe special protocols for conduction of medico-legal autopsies in cases of death in custody or following violation of human rights as per National Human Rights Commission Guidelines	**At the end of the session, learner shall be able to:** 2.15.1:Describe the National Human Rights Commission guidelines for conduction of medicolegal autopsy in cases of death in custody or violation of human rights.	K	KH	Y	SDL – 1 hr	Written, Viva voce	

FM14.18	To examine & prepare medico-legal report of a person in police, judicial custody or referred by Court of Law and violation of human rights as requirement of NHRC, who has been brought for medical examination	**At the end of the session, learner shall be able to:** 14.18.1:Explain the procedure of examination and preparing the medico-legal report of a person in police custody/ judicial custody who has been brought for medical examination. 14.18.2:Explain the procedure of examination and preparing the medico-legal report of a person referred by Court of Law for medical examination.	S	KH	Y	SGD – 1hr (Practical)	Practical book/ Log book Viva voce	

		14.18.3:Explain the procedure of examination and preparing the medico-legal report of a person with history of violation of human rights as per requirement of NHRC (victim of torture, hunger strike, etc), who has been brought for medical examination.						
FM2.32	Demonstrate ability to exchange information by verbal or nonverbal communication to the peers, family members, law enforcing agency and judiciary	**At the end of the session, learner shall be able to:** 2.32.1:Demonstrate the skills of communication by a doctor with the peers. 2.32.2:Demonstrate the skills of communication by a doctor with the patient's family members in MLC works at casualty. 2.32.3:Demonstrate the skills of communication by a doctor with the deceased family members during medicolegal autopsy. 2.32.4:Demonstrate the skills of communication by a doctor with the law enforcing agency/ judiciary in medicolegal practices.	A and C	KH	Y	SGD – 1 hr	OSPE	AETCOM

FM2.33	Demonstrate ability to use local resources whenever required like in mass disaster	**At the end of the session, learner shall be able to:** 2.33.1:Define Mass disaster	A and C	KH	Y		Written, Viva voce	Community Medicine

	situations	2.33.2:Enumerate the types of Mass disaster. 2.33.3:List the objectives of forensic investigation in mass disasters. 2.33.4:Describe the procedure of examination at disaster site and autopsy. 2.33.5:Describe the evidentiary materials to be preserved in mass disasters. 2.33.6:Demonstrate the importance of team work in Mass Disasters.						
FM2.35	Demonstrate professionalism while conducting autopsy in medicolegal situations, interpretation of findings and making inference/opinion, collection, preservation and dispatch of biological or trace evidences	**At the end of the session, learner shall be able to:** 2.35.1:Demonstrate the professionalism of a doctor during conduction of medicolegal autopsies (such as interaction with investigating officer/relatives of deceased, receiving inquest form, maintaining confidentiality, etc). 2.35.2:Demonstrate the professionalism in preservation and dispatching evidentiary materials to FSL (such as proper method of preservation and dispatch of materials with necessary forms and maintaining confidentiality).	A and C	KH /SH			Viva voce	AETCOM

		2.35.3:Demonstrate the professionalism in preservation and dispatching evidentiary materials to histopathology and microbiology investigations (such as proper method of preservation and dispatch of materials with necessary forms and maintaining confidentiality). 2.35.4:Demonstrate the professionalism while giving opinion in medicolegal cases (such as honesty with unbiased inferences)						
Topic: Clinical Forensic Medicine								
FM3.1	**IDENTIFICATION** Define and describe Corpus Delicti, establishment of identity of living persons including race, Sex, religion, complexion, Stature, age determination using morphology, teeth-eruption, decay, bite marks, bones-ossification centres, medicolegal aspects of age	**At the end of the session, learner shall be able to:** 3.1.1:Define Corpus delicti 3.1.2:Describe the importance of corpus delicti in establishing the crime. 3.1.3:List the various means of identification in living and dead persons. 3.1.4:Explain the role of hand writing analysis, gait, speech, photography and facial description as a tool of identification. 3.1.5:Describe the methods of determination of race. 3.1.6:Describe the methods of sex determination in a living person. 3.1.7:Describe the methods of sex determination in a dead person. 3.1.8:Define intersex. 3.1.9:Describe the types of intersex and its medicolegal importance. 3.1.10:Describe the methods of age	K	KH	Y	Lecture – 2 h	Written, Viva voce	Human Anatomy

		determination in a living person. 3.1.11:Describe the methods of age determination in a dead person. 3.1.12:Explain the method of age estimation using Gustafson's technique. 3.1.13:Discuss the forensic aspects related to teeth. 3.1.14:Describe the methods of determination of stature.						
FM14.4	Conduct and prepare report of estimation of age of a person for medico-legal and other purposes & prepare medico-legal report in a simulated/ supervised environment	**At the end of the session, learner shall be able to:** 14.4.1:Explain the procedure of taking an informed consent from a person after explaining the importance and procedure of age estimation in criminal cases (accused/ victim of a crime) and civil cases (joining employment, obtaining pension, etc) 14.4.2:Estimate the age of a person by using physical, dental and radiological findings. 14.4.3:Prepare the medicolegal report on the age of a person	S	KH	Y	SGD – 2 hr (Practical)	OSPE – Writing the informed consent for age estimation	
FM3.2	**IDENTIFICATION** Describe and discuss identification of	**At the end of the session, learner shall be able to:** 3.2.1:Explain the role of hair in the	K	KH	Y	Lecture – 1 h	Written, Viva voce	

	criminals, unknown persons, dead bodies from the remains-hairs, fibers, teeth, anthropometry, dactylography, foot prints, scars, tattoos, poroscopy& superimposition	identification of an individual. 3.2.2: Describe the medicolegal importance of hair. 3.2.3:Describe the dyes used, methods of erasure and medicolegal importance of a tattoo. 3.2.4:Describe the medicolegal importance of the scar. 3.2.5:Define anthropometry. 3.2.6:Describe various data included in anthropometry and its importance in identification. 3.2.7:Define dactylography. 3.2.8:Describe the types, method of collection and medicolegal importance of dactylography. 3.2.9:Discuss the role of poroscopy, cheiloscopy and rugoscopy in identification. 3.2.10: Describe the role of foot prints in establishing the identity. 3.2.11:Describe the role of facial reconstruction in establishing the identity. 3.2.12:Discuss the role of superimposition						

		in establishing the identity.						
FM14.6	Demonstrate and interpret medico-legal aspects from examination of hair (human & animal) fibre, semen & other biological fluids	**At the end of the session, learner shall be able to:** 14.6.1:Identify hair (human/ animal), other fibres by physical and microscopic examination and describe its medicolegal importance. 14.6.2:Identify the semen by physical and microscopic examination and describe its medicolegal importance.	S	KH	Y	SGD – 1 h (Practical) (covered by pathology)	OSPE – Microscopic identification of hair/semen. Practical book/ Log book. Viva voce	
FM14.7	Demonstrate & identify that a particular stain is blood and identify the species of its origin	**At the end of the session, learner shall be able to:** 14.7.1:Identify the blood by physical and microscopic examination. 14.7.2:Explain the various medicolegal conclusions by examining the blood stains. 14.7.3:Explain the method of identifying the species of origin of the blood stain.	S	KH	Y		OSPE – Microscopic identification of blood. Practical book/ Log book Viva voce	Pathology, Physiology

FM14.8	Demonstrate the correct technique to perform and identify ABO & RH blood group of a person	**At the end of the session, learner shall be able to:** 14.8.1:Perform the technique of identifying the ABO blood group of a person. 14.8.2: Perform the technique of identifying the Rh blood group of a person.	S	SH	Y		OSPE – Perform the technique of blood grouping. Practical book/ Log book	Pathology, Physiology
Topic: Toxicology: General Toxicology								
FM8.1	Describe the history of Toxicology	**At the end of the session, learner shall be able to:** 8.1.1:Describe the history of Toxicology	K	K/ KH	Y	SDL – 1 hr	Written, Viva voce	Pharmacology
FM8.2	Define the terms Toxicology, Forensic Toxicology, Clinical Toxicology and poison	**At the end of the session, learner shall be able to:** 8.2.1:Define Toxicology, Forensic Toxicology, Clinical Toxicology and Poison	K	K/ KH	Y		Written, Viva voce	Pharmacology

FM8.3	Describe the various types of poisons, Toxicokinetics, and Toxicodynamics and diagnosis of poisoning in living and dead	**At the end of the session, learner shall be able to:** 8.3.1:Classify poisons in respect to mode of action and mode of usage. 8.3.2:Describe pharmacokinetics & pharmacodynamics of the poisons. 8.3.3:Explain the diagnosis of poisoning in the living individual. 8.3.4:Explain the diagnosis of poisoning in the dead individual.	K	K/ KH	Y		Written, Viva voce	Pharmacology
FM8.4	Describe the Laws in relations to poisons including NDPS Act, Medico-legal aspects of poisons	**At the end of the session, learner shall be able to:** 8.4.1: Describe the legal sections related to poisoning in India. ✓ S. 85 IPC, S. 86 IPC, S. 274 IPC, S. 284 IPC, S. 299 IPC, S. 300 IPC, S. 304 (A) IPC, S. 375 IPC ✓ S. 324 IPC, S. 325 IPC, S. 326 IPC, S. 326A IPC, S. 326B IPC, S. 328 IPC ✓ S. 357C Cr.P.C ✓ S. 185 IMV Act, S. 203 IMV Act, S. 204 IMV Act	K	K/ KH	Y	Lecture – 1 hr	Written, Viva voce	Pharmacology

		8.4.2:Describe Narcotic Drugs and Psychotropic Substances Act, 1985. 8.4.3:Describe Karnataka Poisons (Possession and Sale) Rules, 2015. 8.4.4: Describe the legal responsibilities of a doctor in a case of poisoning.						
FM8.5	Describe Medico-legal autopsy in cases of poisoning including preservation and dispatch of viscera for chemical analysis	**At the end of the session, learner shall be able to:** 8.5.1:Explain the procedure of medico-legal autopsy in a suspected case of poisoning. 8.5.2:Describe the method of preserving the various viscera in a case of poisoning. 8.5.3:Describe the procedure for dispatch of viscera for chemical analysis in a case of poisoning.	K	K/ KH	Y		Written, Viva voce	Pharmacology

FM8.6	Describe the general symptoms, principles of diagnosis and management of common poisons encountered in India	**At the end of the session, learner shall be able to:** 8.6.1:Enumerate the common poisons encountered in India. 8.6.2:Describe the characteristics, mechanism of action, fatal dose, fatal period,clinical features, treatment, post-mortem findings and	K	K/ KH	Y	Lecture – 1 hr	Written, Viva voce	Pharmacology

		medicolegal aspects of Organophosphate poisoning. 8.6.3:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Copper sulphate poisoning. 8.6.4:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Aluminum and Zinc Phosphide poisoning. 8.6.5:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Paracetamol poisoning. 8.6.6:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Benzodiazepines poisoning.						

