

CURRICULUM

MINIMUM TEACHING HOURS

Lectures: 80hrs

Small group learning (tutorials/seminars): 138hours- (**Practical:** 80 hours &**SGD:** 58 hours)

Self-directed learning: 12 hours

Total: 230 hours

THEORY:

Sno	Topic	Competency	Theor y	SGD	SDL	Procedures requiring certification
1	General Pharmacology Toxicology Clinical Pharmacology and rational drug use	PH 1.1 to PH 1.121	6	0		Nil
2	Autonomic Nervous System	PH 1.13, PH1.14	9	2	0	Nil
3	Autacoids	PH 1.16	3	2	1	Nil
4	Drugs in anaesthetic practice	PH 1.15, PH1.17 to PH 1.18	4	0	0	Nil
5	Central Nervous System	PH 1.19 to PH 1.23	8	4	0	Nil
6	Diuretics	PH 1.24	3	1	1	Nil
7	Drugs affecting blood and blood formation	PH 1.25, PH 1.35	3	2	2	Nil
8	Cardiovascular System	PH 1.26 to PH 1.31	9	2	3	Nil
9	Respiratory System:	PH 1.32 to PH 1.33	2	1	0	Nil
10	Gastrointestinal System	PH 1.34	1	2	1	Nil
11	Endocrine System	PH 1.36 to PH 1.41	8	4	1	Nil
12	Chemotherapy	PH 1.42 to PH 1.49	17	5	0	Nil
13	Miscellaneous	PH 1.50 to PH 1.64	3	5	3	Nil
	CBME requirement		80 hour s	36 hours	12 hours	Nil

Practicals

Experimental Pharmacology	PH 4.1	Administer drugs through various routes in a simulated environment using mannequins	10 hours
	PH 4.2	Demonstrate the effects of drugs on blood pressure (vasopressor and vaso-depressors with appropriate blockers) using CAL	6 hours
Communication	PH5.1	Communicate with the patient with empathy and ethics on all aspects of drug use	SGD2hours
	PH5.2	Communicate with the patient regarding optimal use of a) drug therapy, b) devices and c) storage of medicines	SGD4hours
	PH5.3	Motivate patients with chronic diseases to adhere to the prescribed management by the health care provider	SGD4hours
	PH5.4	Explain to the patient the relationship between cost of treatment and patient compliance	SGD2hours
	PH5.5	Demonstrate an understanding of the caution in prescribing drugs likely to produce dependence and recommend the line of management	SGD4hours
	PH5.6	Demonstrate ability to educate public & patients about various aspects of drug use including drug dependence and OTC drugs	SGD4hours
	PH5.7	Demonstrate an understanding of the legal and ethical aspects of prescribing drugs	SGD2hours
CBME requirement			Practicals -80 hours SGD-22 hours

C- Needs certification- 4 no

L- Needs Maintenance of a log book- 3 no.

Note: Spotters can be done concomitantly during the teaching hours.

THEORY

(Competency no-1.1 to 1.64)

General pharmacological Principles

Lecture - 1 Hour

Assessment: Written, Vivavoce

PH 1.1 Define and describe the principles of pharmacology and pharmacotherapeutics

- 1.1.1 Define a drug
- 1.1.2 Explain the terms Pharmacology, clinical pharmacology & therapeutics
- 1.1.3 Enlist and explain about various branches of Pharmacology
- 1.1.4 List out sources of drugs with examples
- 1.1.5 List out sources of drug information & Explain each source briefly
- 1.1.6 Recognize the importance of Clinical pharmacology towards rational approach to prescribing medicine
- 1.1.7 Explain the evolution of Pharmacology from medieval to contemporary times

SGD - 1 Hour

Assessment: Written, Viva voce

PH 1.2 Describe the basis of Evidence based medicine and Therapeutic drug monitoring Evidence based Medicine

- 1.2.1 Identify reliable sources for research evidence
- 1.2.2 Understand research study designs and the hierarchy for research evidence
- 1.2.3 Ascertain strength of evidence for treatments and understand guidelines in different therapeutic areas
- 1.2.4 Explain the importance of keeping prescribing practice up to date with advances in medical knowledge

Therapeutic Drug Monitoring

- 1.2.5 Understand the purpose of TDM
- 1.2.6 Explain the methods in therapeutic drug monitoring
- 1.2.7 Enlist the drugs that require TDM
- 1.2.8 Understand the purpose for and methods in therapeutic drug monitoring
*TDM to be covered after PK/PD

SGD/Practical - 1 Hour

Assessment: Written, Viva voce

PH 1.3 Enumerate and identify drug formulations and drug delivery systems

- 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

Lecture - 5 Hours

Assessment: Written, Viva voce

PH 1.4 Describe absorption, distribution, metabolism & excretion of drugs

Pharmacokinetics (PK)

1.4.1 Explain the term Pharmacokinetics

1.4.2 Explain the four phases of PK

1.4.3 Explain why the understanding of PK is relevant to prescribers

Drug Absorption

1.4.4 Explain the principles involved in drug absorption

1.4.5 Explain the concept of bioavailability and describe the factors affecting bioavailability

1.4.6 Describe the importance of bioequivalence

Drug Distribution

1.4.7 Explain the distribution of drugs across body compartments

1.4.8 Define apparent volume of distribution

1.4.9 Explain the clinical significance of drug distribution

1.4.10 Explain the clinical significance of plasma protein binding of drugs

1.4.11 Describe redistribution of drugs with clinical application

Biotransformation

1.4.12 Define biotransformation

1.4.13 Describe first pass metabolism and its importance

1.4.14 Describe phase 1 and phase 2 reactions

1.4.15 Explain factors affecting biotransformation

1.4.16 Explain the clinical significance of enzyme induction and inhibition

Drug Excretion

1.4.17 Describe the various routes of excretion of drugs

1.4.18 Explain factors affecting renal excretion

1.4.19 Explain plasma half-life and its clinical significance

1.4.20 Explain steady state concentration and its significance

1.4.21 Explain the different kinetics of elimination and their clinical significance

1.4.22 Apply the knowledge of clearance, loading dose and maintenance dose in calculating the dose for a patient

1.4.23 Explain various methods of prolonging drug action

1.4.24 Explain the PK factors that determine the choice of dose, route, and frequency of Drug administration.

Lecture/SGD - 4 Hours

Assessment: Written, Viva voce

PH 1.5 Describe general principles of mechanism of drug action Pharmacodynamics

- 1.5.1 State different mechanisms by which a drug acts giving an example of each
- 1.5.2 Enlist different types of receptors giving examples of drugs acting through them
- 1.5.3 Explain the terms – ‘up regulation’ and ‘down regulation’ of receptors
- 1.5.4 Explain the terms –affinity, efficacy, intrinsic activity & potency
- 1.5.5 Define the terms –agonist, antagonist, partial agonist & inverse agonist.
Give examples of drugs for each
- 1.5.6 Describe dose-response relationship and interpret dose- response curves
- 1.5.7 Explain drug synergism with examples
- 1.5.8 Describe the different types of drug antagonism with examples
- 1.5.9 Describe factors modifying drug action and its clinical implications
- 1.5.10 Explain therapeutic index and therapeutic range with clinical significance

SGD/ Practical - 1 Hour

Assessment: Written, Viva voce

PH 1.6 Describe principles of Pharmacovigilance & ADR reporting systems

- 1.6.1 Define the basic terminologies (ADR, Serious ADR, AE, Toxicity, Pharmacovigilance and Causality assessment)
- 1.6.2 Explain the history, need and principles of pharmacovigilance
- 1.6.3 Discuss various methods/systems of ADR reporting
- 1.6.4 Discuss Pharmacovigilance program of India
- 1.6.5 Report ADRs to a Pharmacovigilance Centre by filling the ADR reporting form
- 1.6.6 Discuss the importance of prescriber’s responsibility in Pharmacovigilance

SGD - 1 Hour

Assessment: Written, Viva voce

PH 1.7 Define, identify and describe the management of adverse drug reactions (ADR)

- 1.7.1 Define an ADR
- 1.7.2 Explain the frequency of ADRs and their impact on public health
- 1.7.3 Describe the common classification of ADRs with examples
- 1.7.4 Describe the management of ADRs.
- 1.7.5 Describe the important risk factors that predict susceptibility to ADRs.
- 1.7.6 Explain the importance of monitoring in prevention of ADRs.

SGD - 1 Hour

Assessment: Written, Viva voce

PH 1.8 Identify and describe the management of drug interactions

- 1.8.1 Define Drug interactions.
- 1.8.2 Describe the types of Drug interactions as In vivo, In vitro & PK and

PD with suitable examples

1.8.3 Describe the useful and harmful drug interactions with suitable examples

1.8.4 Describe Drug–drug; drug-food; Drug-alcohol; drug–tobacco; Drug- complementary/alternative medicine interactions with examples

1.8.5 Explain how to predict and avoid harmful drug interactions in clinical practice

1.8.6 Management of DI.

1.8.7 Identify the sources of information about DI to inform prescribing

SGD - 1 Hour

Assessment: Written, Viva voce

PH 1.9 Describe nomenclature of drugs i.e. generic, branded drugs

1.9.1 Describe the chemical name, non-proprietary and Proprietary name of a drug

1.9.2 Discuss the importance of using non-proprietary name in prescribing.

SGD - 1 Hour

Assessment: Written, Viva voce

PH 1.10 Describe parts of a correct, complete and legible generic prescription. Identify errors in prescription and correct appropriately

1.10.1 Define a prescription along with the importance of each part of prescription

1.10.2 Describe the format of prescription as per MCI model.

1.10.3 Write an unambiguous, legible, complete and legally valid prescription

1.10.4 Identify and correct prescription writing errors

1.10.5 Describe the importance of maintaining records of prescriptions.

SGD - 1 Hour

Assessment: Written, Viva voce

PH 1.11 Describe various routes of drug administration, eg: oral, SC, IV, IM, SL

1.11.1 List the various routes of drug administration-oral, parenteral and topical with examples

1.11.2 Describe the merits and de-merits of each route

1.11.3 Choose the correct route of drug administration in a given clinical scenario

SGD/Practical - 1 Hour

Assessment: Written, Viva voce

PH 1.12 Calculate the dosage of drugs using appropriate formulae for an individual patient, including children, elderly and patient with renal dysfunction

1.12.1 Calculate appropriate doses for individual patients based on age, body weight, and surface area.

1.12.2 Calculate the dose of drug using appropriate formulae in a given clinical case in children

1.12.3 Calculate the dose of drug using appropriate formulae in a given clinical case in elderly

1.12.4 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.

Drugs acting on Autonomic Nervous system

Lecture/SGD- 6/3

HoursAssessment: Written, Viva voce

PH 1.13 Describe mechanism of action, types, doses, side effects, indications and contraindications of adrenergic and anti- adrenergic drugs

- 1.13.1 Describe the organization of autonomic nervous system
- 1.13.2 Describe the steps involved in neurotransmission
- 1.13.3 Describe the synthesis, storage, release and fate of adrenergic transmitters
- 1.13.4 Classify adrenergic receptors with respect to their structure, localization and second messenger system

Adrenergic drugs

- 1.13.5 Classify adrenergic agonists based on their therapeutic uses and actions.
- 1.13.6 Describe the pharmacological effects of adrenaline and correlate the effects of their therapeutic uses and adverse effects
- 1.13.7 State the salient Pharmacokinetic features of adrenaline
- 1.13.8 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.)
- 1.13.9 Compare and contrast directly and indirectly acting sympathomimetics with examples
- 1.13.10 State the therapeutic uses and ADRs of indirectly acting sympathomimetics
- 1.13.11 State the precautions and contraindications of sympathomimetics

Antiadrenergic drugs

- 1.13.12 Classify alpha-adrenergic receptor antagonists, and compare and contrast selective alpha₁ antagonists with non-selective alpha antagonists
- 1.13.13 Describe the pharmacological effects and applied pharmacokinetics, ADRs, precautions and therapeutic uses of prazosin
- 1.13.14 State the advantages of other selective alpha₁ antagonists over prazosin, correlating the same with their therapeutic use
- 1.13.15 Classify beta-adrenergic receptor antagonists with examples
- 1.13.16 Describe the pharmacological effects, pharmacokinetics, ADRs, precautions and contra- indications of beta-adrenergic receptor antagonists
- 1.13.17 State the therapeutic uses of beta-blockers giving pharmacological basis for their use
- 1.13.18 State the advantages of selective beta₁ antagonists over non selective beta antagonists correlating the same with their therapeutic uses and ADRs
- 1.13.19 Mention the beta blockers with (ISA) intrinsic sympathomimetic activity giving their advantages and indications
- 1.13.20 Mention the beta blocker of choice with rationale for the following clinical

- conditions- Glaucoma, CHF, angina, hypertension, thyrotoxicosis, pheochromocytoma, arrhythmias
- 1.13.21 List the various preparations of beta blockers with their routes of administration. (State the beta-blockers that can be given by IV route)

Lecture - 3 Hours

Assessment: Written, Viva voce

PH 1.14 Describe mechanism of action, types, doses, side effects, indications and contraindications of cholinergic and anticholinergic drugs

Cholinergic transmission and Cholinergic drugs

- 1.14.1 Describe the synthesis, storage, release and fate of cholinergic transmitters
- 1.14.2 List the sites where acetylcholine is released
- 1.14.3 Classify cholinergic receptors with their structure, localization and second messenger system
- 1.14.4 Classify cholinomimetic drugs
- 1.14.5 Describe the pharmacological effects of directly acting cholinomimetic drugs
- 1.14.6 Compare the effects of muscarinic agonists on the basis of selectivity and therapeutic uses, adverse effects and contraindications
- 1.14.7 Describe the metabolism of acetylcholine
- 1.14.8 Classify anti-cholinesterase agents
- 1.14.9 Compare the various reversible anti-cholinesterases with respect to their pharmacological properties and therapeutic uses
- 1.14.10 Outline the management of myasthenia gravis
- 1.14.11 State the signs and symptoms of organophosphate compound poisoning
- 1.14.12 Outline the treatment of organophosphorus poisoning with rationale
- 1.14.13 Explain the term enzyme aging and its clinical significance
- 1.14.14 Explain how the treatment of organochlorine compound poisoning differs from that of organophosphate compound poisoning

Anticholinergic drugs

- 1.14.15 Classify cholinergic receptor antagonists giving examples of muscarinic and nicotinic (N_n: ganglion, N_m: Neuromuscular) blockers
- 1.14.16 List the anticholinergic side effects
- 1.14.17 Compare and contrast atropine and hyoscine
- 1.14.18 State the salient pharmacokinetic features of atropine and its substitutes
- 1.14.19 List the adverse drug reactions of anticholinergic drugs
- 1.14.20 List the contraindications to anticholinergic drugs
- 1.14.21 State the advantages of atropine substitutes over atropine and state their clinical uses giving suitable examples
- 1.14.22 List the major clinical indications of atropine

Skeletal Muscle Relaxants

Lecture - 1 Hour

Assessment: Written / Viva voce

PH 1.15 Describe mechanism/ s of action, types, doses, side effects, indications and contraindications of skeletal muscle relaxants

- 1.15.1 Define skeletal muscle relaxant.
- 1.15.2 Classify skeletal muscle relaxants.
- 1.15.3 Explain mechanisms of action of skeletal muscle relaxants
- 1.15.4 Compare and contrast (competitive) non-depolarizing blockers and persistent depolarizing blockers.
- 1.15.5 Describe the pharmacokinetics of skeletal muscle relaxants.
- 1.15.6 Uses of skeletal muscle relaxants.
- 1.15.7 Describe the important drug interactions and adverse effects that occur with skeletal muscle relaxants.
- 1.15.8 Discuss the advantages of newer neuromuscular blockers over the older ones.
- 1.15.9 Compare centrally and peripherally acting skeletal muscle relaxants.