FM8.7	Describe simple Bedside clinic tests to detect poison/drug in a patient's body fluids	**At the end of the session, learner shall be able to:** 8.7.1:Describe the bedside clinic tests for Hydrochloric acid poisoning (Ammonia test, Litmus paper test, Silver nitrate test). 8.7.2:Describe the bedside clinic tests for Nitric acid poisoning (Ferrous Sulphate test). 8.7.3:Describe the bedside clinic tests for Sulphuric acid poisoning (Litmus paper test). 8.7.4:Describe the bedside clinic tests for Oxalic acid poisoning (Barium nitrate test). 8.7.5: Describe the bedside clinic tests for Caustic alkalis poisoning (Litmus paper test). 8.7.6:Describe the bedside clinic tests for Phenol (FolinCiocaltaeu reagent test). 8.7.7:Describe the bedside clinic tests for Salicylates (Trinder's reagent test)	K	K/ KH	Y		Written, Viva voce	Pharmacology
FM8.8	Describe basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced	**At the end of the session, learner shall be able to:** 8.8.1:List the general treatment procedure in case of poisoning. 8.8.2:Explain the procedure of Gastric lavage. 8.8.3:Enumerate the indications and	K	K/ KH	Y	Lecture – 1 hr	Written, Viva voce	Pharmacology

	elimination	contraindications for Gastric lavage. 8.8.4:Define antidote. 8.8.5:Describe the various types of antidotes. 8.8.6:Explain Chelation therapy. 8.8.7:Describe the methods for hastening elimination of absorbed poison.						
FM8.9	Describethe procedure of intimation of suspicious cases or actual cases of foul play to the police, maintenance of records, preservation and despatch of relevant samples for laboratory analysis.	**At the end of the session, learner shall be able to:** 8.9.1:Describe the procedure of intimation of suspicious cases or actual cases of foul play to the police • S. 39 CrPC, S. 40 CrPC, S. 175 CrPC. • S. 166 (B) IPC, S. 176 IPC, S. 177 IPC, S. 201 IPC, S. 202 IPC. 8.9.2:Describe the procedure of record maintenance in a case of poisoning. 8.9.3:Describe the procedure of collection and dispatch of viscera for chemical analysis in a case of poisoning.	K	K/ KH	Y	Lecture – 1 hr	Written, Viva voce	
FM8.10	Describe the general principles of Analytical Toxicology and give a brief description of	**At the end of the session, learner shall be able to:** 8.10.1:List the various analytical methods used	K	K/ KH	Y	SDL – 1 hour	Written, Viva voce	

	analytical methods available for toxicological analysis: Chromatography – Thin Layer Chromatography, Gas Chromatography, Liquid Chromatography and Atomic Absorption Spectroscopy	in Toxicology. 8.10.2:Describe the general principle of Thin Layer Chromatography. 8.10.3:Describe the basic principle and uses of Gas Chromatography. 8.10.4:Describe the basic principle and uses of Liquid Chromatography. 8.10.5:Describe the basic principle and uses of Atomic Absorption Spectroscopy. 8.10.6:Describe the basic principle and uses of Mass Spectrometry. 8.10.7:Describe the basic principle and uses of Radio Immunoassay.						
FM14.2	Demonstrate the correct technique of clinical examination in a suspected case of poisoning & prepare medico-legal report in a simulated/ supervised environment	**At the end of the session, learner shall be able to:** 14.2.1:Take an informed consent from the Patient / Guardian after explaining the importance of MLC registration in Poisoning cases. 14.2.2:Perform the clinical examination (history taking, general physical examination, systemic examination, laboratory	S	SH	Y	SGD – 2 h (Skills lab) Share with medicine	OSPE – Writing the informed consent for poisoning case. OSPE – High-fidelity mannequi	General Medicine

		investigations, differential diagnosis) in poisoning cases in a simulated/ supervised environment. 14.2.3:Prepare the medicolegal certificate after documenting the clinical findings. 14.2.4: Prepare the police intimation.					n in skill lab, OR Interpretation of case examples	
FM14.3	Assist and demonstrate the proper technique in collecting, preserving and dispatch of the exhibits in a suspected case of poisoning, along with clinical examination	**At the end of the session, learner shall be able to:** 14.3.1:Demonstrate the process of collecting, preserving and dispatch of the materials/ exhibits in a suspected case of ingested poisoning. 14.3.2:Demonstrate the process of collecting, preserving and dispatch of the materials/ exhibits in a suspected case of inhalation poisoning along with clinical examination.	S	SH	Y		OSPE – List evidentiary materials in poisoning. Demonstrate the technique of preservation of materials. Prepare letters and labels for	General Medicine

		14.3.3:Demonstrate the process of collecting, preserving and dispatch of the materials/ exhibits in a suspected case of injected poisoning along with clinical examination.					dispatch of evidentiary materials.	
Topic: Toxicology: Chemical Toxicology								
FM9.1	Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to: Caustics Inorganic – sulphuric, nitric, and hydrochloric acids; Organic-Carbolic Acid (phenol), Oxalic and acetylsalicylic acids	**At the end of the session, learner shall be able to:** 9.1.1:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Sulphuric acid poisoning. 9.1.2:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Nitric acid poisoning. 9.1.3:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical	K	K/ KH	Y	SGD – 2 h	Written, Viva voce	Pharmacology, General Medicine

		features, treatment, post-mortem findings and medicolegal aspects of Hydrochloric acid poisoning. 9.1.4: Discuss on Vitriolage. 9.1.5:Describe the characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Carbolic acid poisoning. 9.1.6: Discuss on Carboluria. 9.1.7:Describe the characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Oxalic acid poisoning. 9.1.8:Discuss on Oxaluria. 9.1.9:Describe the characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Acetylsalicylic acid poisoning.						

FM9.2	Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Phosphorus, Iodine, Barium	**At the end of the session, learner shall be able to:** 9.2.1:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Phosphorus poisoning. 9.2.2:Discuss on Phossy jaw. 9.2.3:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Iodine poisoning. 9.2.4:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Barium poisoning.	K	K/ KH	Y	Lecture – 1 h	Written, Viva voce	Pharmacology, General Medicine
FM9.3	Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy,	**At the end of the session, learner shall be able to:** 9.3.1:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and	K	K/ KH	Y	Lecture – 2 h	Written, Viva voce	Pharmacology, General Medicine

	procedures of enhanced elimination with regard to Arsenic, lead, mercury, copper, iron, cadmium and thallium	medicolegal aspects of Arsenic poisoning. 9.3.2:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of lead poisoning. 9.3.3:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Mercury poisoning. 9.3.4:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Copper poisoning. 9.3.5:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Iron poisoning. 9.3.6:Describe the characteristics, mechanism						

		of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Thallium poisoning. 9.3.7:Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Cadmium poisoning. 9.3.8:Describe the causes, clinical features and treatment of Metallic fume fever.						
FM9.5	Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Organophosphates, Carbamates, Organochlorines, Pyrethroids, Paraquat, Aluminium and Zinc phosphide	**At the end of the session, learner shall be able to:** 9.5.1: Classify agricultural poisons. 9.5.2:Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medicolegal aspects of Organo-phosphorous poisoning. 9.5.3:Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and	K	K/ KH	Y	SGD – 2 h	Written, Viva voce	Pharmacology, General Medicine

		medicolegal aspects of Carbamate poisoning. 9.5.4:Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medico legal aspects of Organo-chlorine poisoning. 9.5.5:Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medico legal aspects of Paraquat poisoning. 9.5.6:Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medico legal aspects of Pyrethroid poisoning. 9.5.7:Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medico legal aspects of Aluminium and Zinc phosphide poisoning.						
FM9.6	Describe General Principles and basic methodologies in treatment of poisoning:	**At the end of the session, learner shall be able to:** 9.6.1:Describe physical/chemical	K	K/ KH	Y	SGD – 2 h	Written, Viva voce	Pharmacology,

	decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Ammonia, carbon monoxide, hydrogen cyanide & derivatives, methyl isocyanate, tear (riot control) gases	characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medico legal aspects of Ammonia poisoning. 9.6.2:Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings & medico legal aspects of Carbon monoxide poisoning. 9.6.3:Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medico legal aspects of Cyanide poisoning. 9.6.4:Describe physical/chemical characteristics, mechanism of action, clinical features, treatment, post-mortem findings and medico legal aspects of Methyl Isocyanate poisoning. 9.6.5: Describe clinical features, treatment and medico legal aspects of exposure to tear gas (in riot control).						General Medicine

Topic: Toxicology: Pharmaceutical Toxicology								
FM10.1	Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to: i. Antipyretics – Paracetamol, Salicylates ii. Anti-Infectives (Common antibiotics – an overview) iii. Neuropsychotoxicology Barbiturates, benzodiazepines, phenytoin, lithium, haloperidol, neuroleptics, tricyclics iv. Narcotic Analgesics, Anaesthetics, and	**At the end of the session, learner shall be able to:** 10.1.1:Describe clinical features, treatment and medicolegal aspects of poisoning due to Antipyretics (such as Paracetamol and Salicylates). 10.1.2:Describe clinical features, treatment and medicolegal aspects of poisoning due to Anti-Infective overdose (common antibiotics). 10.1.3:Describe clinical features, treatment, post-mortem findings and medicolegal aspects of Barbiturate poisoning. 10.1.4:Describe clinical features, treatment and medicolegal aspects of Benzodiazepine poisoning. 10.1.5:Describe clinical features, treatment, post-mortem findings and medicolegal aspects of opium and its alkaloids. 10.1.6:Describe clinical features, treatment, post-mortem findings and medicolegal aspects	K	K/ KH	Y	SDL -1 h	Written, Viva voce	Pharmacology, General Medicine