Autocoids and related Drugs

Lecture/SGD/SDL -3/4/1 Hour

Assessment: Written / Viva voce

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-histaminic, 5-HT modulating drugs, NSAIDs, drugs for gout, anti-rheumatic drugs, drugs for migraine

Histamine and Antihistaminics

- 1.16.1 Understand the role of histamine and bradykinin in various physiological and pathophysiological processes.
- 1.16.2 Understand the mechanisms of action of drugs that act as antagonists of the H₁ receptor.
- 1.16.3 Know the therapeutic utility of H₁-receptor antagonists, alone and in combination with other agents.
- 1.16.4 Know the important adverse effects of H₁-receptor antagonists, and the difference between first- and second-generation H₁ antihistamines with regard to adverse effects.
- 1.16.5 Outline the treatment of Vertigo.

5-Hydroxytryptamine, its Antagonists and Drug Therapy of Migraine

- 1.16.6 Describe the synthesis, storage and destruction of 5-Hydroxytryptamine.
- 1.16.7 Name and describe the salient features of important 5-HT receptor subtypes.
- 1.16.8 Describe the pharmacological actions and pathophysiological roles of 5-Hydroxytryptamine
- 1.16.9 Describe drugs affecting 5HT system.
- 1.16.10 Describe mechanism of action, therapeutic uses and side effects of 5HT modulating drugs.
- 1.16.11 Understand the pathophysiology of migraine.
- 1.16.12 Describe the mechanism of action, adverse effects, contraindications and important drug interactions of anti-migraine drugs
- 1.16.13 Describe the management of migraine and the drugs used for prophylaxis of migraine

Non-steroidal Anti-inflammatory Drugs and Antipyretic-Analgesics

- 1.16.14 Classify Non-steroidal Anti-inflammatory drugs based on selectivity of COX enzyme.
- 1.16.15 Explain mechanisms of action of NSAIDs.
- 1.16.16 Compare and contrast features of nonselective COX inhibitors and selective COX-2 inhibitors and enumerate the concerns with selective COX 2 inhibitors.
- 1.16.17 Describe pharmacokinetics and pharmacological actions of NSAIDs.
- 1.16.18 Describe the therapeutic uses of NSAIDs and enumerate doses of most commonly used NSAIDs.
- 1.16.19 List out the adverse effects, drug interactions and necessary precautions and contraindications to be followed with NSAIDs.
- 1.16.20 Outline the management of Salicylate poisoning and Paracetamol poisoning.
- 1.16.21 Describe guidelines for choice of non-steroidal anti-inflammatory drugs.
- 1.16.22 Enumerate the analgesic combinations in common use and discuss about topical NSAIDs.
- 1.16.23 Discuss the rationality of analgesic combinations and topical NSAIDs.

Anti-rheumatoid and Anti-gout Drugs

- 1.16.24 Explain pathophysiology of rheumatoid arthritis and understand the goals of drug therapy in rheumatoid arthritis.
- 1.16.25 Classify drugs used in rheumatoid arthritis.
- 1.16.26 Describe the mechanism of action and pharmacological actions of antirheumatic drugs.
- 1.16.27 Describe the adverse effects of antirheumatic drugs and enumerate the doses of commonly used antirheumatic drugs.
- 1.16.28 Explain the pathophysiology of Gout.
- 1.16.29 Classify drugs used for Gout.
- 1.16.30 Describe mechanism of action and pharmacological actions of drugs used for Gout.
- 1.16.31 Describe the therapeutic uses of drugs used for Gout and enumerate the doses of commonly used drugs for Gout.
- 1.16.32 Discuss the adverse effects, precautions and contraindications of drugs used for Gout.
- 1.16.33 Explain the management of Gout.

Local Anaesthetics

Lecture - 1 Hour

Assessment: Written / Viva voce

PH 1.17 Describe the mechanism/ s of action, types, doses, side effects, indications and contraindications of local anaesthetics

- 1.17.1 Define local anaesthetics.
- 1.17.2 Classify local anaesthetics.
- 1.17.3 Distinguish between the comparative features of general and local anaesthesia.
- 1.17.4 Compare features of amide linked local anaesthetics and ester linked local anaesthetics.
- 1.17.5 Describe mechanism of action, local and systemic actions of local anaesthetics.
- 1.17.6 Describe pharmacokinetics and enumerate the doses of commonly used local anaesthetics.
- 1.17.7 Describe the adverse effects, precautions and drug interactions with local anaesthetics.

- 1.17.8 Describe the indications for local anaesthetics and various dosage forms of lignocaine.
- 1.17.9 Describe the techniques of administration of local anaesthetics and their relevance in clinical practice.
- 1.17.10 Explain the complications of spinal anaesthesia.
- 1.17.11 Explain rationale of combining local anaesthetics with adrenaline and clinical significance

General Anaesthetics

Lecture - 2 Hours

Assessment: Written / Viva voce

PH 1.18 Describe the mechanism/ s of action, types, doses, side effects, indications and contraindications of general anaesthetics, and pre-anaesthetic medications

- 1.18.1 Define general anaesthesia and explain stages of General Anaesthesia.
- 1.18.2 Describe the mechanisms of action of general anaesthetics.
- 1.18.3 Enumerate the properties of ideal general anaesthetics
- 1.18.4 Classify general anaesthetics
- 1.18.5 Explain the pharmacokinetics of general anaesthetics.
- 1.18.6 Describe the pharmacological actions and important adverse effects of general anaesthetics.
- 1.18.7 Enumerate the complications and the important drug interactions with general anaesthetics.
- 1.18.8 Define preanaesthetic medication with the aims of preanaesthetic medication and rationality of use of drugs as preanaesthetic medication.
- 1.18.9 What is balanced anaesthesia and components
- 1.18.10 Compare and contrast nitrous oxide and halothane
- 1.18.11 Enumerate intravenous anaesthetic agents

Central Nervous System

Lecture/SGD: 8/1

Hours Assessment: Written / Viva

voce

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- manic, opioid agonists and antagonists, drugs used for neurodegenerative disorders, anti-epileptics drugs)

Sedatives – hypnotics/ Anxiolytic drugs

- 1.19.1 Define Sedatives and Hypnotics.
- 1.19.2 Describe the different phases of Sleep.
- 1.19.3 Classify Sedative and Hypnotics.
- 1.19.4 Describe the mechanism of action, pharmacokinetics and pharmacological actions of Sedative hypnotics.
- 1.19.5 Describe adverse effects and precautions with long term use and important drug interactions with Sedative and Hypnotics.
- 1.19.6 Describe therapeutic uses of Sedative and Hypnotics.

- 1.19.7 Describe the management of different types of Insomnia.
- 1.19.8 Describe the management of Sedative and Hypnotic overdose.
- 1.19.9 Discuss the use of melatonin for disturbed biorhythms and sleep disorders.
- 1.19.10 Define Anxiety and Anxiolytics.
- 1.19.11 Classify Anxiolytics.
- 1.19.12 Describe pharmacological actions of Anxiolytics.
- 1.19.13 Describe the management of Anxiety
- 1.19.14 Enumerate doses of commonly used sedative hypnotics & anxiolytics.

Antipsychotic drugs

- 1.19.15 Define Psychosis. And enumerate the different types of Psychiatric illness.
- 1.19.16 Explain the pathophysiology of Psychoses.
- 1.19.17 Classify Psychotropic drugs and Antipsychotic drugs.
- 1.19.18 Describe the pharmacokinetics, mechanism of action and pharmacological actions of Antipsychotic drugs.
- 1.19.19 Describe the adverse effects and drug interactions of Antipsychotic drugs.
- 1.19.20 Describe the therapeutic uses of Antipsychotic drugs.
- 1.19.21 Explain the advantages of second-generation Antipsychotics over conventional drugs.

Anti-depressants and Antimanic Drugs

- 1.19.22 Define Depression.
- 1.19.23 Explain the pathophysiology of Depression.
- 1.19.24 Classify Antidepressant drugs.
- 1.19.25 Describe the mechanism of Antidepressant action.
- 1.19.26 Describe the pharmacokinetics and pharmacological actions of Antidepressants.
- 1.19.27 Describe the adverse effects and drug interactions with Antidepressants.
- 1.19.28 Outline the management of acute poisoning with tricyclic antidepressants.
- 1.19.29 Describe therapeutic uses of Antidepressants including those other than depression.
- 1.19.30 Define Mania.
- 1.19.31 Explain the pathophysiology of Mania.
- 1.19.32 Classify Antimanic drugs.
- 1.19.33 Describe mechanisms of action of Lithium.
- 1.19.34 Describe the pharmacokinetics and pharmacological actions of Lithium.
- 1.19.35 Describe the adverse effects and drug interactions of Lithium.
- 1.19.36 Describe the therapeutic uses of Lithium and newer drugs used for mania with their status in management of mania
- 1.19.37 Describe Psychotomimetic drugs.

Opioid Analgesics and Antagonists

- 1.19.38 Define Algesia (Pain). classify pain, Explain the pain pathway and WHO pain ladder.
- 1.19.39 Define and Classify Analgesics.
- 1.19.40 Classify Opioid Agonists and Antagonists.
- 1.19.41 Describe mechanism of action of Opioid Analgesics.
- 1.19.42 Describe pharmacokinetics and pharmacological actions of Opioid Analgesics.
- 1.19.43 Describe adverse effects, precautions and contraindications with Opioid analgesics.
- 1.19.44 Describe types of Opioid receptors.
- 1.19.45 Explain about complex action Opioids- Nalorphine, Pentazocine, Butorphanol, Nalbuphine, Buprenorphine.

- 1.19.46 Describe pure Opioid antagonists and their therapeutic uses.
- 1.19.47 Enumerate endogenous Opioid peptides.
- 1.19.48 Discuss opioid deaddiction
- 1.19.49 Explain treatment of morphine poisoning

Anti-epileptic drugs

- 1.19.50 Describe Epilepsy and the types of Epilepsy.
- 1.19.51 Classify Antiepileptic drugs.
- 1.19.52 Explain the pathophysiology of Epilepsy.
- 1.19.53 Describe mechanism of action and pharmacological actions of Antiepileptic drugs.
- 1.19.54 Describe the adverse effects and important drug interactions of Antiepileptic drugs.
- 1.19.55 Explain the management of different types of Epilepsy including Status Epilepticus.
- 1.19.56 Enumerate the doses of commonly used Antiepileptic drugs.
- 1.19.57 Mention the non-epileptic uses of anti-epileptic drugs

Drugs for Neurodegenerative disorders – Antiparkinsonian drugs and Cognition enhancers

- 1.19.58 Describe Parkinsonism and its pathophysiology.
- 1.19.59 Classify Antiparkinsonian drugs.
- 1.19.60 Describe mechanism of action of Antiparkinsonian drugs.
- 1.19.61 Describe pharmacokinetics and pharmacological actions of Antiparkinsonian drugs.
- 1.19.62 Describe the adverse effects and their management, important drug interactions of Levodopa
- 1.19.63 Describe Alzheimer's disease and its pathophysiology.
- 1.19.64 Classify Cognition enhancers.
- 1.19.65 Describe drugs used in Alzheimer's disease

Alcohol

SGD - 1 Hour

Assessment: Written / Viva voce

PH 1.20 Describe the effects of acute and chronic ethanol intake

- 1.20.1 Classify alcoholic beverages based on their alcohol content
- 1.20.2 Describe pharmacological effects of acute and chronic ethanol intake.
- 1.20.3 Describe the pharmacokinetics of ethanol.
- 1.20.4 Describe the important drug interactions with ethanol principles of alcohol deaddiction.
- 1.20.5 Describe drugs used in alcohol deaddiction
- 1.20.6 Explain the therapeutic uses of alcohol.

Methanol and Ethanol poisoning

SGD - 1 Hour

Assessment: Written / Viva voce

PH 1.21 Describe the symptoms and management of methanol and ethanol poisonings

- 1.21.1 Describe the symptoms of methanol poisoning.
- 1.21.2 Explain the mechanism of methanol poisoning.

- 1.21.3 Describe the management of methanol poisoning.
- 1.21.4 Describe the symptoms of ethanol poisoning.
- 1.21.5 Explain the mechanism of ethanol poisoning.
- 1.21.6 Describe the management of ethanol poisoning.

Drugs of Abuse

SGD - 1 Hour

Assessment: Written / Viva voce

PH 1.22 Describe drugs of abuse (dependence, addiction, stimulants, depressants, psychedelics, drugs used for criminal offences)

- 1.22.1 Define drug addiction and drug dependence.
- 1.22.2 List the pharmacological classes of drugs of abuse.
- 1.22.3 Classify the drugs of abuse based on the CNS effects (stimulants, depressants, hallucinogens) with examples.
- 1.22.4 Give examples of hallucinogens.
- 1.22.5 Describe the source, pharmacological effects, withdrawal symptoms and the management of cocaine addiction.
- 1.22.6 Describe the source, pharmacological effects, withdrawal symptoms and the management of barbiturate addiction.
- 1.22.7 Describe the source, signs and symptoms and withdrawal symptoms of morphine addiction and its management.
- 1.22.8 Describe the source, signs and symptoms of addiction to and withdrawal symptoms and management of cannabis addiction.
- 1.22.9 Enumerate the drugs of abuse associated with criminal offences.
- 1.22.10 Enumerate club drugs, the signs and symptoms of their addiction, withdrawal symptoms and management of their addiction.

SGD - 1 Hour

Assessment: Written / Viva voce

PH 1.23 Describe the process and mechanism of drug deaddiction

- 1.23.1 Outline the general principles and steps in the management of drug deaddiction
- 1.23.2 Explain the mechanism of action of the drugs used in drug deaddiction.

Drugs acting on Kidney

Lecture/ SDL – 3/1 Hours Assessment: 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, antidiuretic s- vasopressin and analogues

- 1.24.1 Explain the transport of electrolytes at proximal convoluted tubule, loop of Henle, distal convoluted tubule and the collecting duct.
- 1.24.2 Classify diuretics based on their efficacy with examples.