	Muscle Relaxants v. Gastro-Intestinal and Endocrinal Drugs – Insulin	of poisoning due to Gastro-Intestinal and Endocrinal Drugs (e.g., Insulin).						
	vi. Cardiovascular Toxicology Cardiotoxic plants – oleander, odollam, aconite, digitalis	10.1.7:Enumerate the cardiotoxic plants. 10.1.8:Describe the active principles, mechanism of action, fatal dose, fatal period, clinical features, treatment, post-mortem findings and medico-legal aspects of poisoning due to cardiotoxic plants.				Lecture – 1 h	Written, Viva voce	

Topic: Toxicology: Bio toxicology								
FM11.1	Describe features and management of Snake bite, scorpion sting, bee and wasp sting and spider bite	**At the end of the session, learner shall be able to:** 11.1.1:Differentiate poisonous and non-poisonous snakes. 11.1.2:Classify poisonous snakes. 11.1.3:Identify the common poisonous and non-poisonous snakes in India.	K	K/ KH	Y	SGD – 2 h	Written, Viva voce	General Medicine

		11.1.4:Describe mechanism of action, clinical features, management, post-mortem findings and medicolegal aspects of snake bite (Ophitoxaemia). 11.1.5: Identify the common scorpions seen in India. 11.1.6:Describe mechanism of action, clinical features, management, post-mortem findings and medicolegal aspects of scorpion sting. 11.1.7:Describe mechanism of action, clinical features, management, post-mortem findings and medicolegal aspects of bee and wasp sting, and spider bite.						
Topic: Toxicology: Sociomedical Toxicology								
FM12.1	Describe features and management of abuse/ poisoning with following chemicals: Tobacco, cannabis, amphetamines, cocaine, hallucinogens, designer drugs & solvent	**At the end of the session, learner shall be able to:** 12.1.1:Define drug abuse, drug addiction, drug habituation and drug dependence. 12.1.2:List the drugs of abuse.	K	K/ KH	Y	Lecture – 1 hr	Written, Viva voce	General Medicine

		12.1.3:Describe clinical features, treatment, post-mortem findings and medicolegal aspects of acute and chronic tobacco poisoning. 12.1.4:Enumerate the active principles and various preparations of cannabis. 12.1.5:Describe clinical features, treatment, post-mortem findings and medicolegal aspects of acute and chronic cannabis poisoning. 12.1.6:Describe clinical features, treatment, post-mortem findings and medicolegal aspects of acute and chronic cocaine poisoning. 12.1.7:Describe clinical features, treatment, post-mortem findings and medicolegal aspects of amphetamine poisoning. 12.1.8:Enlist hallucinogenic substances. 12.1.9:Describe clinical features, treatment, post-mortem findings and medicolegal aspects of Lysergic acid diethylamide poisoning. 12.1.10:Define 'Designer drug'. 12.1.11:Describe the clinical features and management of common designer drugs. 12.1.12:Define 'Solvent abuse'.						

FM14.17	To identify & draw medico-legal inference from common poisons e.g. Datura, castor, cannabis, opium, aconite copper sulphate, pesticides compounds, marking nut, oleander, Nux vomica, abrus seeds, Snakes, capsicum, Calotropis, lead compounds & tobacco.	**At the end of the session, learner shall be able to:** 14.17.1:Identify with physical and /or chemical characteristics of the common poisons e.g. Datura, castor, cannabis, opium, aconite, copper sulphate, pesticide compounds, marking nut, oleander, Nux vomica, abrus seeds, snakes, capsicum, calotropis, lead compounds & tobacco. (regional / local poisons) 14.17.2:Draw the medico-legal inferences with the use of the common poisons	S	KH	Y	SGD – 2 h (Practical)	OSPE – Identification of a given poison and its medicolegal inference. Practical book/ Log book Viva voce	
Topic: Toxicology: Environmental Toxicology								
FM 13.1	Describe toxic pollution of environment, its medico-legal aspects & toxic hazards of occupation & industry	**At the end of the session learner shall be able to:** 13.1.1:Enumerate the causes for environmental pollution. 13.1.2:Describe the health effects of environmental pollution due to toxic substances.	K	K/ KH	Y	Lecture – 1 h	Written, Viva voce	14.2

		13.1.3:Describe the medico-legal aspects of toxic hazards on employees of an industry						
FM 13.2	Describe medico-legal aspects of poisoning in Workman's Compensation Act	**At the end of the session, a student shall be able to:** 13.2.1:Describe the medico-legal issues arising out of effects of poisoning due to occupational exposure as per Workman's Compensation Act. 13.2.2:Discuss the role of physician in cases of poisoning due to occupational exposure.	K	K/ KH	Y		Written, Viva voce	
Topic: Skills in Forensic Medicine & Toxicology								
FM14.5	Conduct & prepare post-mortem examination report of varied aetiologies (at least 15) in a simulated/ supervised environment	**At the end of the session, learner shall be able to:** 14.5.1:Describe the techniques of conducting a medicolegal autopsy. 14.5.2:Describe the post-mortem findings (external and internal) in a medicolegal autopsy. 14.5.3:Enumerate the ancillary investigations required (along with appropriate materials for	S	KH	Y	5 cases	OSPE – Case example with details of a medicolegal case (containing history, post-mortem findings, investigation	

		such investigations) in a medicolegal autopsy. 14.5.4:Draft the post-mortem report after a medicolegal autopsy. Medicolegal autopsies may be a case of unnatural death, natural death, custodial death, alleged medical negligence, decomposed body, mutilated body.					details) – ask to draft PM report and few questions of analysing	

Practicals

- Examination of mutilated bodies or fragments, charred bones and bundle of bones (skeletal remains examination).
- Examination of an individual for estimation of age of a person for medico-legal purpose and preparing report.
- Examination of biological stains, hairs, fibres for individualisation in medico-legal cases.
- Clinical examination in a suspected case of poisoning & prepare medico-legal report.
- Techniques of collecting, preserving and dispatch of the exhibits in a suspected case of poisoning.
- Examination of the accused by medical practitioner at the request of police, judicial custody or by Court of Law and violation of human rights as requirement of NHRC and preparation of medico-legal report.

- Examination of an individual and issuing of drunkenness certificate

Assessment

Theory

Two internal examinations will be conducted in phase II MBBS.

1. First internal assessment examination at the end of block II MBBS
2. Second internal assessment examination at the end of block III MBBS.

Type of questions	Marks per question	Number of questions	Total marks (60)
MCQs	0.5	20	10
Long Essay questions	10	1	10
Short essay questions	5	5	25
Short answer questions	3	5	15

Practical: 20 marks.

Two practical examinations will be conducted at the end of block II &IIIof phase II MBBS

LEARNING RESOURCE MATERIALS:

Digital contents uploaded on the JSSAHER Online portal.

Suggested textbooks (Recent editions):

- K.S.Narayana Reddy, K Suganadevi, Malakpet. The Essentials of Forensic Medicine & Toxicology, Hyderabad..
- Textbook of Forensic Medicine & Toxicology - Krishan Vij, Elsevier Publication, New Delhi
- Rajesh Bardale. Principles of Forensic Medicine and Toxicology.
- V.V.Pillay. Text book of Forensic Medicine and Toxicology. Paras Medical Publishing, Hyderabad.
- J. P Modi. Modi's Textbook of medical jurisprudence and toxicology.

Reference Books (Recent editions):

- P. V. Guharaj, Sudhir K. Gupta. Forensic Medicine and Toxicology. Universities Press
- ApurbaNandy. Principles of Forensic Medicine, New Central Book Agency (P) Ltd.,
- PekkaSaukko and Bernard Knight. Knight's Forensic Pathology, Arnold Publication London, Co-published by Oxford Publications, USA

COMMUNITY MEDICINE

Curriculum of Community Medicine for the Phase II MBBS

Topics and outcomes of Community Medicine in second professional year

Subject	Number of topics	Outcomes
Community Medicine	7	38

Course content

GOAL

The aim of teaching the undergraduate student in Community Medicine is to impart such knowledge and skills that may enable him to diagnose and treat common medical illnesses and recognize the importance of community involvement. He/she shall acquire competence to deal effectively with an individual and the community in the context of primary health care.

Objectives

At the end of second year MBBS the students should be able to accomplish the following objectives,

II. Objectives

At the end of second year MBBS the students should be able to accomplish the following objectives,

Cognitive

1. Discuss various environmental influences on health and disease
2. Describe epidemiology and prevention of various nutritional deficiency disorders of public health importance
3. Discuss various strategies under community nutrition programmes

4. Discuss the epidemiology, prevention and control of various communicable and non communicable diseases of public health importance
5. Describe the concepts of dynamics of disease transmission with respect to communicable diseases
6. Discuss Various epidemiological study designs
7. Describe the concept of disease surveillance and its role in prevention of outbreaks
8. Describe the concepts of essential and counterfeit medicines

Affective

1. Communicate effectively with peers and teachers in various teaching learning activities
2. Effectively reflect on the situations of health impact of poverty and low standard of living
3. Communicate effectively with people in community during family health advisory survey
4. Function as a effective team member

Skills

1. Undertake assessment of environmental and socio-cultural influencers on health and disease at family and community setting
2. Demonstrate the methods of calculation and interpretation of various indicators morbidity and mortality
3. Undertake nutritional status at individual, family and community levels
4. Apply basic knowledge of biostatistics in data presentation and interpretation
5. Demonstrate the steps in conducting outbreak investigation in a simulated setting

III. Course outcomes of second professional year

1. Ability to assess the environmental, Sociodemographic, nutritional and cultural factors influencing health and disease at a family setting

2. Demonstrate nutritional assessment at individual, family and community settings
3. Ability to discuss the steps in investigation of an outbreak
4. Describe the epidemiology and prevention of various communicable and non communicable diseases of public health importance
5. Application of basic concepts of research methodology and biostatistics
6. Conceptualization of dynamics of disease transmission

IV. Syllabus

A. Number of teaching hours:

Teaching method	Hours
Lecture	20
Small group teaching	30
Self directed learning	10
Total	60

B. Distribution of teaching hours for theory and practicals/ Small group teaching is as follows

Topic	Lecture	Small group teaching	SDL	Total
Epidemiology	6	6	2	14
Epidemiology of communicable and non- communicable diseases	6	10	3	19
Environmental Health Problems	6	6	2	14
Biostatistics	`–	5	0	5
Nutrition	2	3	2	7
Essential Medicines	–	–	1	1
Total	20	30	10	60

B. Syllabus at a glance for MBBS Phase II Course

Sl No	Topic Number	Name of topic	Description of competencies
1	2	**Relationship of social and behavioural to health and disease**	CM 2.1 Describe the steps and perform clinico socio-cultural and demographic assessment of the individual, family and community
			CM2.2 Describe the socio-cultural factors, family (types), its role in health and disease & demonstrate in a simulated environment the correct assessment of socio-economic status
			CM2.3 Describe and demonstrate in a simulated environment the assessment of barriers to good health and health seeking behavior
2	3	**Environmental Health Problems**	CM3.1 Describe the health hazards of air, water, noise, radiation and pollution
			CM3.2 Describe concepts of safe and wholesome water, sanitary sources of water, water purification processes, water quality standards, concepts of water conservation and rainwater harvesting
			CM3.3 Describe the aetiology and basis of water borne diseases /jaundice/hepatitis/ diarrheal diseases
			CM3.4 Describe the aetiology and basis of water borne diseases /jaundice/hepatitis/ diarrheal diseases
			CM3.5 Describe the standards of housing and the effect of housing on health
			CM3.6 Describe the role of vectors in the causation of diseases. Also discuss National Vector Borne disease Control Program

			CM3.7 Identify and describe the identifying features and life cycles of vectors of Public Health importance and their control measures
			CM3.8 Describe the mode of action, application cycle of commonly used insecticides and rodenticides
3	5	**Nutrition**	CM5.2 Describe and demonstrate the correct method of performing a nutritional assessment of individuals, families and the community by using the appropriate method
			CM5.3 Define and describe common nutrition related health disorders (including macro-PEM, Micro-iron, Zn, iodine, Vit. A), their control and management
			CM5.4 Plan and recommend a suitable diet for the individuals and families based on local availability of foods and economic status, etc in a simulated environment
			CM5.5 Describe the methods of nutritional surveillance, principles of nutritional education and rehabilitation in the context of sociocultural factors.
			CM5.6 Enumerate and discuss the National Nutrition Policy, important national nutritional Programs including the Integrated Child Development Services Scheme (ICDS) etc
			CM5.7 Describe food hygiene
			CM5.8 Describe and discuss the importance and methods of food fortification and effects of additives and adulteration
4	6	**Basic statistics and its applications**	CM6.1 Formulate a research question for a study
			CM6.2 Describe and discuss the principles and demonstrate the methods of

			collection, classification, analysis, interpretation and presentation of statistical data
			CM6.3 Describe, discuss and demonstrate the application of elementary statistical methods including test of significance in various study designs
			CM6.4 Enumerate, discuss and demonstrate Common sampling techniques, simple statistical methods, frequency distribution, measures of central tendency and dispersion
5	7	**Epidemiology**	CM7.1 Define Epidemiology and describe and enumerate the principles, concepts and uses
			CM7.2 Enumerate, describe and discuss the modes of transmission and measures for prevention and control of communicable and noncommunicable diseases
			CM7.3 Enumerate, describe and discuss the sources of epidemiological data
			CM7.4 Define, calculate and interpret morbidity and mortality indicators based on given set of data
			CM7.5 Define, calculate and interpret morbidity and mortality indicators based on given set of data
			CM7.6 Enumerate and evaluate the need of screening tests
			CM7.7 Describe and demonstrate the steps in the Investigation of an epidemic of communicable disease and describe the principles of control measures
			CM7.8 Describe the principles of association, causation and biases in epidemiological studies

			CM7.9 Describe the principles of association, causation and biases in epidemiological studies
6	8	**Epidemiology of communicable and non- communicable diseases**	CM8.1 Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for communicable diseases
			CM8.2 Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for Non Communicable diseases (diabetes, Hypertension, Stroke, obesity and cancer etc.)
			CM8.4 Describe the principles and enumerate the measures to control a disease epidemic
			CM8.5 Describe and discuss the principles of planning, implementing and evaluating control measures for disease at community level bearing in mind the public health importance of the disease
7	19	**Essential Medicine**	CM19.1 Define and describe the concept of Essential Medicine List (EML)
			CM19.2 Describe roles of essential medicine in primary health care
			CM19.3 Describe counterfeit medicine and its prevention

No	COMPETENCY The student should be able to	Specific Learning Objectives	Domain K/S/A/C	Level K/KH/SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
TOPIC 2 : RELATIONSHIP OF SOCIAL AND BEHAVIOURAL TO HEALTH AND DISEASE										
Topic 2 : Relationship of social and behavioural to health and disease										
CM2.1	Describe the steps and perform clinico socio-cultural and demographic assessment of the individual, family and community	**At the end of 2nd year MBBS the student should be able to,** 1. Describe the steps in clinico social assessment at individual, family and community level. 2. Describe the steps in clinico-cultural assessment at individual, family and community level 3. Describe the steps in socio-demographic assessment at individual, family and community level. 4. Demonstrate the steps in clinico socio-cultural and demographic assessment of the individual, family and community	S	SH	Y	Lecture, Small group discussion, DOAP session	Written / Viva voce/ Skill assessment	N		

CM 2.2	Describe the socio-cultural factors, family (types), its role in health and disease & demonstrate in a simulated environment the correct assessment of socio-economic status	**At the end of 2nd year MBBS the student should be able to,** 1. Define family 2. Describe family cycle and stress 3. Describe types of family 4. Explain functions of family 5. Describe role of family (types) in health and disease 6. Describe role of cultural factors in health and disease 7. Demonstrate the socio-cultural factors, family (types), its role in health and disease in a simulated environment 8. Demonstrate the assessment of socio-economic status correctly in a simulated environment	S	SH	Y	Lecture, Small group discussion, DOAP session	Written / Viva voce/ Skill assessment			
CM2.3	Describe and demonstrate in a simulated environment the assessment of barriers to good health and health	1. Describe dynamics of behaviour 2. Describe barriers to good health 3. Describe health seeking behaviour 4. Describe assessment of barriers to good health and health seeking behaviour 5. Demonstrate the assessment	S	SH	Y	Lecture, Small group discussion, DOAP session	Written / Viva voce/ Skill assessment			

	seeking behavior	of barriers to good health and health seeking behaviour in a simulated environment								
TOPIC 3 : ENVIRONMENTAL HEALTH PROBLEMS										
CM3.1	Describe the health hazards of air, water, noise, radiation and pollution	**At the end of 2nd year MBBS the student should be able to,** 1. Define air pollution. 2. Describe the health hazards of air pollution 3. Enumerate sources of air pollution. 4. Describe meteorological factors. 5. Describe air-pollutants. 6. Describe indoor air pollution. 7. Describe monitoring of air pollution. 8. Describe air pollution monitoring in India. 9. Explain prevention and control of air pollution. 10. Describe disinfection of air. 11. Describe standards and types of ventilation. 12. Describe the health hazards of water pollution 13. Describe water-related diseases. 14. Describe water-pollution law. 15. Define noise pollution. 16. Describe the effects of noise	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine, ENT	

		exposure. 17. Enumerate control measures of noise. 18. Enumerate sources of radiation exposure. 19. Define types of radiation. 20. Define radiation units. 21. Enumerate biological effects of radiation. 22. Describe radiation protection.								
CM3.2	Describe concepts of safe and wholesome water, sanitary sources of water, water purification processes, water quality standards, concepts of water conservation and rainwater harvesting	1. Define safe and wholesome water. 2. Describe sanitary sources of water. 3. Describe purification of water on a large scale. 4. Describe purification of water on a small scale. 5. Describe water quality-criteria and standards. 6. Describe various methods of water conservation. 7. Explain rainwater harvesting.	K	KH	Y	Lecture, Small group discussion, DOAP session	Written / Viva voce			
CM3.3	Describe the aetiology and basis of water borne diseases /jaundice/hep	Describe the aetiology of various water borne diseases. Enlist the water borne diseases. Discuss the epidemiology and preventive measures of jaundice /hepatitis.	K	KH	Y	Lecture, Small group discussion, DOAP session	Written / Viva voce		Microbiology, General Medicine, Paediatri	

	atitis/ diarrheal diseases	Discuss the epidemiology and preventive measures of diarrheal diseases. Explain various treatment and preventive measures to combat these diseases.							cs	
CM3.4	Describe the concept of solid waste, human excreta and sewage disposal	1. List the types of solid waste and the hazards due to each type. 2. Describe various scientific methods of sewage disposal. 3. Describe various scientific methods of solid waste disposal 4. Define sanitation barrier. 5. Describe modern sewage treatment. 6. Discuss hazards due to human excreta and open defecation. 7. Explain the principles behind functioning of sanitary latrines and other methods of human excreta disposal.	K	KH	Y	Lecture, Small group discussio n	Written / Viva voce			
CM3.5	Describe the standards of housing and the effect of housing on health	1. Describe the factors determining environmental health related to housing. 2. Discuss housing standards. 3. Interpret the effects of abnormalities in housing on health. 4. Define social goals of housing. 5. Define overcrowding.	K	KH	Y	Lecture, Small group discussio n	Written / Viva voce			