- 1.24.3 Indicate the site of action of all classes of diuretics.
- 1.24.4 Explain the mechanism of action, pharmacological actions and adverse effects of Thiazide diuretics.
- 1.24.5 Explain the mechanism of action, pharmacological actions and adverse effects of Loop diuretics
- 1.24.6 Explain the mechanism of action and pharmacological actions and adverse effects of potassium sparing diuretics.
- 1.24.7 Explain the mechanism of action and pharmacological actions and adverse effects of osmotic diuretics.
- 1.24.8 Describe the therapeutic uses of diuretics with their rationale.
- 1.24.9 Briefly describe the carbonic anhydrase inhibitors and their current uses.
- 1.24.10 Enumerate doses, routes of administration and preparations of hydrochlorothiazide, furosemide, amiloride, eplerenone, triamterene
- 1.24.11 Classify vasopressin receptors
- 1.24.12 Describe the physiological actions of Vasopressin
- 1.24.13 Classify anti-diuretic drugs
- 1.24.14 Enumerate the vasopressin analogues
- 1.24.15 Describe the adverse effects of Vasopressin.
- 1.24.16 Describe the therapeutic uses of Vasopressin and its analogues explaining the rationale behind their use
- 1.24.17 Mention vasopressin antagonist and its clinical uses

Drugs affecting Blood

Lecture/ SDL – 3/ 1 Hours Assessment: Written, Viva voce

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

- 1.25.1 Describe the coagulation cascade
- 1.25.2 Define the role of coagulants with examples
- 1.25.3 Enumerate the coagulants used clinically
- 1.25.4 Explain the mechanism of anti-coagulant action, adverse effects and therapeutic uses of Vitamin K.
- 1.25.5 Classify anti-coagulants based on their mechanism of action with examples.
- 1.25.6 Describe the pharmacological actions, pharmacokinetics and adverse effects of Heparin
- 1.25.7 Explain the therapeutic uses and contraindications to Heparin.
- 1.25.8 Describe the advantages and disadvantages of low molecular weight heparin.
- 1.25.9 Enumerate the preparations, routes and dose of Heparin.
- 1.25.10 Describe the treatment of Heparin overdose
- 1.25.11 Compare the anticoagulant actions of Heparin with fondaparinux.
- 1.25.12 Describe the mechanism of action, pharmacokinetics and actions of Warfarin
- 1.25.13 Describe the adverse effects and therapeutic uses of Warfarin.
- 1.25.14 Explain the dose regulation and monitoring of patients while on anti-coagulants with reference to parameters such as INR and APTT.
- 1.25.15 Explain the Drug interactions of warfarin

- 1.25.16 Give examples of Direct factor Xa inhibitor and explain their advantages over Warfarin.
- 1.25.17 Explain the advantages and disadvantages of dabigatran over warfarin as anti-coagulant
- 1.25.18 Describe how anticoagulant therapy is monitored

Fibrinolytic and Antifibrinolytic drugs

- 1.25.19 Define fibrinolysis and its mechanisms
- 1.25.20 Enumerate fibrinolytics
- 1.25.21 Describe the actions, adverse effects and advantages of alteplase over streptokinase
- 1.25.22 Describe the therapeutic uses of fibrinolytics
- 1.25.23 Describe the contra-indications to fibrinolytics
- 1.25.24 Describe antifibrinolytics and its application
- 1.25.25 Explain the mechanism of action, indications and therapeutic uses of Tranexamic acid

Antiplatelets

- 1.25.26 Define the functions of platelets in cardiovascular diseases
- 1.25.27 Classify anti-platelet drugs based on their mechanisms of action with examples
- 1.25.28 Compare aspirin, dipyridamole and clopidogrel as anti-platelet agents
- 1.25.29 Describe the therapeutic uses of anti-platelet agents with the rationale for their use in the conditions mentioned
- 1.25.30 Describe the indications for the use of newer antiplatelet agents
- 1.25.31 Compare the newer anti-platelet drugs with aspirin

Plasma Expanders

- 1.25.32 Define plasma expanders
- 1.25.33 Classify plasma expanders with examples
- 1.25.34 Describe the mechanism of actions of crystalloids and colloids
- 1.25.35 Explain the detailed composition of crystalloids
- 1.25.36 Compare crystalloids and colloids
- 1.25.37 Describe the adverse effects and precautions while using plasma expanders
- 1.25.38 Describe the therapeutic uses of plasma expanders

Drugs affecting Renin Angiotension and Aldosterone system

Lecture/ SDL – 1/ 2 Hours Assessment: Written, Viva voce

PH 1.26 Describe mechanism of action, types, doses, side effects, indications and contraindications of the drugs modulating the renin- angiotensin and aldosterone system

- 1.26.1 Explain the physiology of renin angiotensin system
- 1.26.2 Describe the patho-physiological actions of Angiotensin-II with reference to the location of its receptors
- 1.26.3 Enumerate the drugs that modulate Renin angiotensin system
- 1.26.4 Enumerate the Angiotensin converting enzyme inhibitors (ACEIs)
- 1.26.5 Describe the mechanism of action and pharmacological action of Angiotensin converting enzyme inhibitors

- 1.26.6 Describe the adverse effects and therapeutic uses of ACE inhibitors explaining the rationale for their uses
- 1.26.7 Indicate the route, dose and preparations of enalapril, Lisinopril
- 1.26.8 Enumerate Angiotensin receptor blockers (ARBs) used clinically
- 1.26.9 Describe the pharmacological actions, adverse effects, and therapeutic uses of ARBs
- 1.26.10 Describe the advantages of ARBs over ACEIs
- 1.26.11 Explain the mechanism of action, pharmacokinetics, therapeutic uses and adverse effects of Aliskiren

Antihypertensive Drugs and drugs used in Shock

Lecture/ SGD – 1/ 2 Hours Assessment: Written, Viva voce

PH 1.27 Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antihypertensive drugs and drugs used in shock

- 1.27.1 Define the categories of hypertension as per JNC 7 and JNC 8 criteria
- 1.27.2 Describe the pathophysiology of hypertension
- 1.27.3 Classify anti-hypertensives with examples
- 1.27.4 Describe the mechanism of antihypertensive action, anti-hypertensive effects, adverse effects and drug interactions, dose, routes of administration and uses of Diuretics in hypertension
- 1.27.5 Describe the mechanism of antihypertensive action, anti-hypertensive effects, adverse effects, drug interactions, dose, routes of administration and uses of ACE inhibitors in hypertension
- 1.27.6 Describe the mechanism of antihypertensive action, anti-hypertensive effects, adverse effects, drug interactions, dose, routes of administration and uses of calcium channel blockers in hypertension
- 1.27.7 Describe the mechanism of antihypertensive action, anti-hypertensive effects, adverse effects, drug interactions, dose, routes of administration and uses of beta blockers in hypertension
- 1.27.8 Enumerate the sympatholytics used in the management of hypertension
- 1.27.9 Explain the mechanism of action, adverse effects and indications for the use of sympatholytics.
- 1.27.10 Explain the management of hypertensive crisis
- 1.27.11 Describe the mechanism of antihypertensive action, anti-hypertensive effects, adverse effects, drug interactions, and use of alpha blockers in hypertension.
- 1.27.12 Describe the mechanism of antihypertensive action, anti-hypertensive effects, adverse effects, drug interactions, dose, routes and uses of Vasodilators in hypertension
- 1.27.13 Discuss which drugs are used in combination in the management of Hypertension.
- 1.27.14 Describe which drugs are most effective in treating individual hypertensive patients with specific comorbidities, including diabetes mellitus, congestive heart failure, and renal disease.
- 1.27.15 Pharmacotherapy of Pulmonary Hypertension and Orthostatic hypotension.
- 1.27.16 Management of Hypertension during pregnancy.

Pharmacotherapy of Shock

- 1.27.17 Define shock
- 1.27.18 Enumerate the types of shock
- 1.27.19 Explain the pathophysiology of shock
- 1.27.20 Describe the pharmacological management of anaphylactic shock explaining the rationale for the use of drugs used in the management
- 1.27.21 Describe the pharmacological management of hypovolemic shock explaining the rationale for the use of drugs used in the management
- 1.27.22 Describe the pharmacological management of cardiogenic shock explaining the rationale for the use of drugs used in the management.

Pharmacotherapy of Angina pectoris, Acute MI and PVD

Lecture/ SGD – 2/ 1 Hours Assessment: Written, Viva voce

PH 1.28 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

- 1.28.1 Define angina pectoris
- 1.28.2 Explain the various types of angina pectoris describing their underlying pathology
- 1.28.3 Classify anti-anginal drugs
- 1.28.4 Describe the mechanism of action, pharmacological actions, adverse effects and therapeutic uses of nitrates
- 1.28.5 Describe the routes of administration, doses and preparations of Nitrates
- 1.28.6 Classify Calcium channel blockers.
- 1.28.7 Describe the mechanism of action, pharmacological actions, adverse effects and therapeutic uses of calcium channel blockers
- 1.28.8 Mention the routes of administration, doses and preparations of Nifedipine and amlodipine
- 1.28.9 Mention the unique features of Felodipine, Nitrendipine, Cilnidipine, Nicardipine and Nimodipine
- 1.28.10 Compare Dihydropyridines with Phenylalkylamines
- 1.28.11 Describe the anti-anginal actions, adverse effects and contra-indications to beta-blockers
- 1.28.12 Describe the mechanism of action, anti-anginal actions, adverse effects and the indication for the use of potassium channel openers (nicorandil) in angina pectoris
- 1.28.13 Describe the anti-anginal actions and indications for the use of Trimetazidine in angina pectoris
- 1.28.14 Describe the anti-anginal actions and indications for the use of Ranolazine in angina pectoris
- 1.28.15 Describe the anti-anginal actions and indications for the use of Ivabradine in angina pectoris
- 1.28.16 Explain the pathophysiology of myocardial infarction
- 1.28.17 Explain the steps in the use of drugs in myocardial infarction with the rationale for using them
- 1.28.18 Describe the pathophysiology of peripheral vascular disease (PVD)
- 1.28.19 Classify the drugs used in PVD
- 1.28.20 Describe the mechanism of action, pharmacological actions, adverse effects, dose and uses of Pentoxifylline.
- 1.28.21 Describe the mechanism of action, pharmacological actions, adverse effects, dose and uses of Cilostazol.

Pharmacotherapy of Heart Failure

Lecture – 1 Hour Assessment: Written, Viva voce

PH 1.29 Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in congestive heart failure

- 1.29.1 Describe the stages of heart failure and the treatments that are recommended at each stage.
- 1.29.2 Describe the rationale for the use of drugs that prevent and slow the progression of heart failure
- 1.29.3 Describe the mechanism of action of inotropic drugs and how they are used to maintain left ventricular function.
- 1.29.4 Identify the major side effects and adverse drug reactions of the drugs used to treat heart failure.
- 1.29.5 Describe the Management of Digitalis Toxicity

Pharmacotherapy of Cardiac Arrhythmias (Non Core)

SDL/ Lecture – 1/ 1 Hour Assessment:
Written, Viva voce

PH 1.30 Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the antiarrhythmics

- 1.30.1 Describe the principles of cardiac electrophysiology especially the ion channels, exchangers, and pumps that are targets of antiarrhythmic drugs.
- 1.30.2 Describe the mechanisms that cause cardiac arrhythmias.
- 1.30.3 Describe the common and important tachyarrhythmias and their mechanisms.
- 1.30.4 Describe the mechanisms and classification of antiarrhythmic drugs.
- 1.30.5 Describe the principles of antiarrhythmic drug pharmacotherapy
- 1.30.6 Describe the pharmacological, pharmacokinetic, and adverse effects of specific antiarrhythmic agents.

Hypolipidaemic drugs

Lecture / SDL – 1/ 1 Hour Assessment:
Written, Viva voce

PH 1.31 Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in the management of dyslipidaemias

- 1.31.1 Describe lipid metabolism, different classes of lipoproteins and their formation
- 1.31.2 Describe the pathophysiology of primary and secondary hyperlipidaemias
- 1.31.3 Mention the classification of hypolipidemic drugs based on mechanism of action
- 1.31.4 Describe the mechanism of action, pleiotropic effects, indications, adverse effects, drug interactions of statins
- 1.31.5 Compare the features of all statins
- 1.31.6 Describe the mechanism of action, indications, adverse effects, drug interactions of Resins, ezetimibe, niacin, fibric acid derivatives
- 1.31.7 Describe the combination therapy in dyslipidaemia
- 1.31.8 Discuss which patients with dyslipidaemias should be treated and when

treatment should be initiated.

1.31.9 Discuss which drugs are most effective in treating patients with different dyslipidaemias.

1.31.10 Describe the non-pharmacological treatment including natural agents

Drugs used in Bronchial Asthma and COPD

Lecture - 2 Hours Assessment: Written, Viva voce

PH- 1.32 Describe the mechanism/ s of action, types, doses, side effects, indications and contraindications of drugs used in bronchial asthma and COPD

1.32.1 Describe the patho-physiology of Bronchial Asthma and COPD

1.32.2 Classification of anti-asthmatic drugs

1.32.3 Discuss the mechanism of action, pharmacokinetics, Adverse effects, status, merits and demerits of beta2 agonists, methyl xanthines, corticosteroids, anti-cholinergics, mast cell stabilizers, leukotriene antagonists, anti IgE antibodies in asthma.

1.32.4 Discuss inhaled medication in bronchial asthma

1.32.5 Describe the step wise management of Bronchial asthma (GINA guidelines)

1.32.6 Describe the management of acute severe asthma with the help of a case scenario

1.32.7 Enumerate the various inhalational devices available in India

1.32.8 Describe the advantages and disadvantages of MDI, rotahaler, use of spacer, nebulizer

Pharmacotherapy of cough

SGD - 1 Hour, Assessment: Written/ Viva voce

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)

1.33.1 Explain the cough pathway.

1.33.2 Enumerate various causes of cough

1.33.3 State the various causes of cough

1.33.4 Classify the drugs used in cough

1.33.5 Explain the mechanism of action, indications and adverse effects of pharyngeal demulcents, expectorants, mucolytics and anti-tussive with examples

1.33.6 List the drugs that induce cough and bronchospasm

1.33.7 Comment on the preparations available in Indian market for cough

Drugs used in Disorders of Gastrointestinal Tract

Lecture/ SGD/ SDL - 1/ 3/1 Hours Assessment: Written/ Viva voce

PH- 1.34- 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 disorders.

- 1.34.1 Explain the physiology of vomiting and role of various neurotransmitters
- 1.34.2 Classification of anti-emetics based on mechanism of action
- 1.34.3 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
- 1.34.4 Enumerate the drug of choice for various clinical scenarios, such as post-operative vomiting, cancer chemotherapy induced vomiting etc
- 1.34.5 Enumerate drugs used in vomiting during pregnancy
- 1.34.6 Enumerate the drugs that cause emesis.
- 1.34.7 Compare and contrast Metoclopramide and Domperidone
- 1.34.8 Pathophysiology of gastric acid secretion
- 1.34.9 Identify the sites in the gastric parietal cell where drugs act to suppress acid secretion.
- 1.34.10 Describe the mechanism of action of proton pump inhibitors, H₂ receptor antagonists, and prostaglandin analogs to suppress gastric acid secretion.
- 1.34.11 Describe the limitations to the use of H₂ receptor antagonists in chronic acid suppression.
- 1.34.12 Identify potential drug interactions with proton pump inhibitors and H₂ receptor antagonists
- 1.34.13 Describe the mechanism of action of drugs that enhance gastric cytoprotection.
- 1.34.14 Describe the recommendations for therapy of gastroesophageal reflux disease (GERD)
- 1.34.15 Explain the pathophysiology of constipation
- 1.34.16 Classify laxatives/purgatives
- 1.34.17 Explain the mechanism of action, indications, contra-indications and adverse effects of bulk laxatives, stool softener, stimulant purgative, osmotic purgative and 5HT₄ agonists
- 1.34.18 Mention the laxative of choice in bedridden patients, pregnancy, post-operative, functional constipation
- 1.34.19 Classify antidiarrheal agents.
- 1.34.20 Enumerate the principles of management of Diarrhea with rationale for its composition
- 1.34.21 Discuss the advantages of New formula WHO-ORS versus the older composition.
- 1.34.22 Explain the role of Zinc in pediatric diarrhea
- 1.34.23 Explain the mechanism of action, indications, contra-indications and adverse effects of opioids, anticholinergics, PG inhibitors, chloride channel inhibitor, racecadotril and probiotics
- 1.34.24 Explain the pathophysiology and pharmacotherapy of Irritable bowel syndrome
- 1.34.25 Explain the pathophysiology and pharmacotherapy of Inflammatory bowel disorder, Acute pancreatitis
- 1.34.26 Explain the pancreatic enzyme replacements and drugs that inhibit formation of gall stones