CM3.6	Describe the role of vectors in the causation of diseases. Also discuss National Vector Borne disease Control Program	1. Describe the role of various vectors in the causation of diseases. 2. Discuss on various aspects of National Vector Borne Disease Control Program. 3. Interpret the various indices used in vector control.	K	KH	Y	Lecture, Small group discussio n	Written / Viva voce		Microbio logy	
CM3.7	Identify and describe the identifying features and life cycles of vectors of Public Health importance and their control measures	1. Identify various vectors of public health importance. 2. Describe their identifying features and salient features of their life cycles. 3. Discuss various control measures available for specific vectors	S	SH	Y	Lecture, Small group discussio n, DOAP session	Written / Viva voce/ Skill assessment		Microbio logy	
CM3.8	Describe the mode of action, application cycle of commonly used insecticides and rodenticides	1. List various insecticides and rodenticides with respect to insects and rodents of public health importance. 2. Describe the mode of action of various insecticides and rodenticides. 3. Explain the methods of application of these rodenticides and insecticides safely to prevent zoonotic	K	KH	Y	Lecture, Small group discussio n	Written / Viva voce		Pharmac ology	

		diseases and agricultural as well as domestic loss.								
Topic 5: Nutrition										
CM 5.2	**Describe and demonstrate the correct method of performing a nutritional assessment of individuals, families and the community by using the appropriate method**	1. Describe different methods available for nutritional assessment at individual level 2. Describe different nutritional assessment methods available at community level 3. Discuss the importance of nutritional assessment 4. Demonstrate nutritional assessment methods at the community level	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		General Medicine, Pediatrics	
CM5.3	Define and describe common nutrition related health disorders (including macro-PEM,	1.List the common nutrition related health disorders . 2.Define PEM and discuss its clinical features 3.Discuss the management of PEM	K		Y	Small group discussion, Lecture	Written / Viva voce		General Medicine, Pediatrics	

	Micro-iron, Zn, iodine, Vit. A), their control and management	4. Discuss preventive measures of PEM. 5.Define nutritional Anaemia. 6.Discuss the epidemiological factors influencing nutritional anemia 7. clinical signs and symptoms of nutritionan anemia\ 8.Discuss the preventive measures of iron deficiency anaemia. 9.Describe the spectrum of iodine deficiency disorder. 10.Describe the control measure in reference to NIDDCP. 11.Describe clinical manifestations of Vitamin A deficiency . 12.Discuss the prevention of Vitamin A deficiency with reference to Vit A prophylaxis program								
CM 5.4	Plan and recommend a suitable diet for the individuals	1. Students would be able to prepare a balanced diet chart for a • Pregnant women	S	SH	Y	DOAP sessions	Skill Assessment		General Medicine, Pediatrics	

	and families based on local availability of foods and economic status, etc in a simulated environment	• Prisoner • An elderly with diabetes • Child with PEM belonging to low socio economic status • Lactating women • Obese hypertensive 2. Calculate the calorie and nutrient requirements for a given family using consumption units 3. Derive a meal plan for a family using the consumption units								
CM 5.5	Describe the methods of nutritional surveillance, principles of nutritional education	1. Define nutritional surveillance 2. Differentiate between growth monitoring and nutritional surveillance 3. Describe the methods of nutritional surveillance 4. Discuss the principles of nutritional education 5. Describe various components of	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine, Pediatrics	

	and rehabilitation in the context of sociocultural factors.	nutritional rehabilitation 6. Describe the modes of nutritional education in context of socio cultural factors								
CM5.6	Enumerate and discuss the National Nutrition Policy, important national nutritional Programs including the Integrated Child Development Services Scheme (ICDS) etc	1. Discuss strategies under National Nutrition Policy 1993 2. Discuss objectives and provisions under National Nutritional anemia prophylaxis programme 3. Discuss briefly the various community nutritional programs (Vit A Prophylaxis Program, IDD control, Mid day meal scheme, mid day meal program etc.,) 4. List objectives of ICDS								

		5. Enlist the beneficieries under ICDS 6. Describe various services provided under ICDS programme								
CM 5.7	**Describe food hygiene**	1. Define " Food hygiene" 2. List components of Food hygiene 3. Discuss requirements for a canteen/eatery 4. Describe measures for food handlers as per minimum standards suggested under 5. Classify milk borne diseases giving examples of at least 2 zoonoses commonly found in India 6. Describe Pasteurization of milk 7. Describe different tests performed to check for adequate pasteurization of milk 8. List diseases commonly transmitted through	K	KH	Y	Lecture Small group	Written, Viva voce			

		consumption of flesh foods/meat in India 9. Describe the measures for slaughter house sanitation								
5.8	**Describe and discuss the importance and methods of food fortification and effects of additives and adulteration**	1. Define the term 'food fortification 2. Discuss the need for food fortification briefly 3. Enumerate at least two methods of food fortification and the criteria to be satisfied by the vehicle and the nutrient in order to qualify as suitable for fortification correctly 4. Define the term 'food additive' correctly 5. Define the term 'food adulteration' 6. Enumerate common modes of food adulteration 7. Discuss the hazards of food additives/adulteration briefly 8. Describe the measures taken at the national and	K	KH	Y	Lecture, Small group sessions	Written, Viva voce			

		international level to control food adulteration briefly								
Topic 6: Basic statistics and its applications										
CM 6.1	Formulate a research question for a study	**At the end of 2nd year MBBS the student should be able to** 1. Describe importance of research question 2. Formulate research question using PICO approach 3. Differentiate between aim and objective of research 4. Formulate research objective with SMART criteria	K	KH	Y	Small group discussion, Lecture, DOAP sessions	Written / Viva voce/ Skill assessment		General Medicine, Pediatrics	
CM 6.2	Describe and discuss the principles and demonstrate the methods	1. Enlist various tools for data collection 2. List the advantages and disadvantages of various tools for data collection 3. Describe various methods	S	SH	Y	Small group discussion, Lecture, DOAP	Written / Viva voce/ Skill assessment		General Medicine, Pediatrics	

	of collection, classification, analysis, interpretation and presentation of statistical data	of data collection in epidemiological research 4. Describe various methods of presentation of data (tables and figures)				sessions				
CM 6.3	Describe, discuss and demonstrate the application of elementary statistical methods including test of significance in various study designs	1. Define hypothesis in research 2. Classify types of hypothesis 3. List the needs for testing the hypothesis 4. Classify various tests of significance 5. Discuss the conditions where student t test is applied with example 6. Discuss the conditions where paired t test is applied with example 7. Discuss the condition where ANOVA is applied	S	SH	Y	Small group discussion, Lecture, DOAP sessions	Written / Viva voce/ Skill assessment		General Medicine, Pediatrics	

		with example 8. Discuss the conditions where chi square test is applied with example 9. Demonstrate chi square test on a given data 10. Demonstrate student t test on a given data								
CM 6.4	Enumerate, discuss and demonstrate Common sampling techniques, simple statistical methods, frequency distribution, measures of central tendency and dispersion	1. Classify various sampling techniques 2. Describe various sampling techniques with examples 3. Describe various measures of central tendency with examples 4. Describe various methods of dispersion with examples 5. Calculate various measures of central tendency in a given data 6. Calculate various measures of dispersion in a given data 7. Construct various graphs for the given set of data	S	SH	Y	Small group discussion, Lecture, DOAP sessions	Written / Viva voce/ Skill assessment		General Medicine, Pediatrics	

Topic 7: Epidemiology										
CM7.1	Define Epidemiology and describe and enumerate the principles, concepts and uses	At the end of 2nd year MBBS the student should be able to, 1. Define epidemiology 2. Describe components of epidemiology (disease frequency, distribution of disease and determinants of disease) 3. Enumerate principles of epidemiology 4. List differences between epidemiology and clinical medicine 5. Enlist the aims of epidemiology 6. Describe foundations of epidemiological approach 7. Describe uses of epidemiology	K	KH	Y	Lecture Seminar	Long essay Short Essay Short Answer MCQs			

CM 7.2	**Enumerate, describe and discuss the modes of transmission and measures for prevention and control of communicable and non communicable diseases**	**At the end of 2nd year MBBS the student should be able to,** 1. Define infection 2. Define contamination 3. Define infestation 4. Define communicable disease 5. Differentiate between infectious, communicable and contagious diseases 6. Define sporadic, epidemic, endemic and pandemic of infection 7. Define zoonotic diseases 8. Classify modes of transmission of zoonotic diseases 9. Define nosocomial infection with suitable examples 10. Define iatrogenic infection with examples 11. Differentiate between concept of elimination and	**K**	KH	**Y**	**Lecture, Small group teaching, academic field visits, Problem based learning sessions, DOAP sessions**	Long Essay Short essay/ short answers MCQ's VIVA-VOCE OSPE/OSCE			

		eradication 12. Describe the chain of transmission of disease 13. Differentiate between source and reservoir of infection with examples 14. Classify and describe reservoirs of infection with examples 15. Classify and describe various modes of transmission of infection 16. Describe components of successful parasitism 17. Define Incubation period 18. List the uses of incubation period 19. Define latent period 20. Define serial interval 21. Define generation time 22. Define communicable period 23. Describe the concept of secondary attack rate with								

		examples 24. Classify host defence mechanisms 25. Differentiate between active and passive immunity 26. Describe the concept of herd immunity 27. Describe various types of immunizing agents 28. Describe the components/equipments of cold chain system 29. List the uses of cold chain system 30. Classify and describe adverse events following immunization (AEFI) 31. Discuss the stages of Vaccine Vial Monitor 32. List the contraindications for various vaccines 33. Classify and describe various components of disease								

		prevention and control 34. Enlist notifiable diseases 35. Describe isolation as a preventive and control measure 36. Define quarantine 37. Classify quarantine 38. Describe components of Universal Immunization Schedule 39. Enlist the indications for chemoprophylaxis for various diseases 40. Enlist the indications of passive immunization 41. Define and classify surveillance 42. Enlist common health problems among travellers 43. Describe various health advises to be provided to the travellers 44. Differentiate between								

		sterilization, disinfection and antiseptic 45. List the properties of an ideal disinfectant 46. Classify disinfection 47. Classify and describe agents of disinfection with examples 48. Enlist the factors influencing efficacy of disinfection 49. Discus the methods of disinfection of urine, stools and sputum								
CM 7.3	**Enumerate, describe and discuss the sources of epidemiological data**	**At the end of 2nd year MBBS the student should be able to,** 1. Enlist various sources of epidemiological data 2. Describe the advantages and disadvantages of various sources of epidemiological data 3. Discuss the uses of epidemiological data	**K**	**KH**	**Y**	**Lecture, Small group teaching**	**Short essay/ short answers/ MCQ's VIVA-VOCE**			

		4. Describe the regulations for birth and death registration system in India 5. Enlist the uses of hospital records 6. Enlist the uses of notification of diseases 7. Describe the uses of record linkage 8. Classify health surveys 9. Describe methods of data collection in health surveys								
CM 7.4	**Define, calculate and interpret morbidity and mortality indicators based on given set of data**	**At the end of second year MBBS the student should be able to,** 1. Enumerate various measurements in epidemiology 2. Differentiate between Rate, Ratio and Proportion with examples 3. Describe the concept of denominator in	**S**	**SH**	**Y**	**Lecture, Problem based learning sessions, epidemiological exercises, Interpretation of charts and**	**Problem solving exercise Interpretation of charts and tables Short essay/ short answers**			

		epidemiological measurements 4. Enumerate the limitations of mortality data 5. Enumerate various mortality rates 6. Enumerate various mortality ratios 7. Define crude death rate 8. List the advantages and disadvantages of crude death rate 9. Define specific death rate with suitable examples 10. Define case fatality rate 11. List the uses of case fatality rate 12. Define proportionate mortality rates with examples 13. List the uses of proportionate mortality rates				**tables**	**MCQ's** **VIVA-VOCE**			

		14. Define survival rate 15. List uses of standardization of mortality rates 16. Calculate crude death rate for a given data and interpret the results 17. Calculate proportionate mortality rate for a given data and interpret the results 18. Calculate specific death rate for a given data and interpret the results 19. Describe the uses of morbidity data 20. Describe the concept of incidence of disease 21. Define incidence rate 22. Define attack rate with example 23. List uses of incidence rate								

		24. Define prevalence of disease 25. Differentiate between point prevalence and period prevalence with suitable examples 26. Describe the concept of difference between incidence and prevalence 27. List uses of prevalence 28. Calculate and interpret incidence rate for a given data 29. Calculate and interpret attack rate for a given data 30. Calculate and interpret secondary attack rate for a given data 31. Calculate and interpret point and period prevalence for a given data								

CM 7.5	**Enumerate, define, describe and discuss epidemiological study designs**	**At the end of 2nd year MBBS, the student should be able to** 1. Classify epidemiological study designs 2. Describe steps in conducting descriptive epidemiological studies a. Describe different time trends in occurrence of diseases b. List the uses of migration studies 3. Describe the steps in conducting cross sectional studies 4. Differentiate between cross sectional and longitudinal studies 5. Enlist distinctive features of case control studies	**K**	**KH**	**Y**	**Lecture, Problem based learning sessions, epidemiological exercises, Interpretation of charts and tables**	**Problem solving exercise Long essay Short essay/ short answers MCQ's VIVA-VOCE**			

		6. Describe steps in conducting case control studies with example a. Calculate and interpret Odds ratio for a given data 7. List advantages and disadvantages of case control studies 8. List the distinctive features of cohort studies 9. Describe steps in conducting cohort studies with example a. Calculate and interpret relative risk for a given data b. Calculate and interpret attributable risk for a given data c. Calculate and interpret population attributable risk for a given data 10. List advantages and								

		disadvantages of cohort studies 11. List the aims of experimental epidemiological studies 12. List the advantages and disadvantages of animal studies 13. Describe the steps in conducting a randomized control trial with examples a. Classify blinding b. Describe the uses of blinding 14. Describe the concept of cross over type of study design with suitable examples 15. Describe various types of randomized control trials 16. List various non randomized trials 17. List five risk factor intervention trials								

CM 7.6	Enumerate and evaluate the need of screening tests	At the end of 3rd year MBBS the student should be able to 1. Define screening for diseases 2. List differences between screening and diagnostic tests 3. Describe concept of lead time 4. Describe uses of screening 5. Discuss types of screening 6. Enlist criteria for a disease to qualify for screening 7. Describe the criteria for a test to qualify to be a screening test 8. List 10 screening tests for various disease conditions 9. Define validity of a screening test 10. Define reliability of a screening test 11. Calculate and interpret	S	SH	Y	Problem based learning sessions, epidemiological exercises, Interpretation of charts and tables DOAP Sesions	Problem solving exercise MCQ's VIVA-VOCE			

		sensitivity of a screening test 12. Calculate and interpret specificity of a screening test 13. Calculate and interpret positive predictive value of a screening test 14. Calculate and interpret negative predictive value of a screening test 15. Calculate rate of false positive 16. Calculate the rate of false negative 17. List methods of evaluation of screening tests								
CM 7.7	**Describe and demonstrate the steps in the Investigation of an**	**At the end of 2nd year MBBS the student should be able to** 1. Define outbreak of infectious disease 2. Define epidemic 3. Describe types of epidemic	**S**	**SH**	**Y**	**Problem based learning sessions, epidemiological**	**Problem solving exercise OSPE MCQ's VIVA-**			

	epidemic of communicable disease and describe the principles of control measures	with suitable examples 4. List various epidemic prone diseases 5. Describe various steps involved in investigation of an outbreak of infectious disease 6. Draw and interpret epidemic curve for a given data on disease outbreak 7. Describe various prevention and control measures to be undertaken at the time of epidemic 8. Demonstrate the steps in investigation of epidemic in a simulated condition				**exercises, Interpretation of charts and tables, DOAP session**	**VOCE**			
CM 7.8	**Describe the principles of association, causation and biases in epidemiologi**	**At the end of 2nd year MBBS the student should be able to,** 1. Define association 2. Classify associations 3. Describe spurious association with suitable	**K**	**KH**	**Y**	**Lecture Seminar**	**Long essay**			

	cal studies	example 4. Describe indirect association with suitable example 5. Describe types of direct association with suitable examples 6. Describe the Bradford Hill Criteria for association and causation a. Describe temporality of association with suitable example b. Describe measures of strength of association c. Describe specificity of association with example d. Discuss biological plausibility with suitable example e. Describe coherence of association with suitable examples					**Short essay MCQ's VIVA-VOCE**			

		7. Describe various types of Bias in epidemiological studies 8. Describe the impact of bias on the outcome in epidemiological studies 9. Discuss the methods to prevent/control bias in epidemiological studies								
CM 7.9	**Describe and demonstrate the application of computers in epidemiology**	**At the end of 2nd year MBBS the student should be able to** 1. List the uses of computers in disease surveillance 2. List the uses of computer softwares in research designs 3. List various statistical softwares available for data management in epidemiology 4. Describe role of Geographic information system in health care	**S**	**KH**	**Y**	**Lecture, DOAP sessions**	**Short essay MCQ's VIVA-VOCE**			

		5. List uses of computers in health informatics 6. List the uses of electronic medical records								
Topic 8 : Communicable and Non-Communicable diseases										
CM 8.1	**Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for communicable diseases**	**At the end of 3rd year MBBS the student should be able to,** 1. Enlist the communicable diseases of public health concern 2. Describe the various epidemiological determinants of communicable diseases, their nature of transmission, role of incubation period in infectivity 3. Identifying and distinguishing the clinical features of each of these diseases 4. Describing the various epidemiological definitions coined by surveillance teams 5. Describe the laboratory	**K**	**KH**	**Y**	Lecture Field visits to PHC/UHC/IDSP/NPSP and examine these Communicable diseases, Outbreak investigation and their laboratory linkage Seminars Bed side clinics	Main Question/Short essay/ Short answers/ MCQs VIVA-VOCE OSCE – Demonstrate the understanding of communicable diseases epidemiology and diagnostic measures OSPE/			

		diagnosis and essential laboratory tests available at the primary care set up					OSCE station: Non observing station to demonstrate the steps of management of any communicable disease			
CM 8.2	**Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for Non-Communicable diseases (diabetes, Hypertension, Stroke, Obesity,**	**At the end of 3rd year MBBS the student should be able to,** 1. Enlist the NCD diseases of public health concern 2. Describe the various epidemiological determinants of Non-communicable diseases and their risk factors 3. Identifying and distinguishing the clinical features of each of these diseases 4. Describing the various epidemiological definitions coined for surveillance purpose 5. Describe the laboratory	**K**	**KH**	**Y**	Lecture Field visits to PHC/UHC/NCD clinic/Wellness centres and examine these Non-Communicable diseases, their investigation and	Written / MCQs VIVA-VOCE OSCE – OSPE/ Clinico-social case			

	Cancer, etc)	diagnosis and essential laboratory tests available at the primary care set up				laboratory linkage Clinico-social case Seminars Group discussion				
CM 8.3	**Enumerate and describe disease specific National Health Programs including their prevention and treatment of a case**	**At the end of 3rd year MBBS the student should be able to,** 1. Differentiate the prevention, control and treatment modalities for each of the communicable and non-communicable diseases 6. Interpret the goals and objectives of national health programs for each of these diseases	**K**	**KH**	**Y**	Seminars Lecture Clinico-social case discussion	Long Short essay/ Short answers/ MCQs VIVA-VOCE Clinico-social case presentation OSCE – OSPE/ OSCE station:			
CM 8.4	**Describe the principles and enumerate**	**At the end of 3rd year MBBS the student should be able to,** 1. Describe the principles	**K**	**KH**	**Y**	Lecture Visit to IDSP/NP	Long essay/Short essay/ Short			

	the measures to control a disease epidemic	and steps of outbreak investigation 2. Differentiate the primary and secondary preventive measures for each of the communicable and non-communicable diseases				SP/DTO office Field visit during Outbreak investigation Role play	answers/ MCQs VIVA-VOCE OSCE –			
CM 8.5	**Describe and discuss the principles of planning, implementing and evaluating control measures for disease at community level bearing in mind the public health importance of the disease**	**At the end of 3rd year MBBS, the student should be able to** 1. Understand the steps of Planning Cycle 2. Applying the steps of planning cycle in various control measures for diseases in the community 3. Get a hands-on experience in planning, executing and evaluating control measures for at least three diseases in a community	**K**	**KH**	**Y**	Lecture Group activity Visit to the community Group project for implementing interventions	Short essay/ Short answers/ MCQs Spotters VIVA-VOCE OSPE/ OSCE			
Topic 19: Essential Medicines										