Drugs affecting Blood Formation

SDL/SGD - 1/2 Hours Assessment: Written/ Viva voce

PH 1.35 - Describe the mechanism/ s 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

- 1.35.1 Define anaemias and describe the types and causes of anaemia

- 1.35.2 State the role of iron, its sources, requirements, iron absorption, factors that reduce and enhance iron absorption
- 1.35.3 List the oral and parenteral iron preparations with merits and demerits and specific indications
- 1.35.4 Define megaloblastic anaemia
- 1.35.5 State the role of vitamin B12, Folic acid, along with sources and daily requirements
- 1.35.6 State the vitamin B12 preparations
- 1.35.7 State the indications for use of erythropoietin
- 1.35.8 Describe the various types of colony stimulating factors with their approved indications (Cancer chemotherapy)

Drugs used in Endocrine Disorders

Lecture/ SDL/ SGD - 3/1/1 Hours, Assessment: Written/ Viva voce

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)

Diabetes Mellitus

- 1.36.1 Describe the mechanisms of action of insulin and the oral antidiabetic drugs.
- 1.36.2 Describe the components for management of the diabetic patient including the goals of therapy.
- 1.36.3 Describe the pharmacotherapeutic options for the treatment of patients with type 1 or type 2 diabetes.
- 1.36.4 Describe the adverse effects of insulin and the oral antidiabetic drugs.
- 1.36.5 Describe the treatment of hypoglycemia.
- 1.36.6 Discuss the management of diabetic ketoacidosis and hyperosmolar (nonketotic) coma

Thyroid disorders

- 1.36.7 Discuss the principles of thyroid hormone regulation.
- 1.36.8 Describe the diagnosis and treatment of hypothyroidism and hyperthyroidism, including during pregnancy.
- 1.36.9 Describe the treatment options for well-differentiated thyroid cancer.

Osteoporosis

- 1.36.10 Describe calcium and phosphorus homeostasis.
- 1.36.11 Describe the roles of PTH, calcitonin, and vitamin D in calcium homeostasis.
- 1.36.12 Understand the concept of bone resorption and bone formation.
- 1.36.13 Describe the mechanism of action and untoward effects of bisphosphonates.
- 1.36.14 Describe the role of bisphosphonates in the prevention and treatment of osteoporosis.
- 1.36.15 Describe the pharmacological management of hypocalcemia and hypercalcemia.

Lecture/SGD-2/2hours Assessment: Written/ Viva voce

- **PH 1.37 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**

Pituitary Hormones

- 1.37.1 Describe the functioning of the hypothalamic-pituitary axis
- 1.37.2 Describe the pharmacotherapy of GH excess and GH deficiency.
- 1.37.3 Develop knowledge of the clinical uses of gonadotropin-releasing hormone (GnRH) and its analogs.

Androgens and antiandrogens

- 1.37.4 Describe physiological secretion and regulation of androgens (natural and synthetic)
- 1.37.5 Describe mechanism of action, uses and adverse effects of different preparations of testosterone
- 1.37.6 Explain mechanism of action, uses and adverse effects of anabolic steroids and anti-androgens
- 1.37.7 Describe drug therapy of erectile dysfunction

Estrogens and Progestins

- 1.37.8 Describe physiological secretion and regulation of estrogen and progesterone
- 1.37.9 Describe the therapeutic uses and ADRs of postmenopausal hormonal replacement therapy
- 1.37.10 Describe mechanism of action, uses and adverse effects of selective estrogen receptor modulators, anti-estrogens and aromatase inhibitors
- 1.37.11 Describe mechanism of action, uses, adverse effects and contraindications of anti-progestins
- 1.37.12 Explain various drugs used in treatment of infertility

Lecture - 1 Hour, Assessment: Written/ Viva voce

PH 1.38 Describe the mechanism of action, types, doses, side effects, indications and contraindications of corticosteroids

- 1.38.1 Explain physiology of biosynthesis, actions, hypo and hyper secretion of corticosteroids
- 1.38.2 Classify corticosteroid preparations
- 1.38.3 Describe distinctive features, uses, adverse effects and contraindications of various corticosteroid preparations
- 1.38.4 Understand the effect of abrupt cessation of glucocorticoid therapy.

SGD - 2 Hours Assessment: Written/ Viva voce

PH 1.39 Describe mechanism of action, types, doses, side effects, indications and contraindications the drugs used for contraception

- 1.39.1 Classify female contraceptive preparations
- 1.39.2 Explain all types with mechanism of action, uses, adverse effects, contraindications and practical considerations of female contraceptives.

Lecture – 2 Hours Assessment: 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**
- 1.40.1 Describe the causes of infertility
- 1.40.2 Enumerate drugs used in the treatment of infertility

- 1.40.3 Describe the mechanism of action of drugs used in the treatment of infertility
- 1.40.4 Describe the therapeutic uses of drugs used in the treatment of infertility
- 1.40.5 Describe the precautions and contraindications of drugs used in the treatment of infertility
- 1.40.6 Describe the adverse effects of drugs used in the treatment of infertility
- 1.40.7 Describe the drug interactions of drugs used in the treatment of infertility
- 1.40.8 Describe the causes of erectile dysfunction
- 1.40.9 Enumerate drugs used in erectile dysfunction
- 1.40.10 Describe the mechanism of action of drugs used in erectile dysfunction
- 1.40.11 Describe the therapeutic uses of drugs used in erectile dysfunction

SGD - 1 Hour, Assessment: Written/ Viva voce

PH 1.41 Describe the mechanisms of action, types, doses, side effects, indications and contraindications of uterine relaxants and stimulants

- 1.41.1 Classify uterine stimulants
- 1.41.2 Explain mechanism of action, uses, adverse effects and contraindications of each group
- 1.41.3 Classify uterine relaxants.
- 1.41.4 Explain mechanism of action, uses, adverse effects and contraindications of each group

Chemotherapy

Lecture/SGD-2/2hours Assessment: Written/ Viva voce

PH 1.42 Describe general principles of chemotherapy

General Principles

- 1.42.1 Classify the chemotherapeutic agents based on chemical structure, mechanism of action, source
- 1.42.2 Describe common problems encountered with use of chemotherapeutic agents
- 1.42.3 Describe anti-microbial resistance and discuss monitoring of antimicrobial therapy
- 1.42.4 Enumerate the factors to be considered for choosing an antimicrobial agent
- 1.42.5 Mention the advantages and disadvantages of antimicrobial combination with examples

Sulfonamides & Quinolones

- 1.42.6 Explain the mechanism of action of sulfonamide drugs.
- 1.42.7 Explain the various sulfonamide drugs and categorize them according to their absorption from the gastrointestinal (GI) tract.
- 1.42.8 Explain the therapeutic uses and untoward effects of sulfonamide drugs including trimethoprim-sulfamethoxazole.
- 1.42.9 Describe the therapeutic uses, mechanisms of action, and toxicities of quinolone antibiotic drugs.