CM19.1	Define and describe the concept of Essential Medicine List (EML)	1. Define essential medicines 2. Describe the concept of essential medicine list 3. List the importance of generic drugs in public health	K	KH	Y	Lecture SDL	Written Viva voce		Pharmacology	
CM19.2	Describe roles of essential medicine in primary health care	1. Discus the importance of essential drugs at Primary health care level 2. Describe various inventory management techniques at PHC level	K	KH	Y	Lecture SDL	Written Viva voce		Pharmacology	
CM19.3	Describe counterfeit medicine and its prevention	1. Define counterfeit medicine 2. Discuss various hazards associated with counterfeit medicines 3. Describe various strategies adapted for prevention of counterfeit medicine	K	KH	Y	Lecture SDL	Written Viva voce		Pharmacology	

PRACTICAL

1. Calculation and interpretation of various parameters measuring validity of a screening test
2. Calculation and interpretation of various indicators of morbidity and mortality
3. Calculation and interpretation of rates, ratios and proportions relevant to epidemiology and public health
4. Calculation and interpretation of various measures of central tendency and dispersion in a given set of data
5. Calculation and interpretation of elementary tests of significance in biostatistics
6. Presentation of data as tables and graphs
7. Describing steps in investigation of an outbreak/epidemic
8. Problem solving exercises for various communicable diseases using Problem based learning techniques
9. Preparing balanced diet chart for various persons with different health conditions
10. Identification and description of nutritional significance of various food items
11. Calculation of chlorine requirement for disinfection of water bodies
12. Identification of life stages of various vectors responsible for transmission of vector borne diseases

Clinical Postings (04 weeks)

Family Health Advisory survey to assess,

- Sociodemographic, environmental, nutritional, cultural factors influencing health and disease in rural/urban communities
- Understand various health needs, health demands and barriers for health seeking among families
- Compilation and presentation of data gathered from the family health advisory survey

Academic field visits to

- Water treatment plant
- District rehabilitation centre

- TB Unit
- Epidemic disease hospital
- Anganwadi centre

ASSESSMENT

One internal assessment examinations will be conducted in second year MBBS

A. Theory – 35 Marks
   i. MCQ- 10 Marks
   ii. Written examination – 25 Marks- 05 Short essays – 05 for five marks each

B. Practical - 15 Marks
   i. Spotters – 05 spotters for one mark each- Total 05 marks
   ii. Exercises on vital statistics, health indicators and fertility indicators – 02 in numbers with five marks each – total 10 marks

LEARNING RESOURCES – REFERENCE BOOKS

1. K. Park. Textbook of Preventive & Social Medicine. M/s Banarsidas Bhanot Publishers, Premnagar, Jabalpur - 482 001.
2. Sunderlal, Adarsh and Pankaj. Textbook of Community Medicine. CBS Publishers and Distributors, Daryaganj, New Delhi -110 002.
3. Roy Rabindranath, SahaIndranil. Mahajan & Gupta's Textbook of Preventive and Social Medicine. Jaypee Brothers Medical Publishers (P) Ltd., Daryaganj, New Delhi
4. AH Suryakantha. Community Medicine with Recent Advances. Jaypee Brothers Medical Publishers (P) Ltd., Daryaganj, New Delhi
5. IAPSM Text Book of Community Medicine. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi
6. DK Mahabalaraju. Essentials of Community Medicine Practicals. Jaypee Brothers Medical Publishers (P) Ltd., Daryaganj, New Delhi - 110 002.
7. Gopalan et al., Nutritive Value of Indian Food Stuffs - NIN/ICMR, Hyderabad.

Clinical Postings in Community Medicine in Second Professional Year

Goals

Goal of Community Medicine Posting in Second Professional Year is to orient the student towards community diagnosis and survey methodology (CM 2.1, CM, 2,2, CM 2.3 CM.17.1)

Objectives

1. Demonstrate the steps and perform clinico socio-cultural and demographic assessment of the individual, family and community (CM 2.1)
2. Demonstrate the socio-cultural factors, family (types), its role in health and disease & demonstrate in a simulated environment the correct assessment of socio-economic status (CM 2.2)
3. Understand the environmental and housing factors influencing health and disease at community setting (CM 3.5)
4. Describe and demonstrate in a simulated environment the assessment of barriers to good health and health seeking behavior (CM 2.3)
5. Describe and demonstrate the correct method of performing a nutritional assessment of individuals, families and the community by using the appropriate method (CM 5.2)
6. Describe and discuss the principles and demonstrate the methods of collection, classification, analysis, interpretation and presentation of statistical data (CM 6.2)
7. Understand organogram and functioning of various centers involved in primary health care and public health

Total duration of Postings in Community Medicine: 4 Weeks (3 Hours per day from Monday to Friday) – approximately = 60 Hours

Tentative Distribution of Posting Hours

Sl No	Item	Hours
1	Orientation to Community Medicine Postings	1
2	Orientation towards family health advisory survey	6
3	Community Orientation and family health advisory survey	12
4	Data entry	6
5	Data analysis interpretation	3
6	Presentation and Group discussion of survey	3
7	Orientation to field visits related to Public health	6
8	Field visits	18
9	Presentation and Group discussion on field visits	3
10	Reflection, feedback and Log Book verification	2

Teaching Learning Methods

1. DOAP Sessions
2. Field visits
3. Group discussion
4. Videos

Assessment

1. Participation in group discussions
2. Reflective writing
3. Log Book

OTORHINOLARYNGOLOGY (ENT)

1. Goals

The broad goal is to teach clinical skills in Otorhinolaryngology to undergraduate students to impart adequate knowledge & skills to identify, treat common disorders & emergencies in Otorhinolaryngology. The aim is to teach masterly dexterity in the examination of Ear, Nose, Pharynx&Larynx.

2. Objectives

(a) Knowledge:

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

I. Elicit, document & present on appropriate history in patient presenting with on ENT complaint
II. Demonstrate the correct use of headlamp, ENT OPD instruments in the examination of Ear, Nose &Throat
III. Identify & describe the use of commonly used instruments in ENT Surgeries.
IV. Knowledge of indications & steps involved in the performance of Otomicroscopic examination, Diagnostic Nasal Endoscopy, Rigid laryngoscopy.
V. Outline correct history, Clinical features, Investigations &Treatmentof common disease in Otorhinolaryngology – acute Suppurativeotitis Media, Chronic SuppurativeOtitis Media, Deviated Nasal Septum, Tonsillitis.

(b) Skills:

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

I. Analyze&interpret clinical history in common ENT disorders
II. Make use of ENT OPD Instruments to perform a detailed Ear, Nose, Throat examination
III. Demonstrate the skills of diagnosing & suggesting management for Common ENT disorders.

(c) . Integration:

Knowledge required in Otorhinolaryngology should help the students to integrate clinical skills in identifying& treating common disorders in ENT. There will also be an integrated approach to various other departments like Neurosciences, Ophthalmology, Oncology, Speech&Hearing.

(d) Course Outcome

At the end of the course, students should be able to understand, perform clinical examination with proper instruments, interpret common investigation & come out with a provisional diagnosis.

Teaching hours

4 weeks of clinical postings.
3 hours per day x 5 days= 15 hours per week
15 hours x 4 week= 60 hours

Sl. No.	Topic	Number of hours
1.	Introduction, History Taking	6 hours
2.	ENT OPD instruments	3 hours
3.	Examination of Ear	3 hours
4.	Examination of Nose	3 hours
5.	Examination of Throat	3 hours
6.	Common disorders in ENT	6 hours
7.	Acute Suppurative Otitis Media	6 hours
8.	Chronic SuppurativeOtitis Media	6 hours
9.	Deviated Nasal Septum	6 hours
10.	Tonsillitis	6 hours
11.	Diagnostic Nasal Endoscopy	3 hours
12.	Laryngoscopy	3 hours
13.	Otoendoscopy	3 hours
14.	Pure Tone Audiometry	3 hours
	Total:	60 hours

Competencies & Specific Learning Objectives withIntegration, Teaching Learning &Assessment method

Topic: Clinical Skills	**Number of competencies: (15) Number of procedures that require certification : (NIL)**					
EN2.1	Elicit document and present an appropriate history in a patient presenting with an ENT complaint	K/S/A/C	SH	Y	Lecture, Small group discussion, Demonstration	Skill assessment
EN2.2	Demonstrate the correct use of a headlamp in the examination of the ear, nose and throat	S	SH	Y	DOAP session	Skill assessment/ OSCE
EN2.3	Demonstrate the correct technique of examination of the ear including Otoscopy	K/S/A	SH	Y	DOAP session, Bedside clinic	Skill assessment/ OSCE
EN2.4	Demonstrate the correct technique of performance and interpret tuning fork tests	K/S/A	SH	Y	DOAP session, Bedside clinic	Skill assessment/ OSCE
EN2.5	Demonstrate the correct technique of examination of the nose & paranasal sinuses including the use of nasal speculum	S	SH	Y	DOAP session, Bedside clinic	Skill assessment/ OSCE
EN2.6	Demonstrate the correct technique of examining the throat including the use of a tongue depressor	S	SH	Y	DOAP session, Bedside clinic	Skill assessment/ OSCE
EN2.7	Demonstrate the correct technique of examination of neck including elicitation of laryngeal crepitus	S	SH	Y	DOAP session, Bedside clinic	Skill assessment

Number	COMPETENCY The student should be able to:	Domain K/S/A/ C	Level K/KH /SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
EN2.8	Demonstrate the correct technique to perform and interpret pure tone audiogram & impedance audiogram	K/S	SH	Y	DOAP session, Bedside clinic	Skill assessment			
EN2.9	Choose correctly and interpret radiological, microbiologi cal & histological investigation s relevant to the ENT disorders	K/S	SH	Y	Lecture, Small group discussion , DOAP session	Written/ Viva voce/ Skill assessment			
EN2.10	Identify and describe the use of common instruments used in ENT surgery	K	SH	Y	DOAP session, Bedside clinic	Skill assessment			

Topic: Diagnostic and Therapeutic procedures in ENT certification: (NIL)		Number of competencies:(06)				Number of procedures that require			
EN3.1	Observe and describe the indications for and steps involved in the performance of Otomicroscopic examination in a simulated environment	S	KH	N	Lecture, Small group discussion, Demonstration	Written/ Viva voce			

Number	COMPETENCY The student should be able to:	Domain K/S/A/C	Level K/KH/SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
EN3.2	Observe and describe the indications for and steps involved in the performance of diagnostic nasal Endoscopy	S	KH	N	Lecture, Small group discussion, Demonstration	Written/ Viva voce			
EN3.3	Observe and describe the indications for and steps involved in the performance of Rigid/Flexible Laryngoscopy	K	KH	N	Lecture, Small group discussion, Demonstration	Written/ Viva voce			

Topic: Management of diseases of ear, nose & throat Number of competencies: (53) Number of procedures that require certification : (NIL)									
EN4.1	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Otalgia	K/S	SH	Y	Lecture, Small group discussion, DOAP session, Bedside clinic	Written/ Viva voce/ Skill assessment			
EN4.3	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of ASOM	K/S	SH	Y	Lecture, Small group discussion, DOAP session, Bedside clinic	Written/ Viva voce/ Skill assessment			

Number	COMPETENCY The student should be able to:	Domain K/S/ A/C	Level K/KH/SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
EN4.4	Demonstrate the correct technique to hold visualize and assess the mobility of	K/S/ A	SH	Y	Clinical, Demonstration	Written/ Viva voce/ Skill			

	the tympanic membrane and its mobility and interpret and diagrammatically represent the findings					assessment			
EN4.6	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Discharging ear	K/S	SH	Y	Lecture, Small group discussion, DOAP session, Bedside clinic	Written/ Viva voce/ Skill assessment			
EN4.7	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of CSOM	K/S	SH	Y	Lecture, Small group discussion, DOAP session, Bedside clinic	Written/ Viva voce/ Skill assessment			

Number	COMPETENCY The student should be able to:	Domain K/S/A/C	Level K/KH/SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
EN4.22	Elicit document and present a correct history demonstrate and describe	K/S	SH	Y	Lecture, Small group	Written/ Viva voce/ Skill			

	the clinical features, choose the correct investigations and describe the principles of management of squamosal type of Nasal Obstruction				discussion, Demonstration	assessment			
EN4.23	Describe the clinical features,investigations and	K	KH	Y	Lecture, Small group discussion, Demonstration	Written/ Viva voce/ Skill assessment			
EN4.39	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of squamosal type of Acute & Chronic Tonsillitis	K/S	SH	Y	Lecture, Small group discussion, DOAP session, Bedside clinic	Written/ Viva voce/ Skill assessment			

Assessment:

At the end of 4 weeks of clinical postings one practical internal assessment will be conducted with maximum marks of 20

Recommended text books

1. Diseases of ear, Nose & throat & Head& Neck Surgery by PL DHINGRA 7th Edition.
2. Disease of Ear, Nose & Throat by Mohan Bansal
3. Practical ENT Book by Vikas Sinha

Reference textbooks

4. Scott Brown's Otorhinolaryngology Head & Neck Surgery Eight edition

OPHTHALMOLOGY

1. **Goal-**

The broad goal of teaching an undergraduate in ophthalmology in professional II is to provide adequate knowledge and impart skills in identifying common eye problems prevalent in the community, their typical presentations, diagnosis and outline of treatment for the same

2. **Objectives**

At the end of the clinical postings in professional II, the learner should be able to

A. Knowledge

1. Describe the anatomy of eyeball and enumerate the different components of the same. The learner should also have an adequate knowledge of the applied aspects of various anatomical parts of the eye
2. Enumerate and know various presenting complaints of a patient visiting an ophthalmologist for consultation
3. Define visual acuity and describe the various tests used to record distance vision, near vision and colour vision
4. Define pin hole and describe the clinical importance of its use
5. Enumerate the causes, describe and discuss the aetiology, clinical presentations and diagnostic features of common conditions of the lid and adnexa including Hordeolum externum/ internum, blepharitis, lagopthalmos etc
6. Describe various causes of watering and lacrimal syringing
7. Define red eye, describe its various causes and outline the management of the same
8. Define pterygium and describe its ocular features, etiology, differential diagnosis and outline its management
9. Define cataract and enumerate the etiological factors
10. Describe the different stages of cataract maturation and its clinical features and complications
11. Enumerate the types of cataract surgery and describe the steps broadly
12. Describe normal pupillary reflexes and enumerate the abnormal ones
13. Enumerate the intra and extraocular muscles of the eye and their various actions
14. Enumerate the different causes for avoidable blindness and list the national programs for control of blindness

B. Skills

1. Demonstrate different parts of eyeball using torch light
2. To elicit, document, interpret and present appropriate history in a patient presenting with ocular complaints
3. Perform visual acuity assessment using Snellen chart for distance vision, near vision and perform colour vision tests
4. Demonstrate torch light examination on various structures of the eye and identify gross abnormalities
5. Demonstrate the method of examination in red eye including type of congestion, vision assessment, corneal reflexes and pupil

6. Demonstrate the presence of cataract using torch light examination in cases of advanced cataract
7. Demonstrate the correct technique of examination of cataract and its various stages
8. Demonstrate normal pupillary responses using torch light
9. Demonstrate the correct method of checking extraocular movements
10. Demonstrate the correct technique of regurgitation on pressure over lacrimal sac area in cases of lacrimal sac disorders

C. Affective domain
1. Demonstrate empathy while communicating with patients and their attenders during history taking and clinical examination.
2. Communicate effectively with peers, teachers, post graduates and non teaching staff during clinical postings

D. Integration
1. Knowledge to be acquired with respect to anatomy and its applied aspects can be done with Department of Anatomy
2. Clinical skills like vision assessment, field of vision, colour vision and pupillary reflexes can be done with the department of Physiology
3. Nutritional aspects and various national programs can be taught in combination with department of Community Medicine

Outcome at the end of clinical postings in Professional 2-

The students should be able to understand the basic anatomy, broad outline of the common diseases and their clinical features and basic clinical examination with a few instruments, interpret common investigations and come out with a provisional diagnosis

Teaching hours

Number	Competency	Domain K/S A/C	Level K/KH/ SH/P	Core Y/N	Teaching learning method	Assessment method	Certification	Vertical integration	Horizontal integration
OP1.1	Describe the physiology of vision	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Physiology	
OP 1.3	Demonstrate the steps in	S	SH	Y	DOAP	Skill			

	performing the visual acuity assessment for distance vision, near vision, colour vision, the pin hole test and the menace and blink reflexes				session Lecture	assessment Log book			
OP 2.1	Enumerate the causes, describe and discuss the aetiology, clinical presentations and diagnostic features of common conditions of the lid and adnexa including Hordeolum externum/ internum, blepharitis, preseptal cellulitis, dacryocystitis, hemangioma, dermoid, ptosis, entropion, lid lag, lagopthalmos	K	KH	Y	Lecture Small group discussion	Written/viv a voce			Human anatomy
OP 2.2	Demonstrate the symptoms & clinical signs of conditions enumerated in OP2.1	S	S	Y	DOAP session	Skill assessment			
OP 2.3	Demonstrate under supervision clinical procedures performed in the lid including: bells phenomenon, assessment of entropion/	S	SH	Y	DOAP session Lecture	Skill assessment			

	ectropion, perform the regurgitation test of lacrimal sac. massage technique in cong. dacryocystitis, and trichiatic cilia removal by epilation								
OP 3.1	Elicit document and present an appropriate history in a patient presenting with a “red eye” including congestion, discharge, pain	S	SH	Y	DOAP session	Skill assessment			
OP 3.2	Demonstrate document and present the correct method of examination of a “red eye” including vision assessment, corneal lustre, pupil abnormality, ciliary tenderness	S	SH	Y	DOAP session	Skill assessment			
OP 3.6	Describe the aetiology, pathophysiology, ocular features, differential diagnosis, complications and management of pterygium	K	KH	Y	Lecture Small group discussion	Written Viva voce			
OP 7.2	Describe and discuss the aetio-pathogenesis, stages of maturation and complications of cataract	K	KH	Y	Lecture Small group discussion	Written Viva voce			

OP 7.3	Demonstrate the correct technique of ocular examination in a patient with a cataract	S	SH	Y	DOAP session	Skill assessment			
OP 7.4	Enumerate the types of cataract surgery and describe the steps, intra-operative and post-operative complications of extracapsular cataract extraction surgery.	S	KH	Y	DOAP session Lecture small group discussion	Written Viva voce			
OP 9.1	Demonstrate the correct technique to examine extra ocular movements (Uniocular & Binocular	S	P	Y	DOAP session	Skill assessment			
OP 9.4	Enumerate, describe and discuss the causes of avoidable blindness and the National Programs for Control of Blindness (including vision 2020)	K	KH	Y	Lecture Small group discussion	Written/viva voce			
PY 10.20	Demonstrate testing of visual acuity, colour and field of vision in volunteer/ simulated environment	S	P	Y	DOAP sessions	Skill assessment/ viva voce			

Assessments

At the end of clinical postings, an assessment will be held where in the student will be asked to present a case given to him covering all aspects including provisional diagnosis and probable line of management

During the viva, the student may be asked to perform bedside testing covering the basic ophthalmic examination

List of recommended text books

Comprehensive ophthalmology- A K Khurana- 7th Edition

Undergraduate ophthalmology- M vanathi, Zia Chaudhari

Clinical methods in ophthalmology; A practical manual for medical students – Dadapeer K

Reference books

Parson's diseases of the eye- edited by RamanjitSihota, Radhika Tandon- 23rd edition

Kanski clinical Ophthalmology – 8th edition