Beta lactams

- 1.42.10 Explain the mechanisms of action of the penicillins, cephalosporins, and other β -lactam antibiotics.
- 1.42.11 Explain the mechanisms of resistance of the penicillins, cephalosporins, and other β -lactam antibiotics.
- 1.42.12 Describe the therapeutic effects of the penicillins, cephalosporins, and other β -lactam antibiotics.
- 1.42.13 Describe the untoward effects and contraindications of the penicillins, cephalosporins, and other β -lactam antibiotics.

Aminoglycosides

- 1.42.14 Explain aminoglycoside mechanisms of action and resistance.
- 1.42.15 Describe the advantages and disadvantages of multiple daily dosing versus once daily extended-interval dosing regimens for aminoglycosides.
- 1.42.16 Describe the rationale and the methods of plasma concentration monitoring of aminoglycoside therapy.
- 1.42.17 Describe the causes and clinical signs of aminoglycoside ototoxicity and nephrotoxicity and the best means of monitoring therapy to avoid these serious toxicities.
- 1.42.18 Explain the unique clinical differences among the aminoglycosides.
- 1.42.19 Describe the mechanisms of action and resistance of tetracyclines, macrolides, vancomycin, linezolid, daptomycin, and quinupristin/dalfopristin
- 1.42.20 Describe the unique toxicities of antibiotics that are inhibitors of bacterial protein synthesis
- 1.42.21 Describe the uses and untoward reactions of vancomycin
- 1.42.22 Explain the drug–drug interactions that occur with some of these antibiotics
- 1.42.23 Explain how linezolid, daptomycin, and quinupristin/dalfopristin are used to

treat methicillin- resistant and vancomycin-resistant organisms

SGD – 4 Hour, Assessment: Written, Viva voce

PH 1.43 - Describe and discuss the rational use of antimicrobials including antibiotic stewardship program

- 1.43.1 Enumerate the factors influencing the antimicrobial selection, duration and dose
- 1.43.2 Define appropriate empiric antimicrobial prescribing
- 1.43.3 Highlight mechanisms by which microorganisms develop antimicrobial resistance
- 1.43.4 Understand the impact of pharmacodynamics, pharmacokinetics, bioavailability on development of antimicrobial resistance with examples
- 1.43.5 Understand the principles of antimicrobial selection for a specific infectious condition
- 1.43.6 Enumerate basic steps of prevention of antimicrobial resistance

Lecture – 1 Hour, Assessment: Written, Viva voce

PH 1.44 - Describe the first line anti tubercular drugs, their

mechanisms of action, side effects and doses

- 1.44.1 Discuss pathophysiology of tuberculosis.
- 1.44.2 Enumerate various anti- tubercular drugs.
- 1.44.3 Describe the mechanism of action and resistance to anti tubercular drugs.
- 1.44.4 Describe the adverse effects and drug interactions commonly associated with anti-TB drugs.
- 1.44.5 Understand the rationale for combination drug therapy in the treatment of tuberculosis
- 1.44.6 Describe and discuss the salient features, diagnostic criteria and guidelines for treatment of tuberculosis under NTEP

Lecture – 1 Hour, Assessment: Written, Viva voce

PH 1.45 - Describe the drugs used in MDR and XDR Tuberculosis

- 1.45.1 Define MDR and XDRTB
- 1.45.2 List drugs, mechanism of action, indications, contraindications and adverse effects of drugs used in MDR and XDR Tuberculosis.
- 1.45.3 Explain the regimen for MDR and XDR tuberculosis

Lecture – 1 Hour, Assessment: Written, Viva voce

PH 1.46 - Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antileprotic drugs

- 1.46.1 Describe the principles of anti-leprosytherapy.
- 1.46.2 Describe the mechanism of action, ADE, DI of antileproticdrugs
- 1.46.3 Discuss the management of leprosy and treatment of Leprareactions

Lecture/ SGD – 4/2 HoursAssessment: Written, Viva voce

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

- 1.47.1 Describe the stages of the malaria parasite in the humanbody.
- 1.47.2 Classify antimalarial drugs into those that are effective against only the blood stages of the parasite, those that are effective against both theblood and liver stages, and those that are effective against only the liver stages of theparasite.
- 1.47.3 Explain the use of antimalarial drugs in clinical context, particularlywith regard to their mechanism of action, therapeutic uses, andtoxicities.
- 1.47.4 Describe the principles and guidelines for the chemoprophylaxis and treatment of malaria.
- 1.47.5 DefineKALA-AZAR
- 1.47.6 Discuss pathophysiology ofKALA-AZAR
- 1.47.7 Enumerate drugs used inKALA-AZAR
- 1.47.8 Describe the mechanism of action of drugs used inKALA-AZAR
- 1.47.9 Describe the therapeutic uses of drugs used inKALA-AZAR
- 1.47.10 Describe the precautions and contraindications of drugs used inKALA-AZAR
- 1.47.11 Describe the adverse effects of drugs used inKALA-AZAR
- 1.47.12 Describe the drug interactions of drugs used inKALA-AZAR
- 1.47.13 Describe the management ofKALA-AZAR
- 1.47.14 Defineamoebiasis
- 1.47.15 Discuss pathophysiology ofamoebiasis
- 1.47.16 Enumerate drugs used foramoebiasis
- 1.47.17 Describe the mechanism of action of drugs used foramoebiasis
- 1.47.18 Describe the therapeutic uses of drugs used foramoebiasis
- 1.47.19 Describe the precautions and contraindications of drugs used foramoebiasis
- 1.47.20 Describe the adverse effects of drugs used foramoebiasis
- 1.47.21 Describe the drug interactions of drugs used foramoebiasis
- 1.47.22 Describe the management ofamoebiasis
- 1.47.23 Describe the common helminth infections, the clinical symptoms,and the mainstays oftherapy.
- 1.47.24 Describe the therapeutic uses of anthelminticdrugs.
- 1.47.25 Explain the mechanisms of actions of anthelminticdrugs.
- 1.47.26 Describe the toxicities and contraindications of anthelminticdrugs

Lecture/ SGD – 3/2 HoursAssessment: Written, Vivavoce

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

- 1.48.1 DefineUTI
- 1.48.2 Discuss pathophysiology ofUTI
- 1.48.3 Enumerate drugs used forUTI
- 1.48.4 Describe the mechanism of action of drugs used forUTI
- 1.48.5 Describe the therapeutic uses of drugs used forUTI
- 1.48.6 Describe the precautions and contraindications of drugs used forUTI
- 1.48.7 Describe the adverse effects of drugs used forUTI
- 1.48.8 Describe the drug interactions of drugs used forUTI
- 1.48.9 Describe the management ofUTI
- 1.48.10 DefineSTD
- 1.48.11 Enumerate common STDs
- 1.48.12 Enumerate drugs used inSTDs
- 1.48.13 Describe the mechanism of action of drugs used inSTD
- 1.48.14 Describe the precautions and contraindications of drugs used inSTD
- 1.48.15 Describe the adverse effects of drugs used inSTD
- 1.48.16 Describe the drug interactions of drugs used inSTD
- 1.48.17 Describe the management ofSTD
- 1.48.18 Describe the mechanisms of action and resistance of antifungalagents.
- 1.48.19 Describe the therapeutic uses of antifungal agents in the contextof treatment for fungal diseases
- 1.48.20 Develop knowledge of the common and unique toxicities of antifungalagents.
- 1.48.21 Explain the drug–drug interactions that can occur with the use of azole antifungalagents
- 1.48.22 Explain the treatment of herpes virus infections and the use of anti-herpesdrugs
- 1.48.23 Discuss the treatment strategies for chronic hepatitis B and C infections
- 1.48.24 Explain the mechanisms of action and resistance, and the therapeutic useof the anti-influenzaagents
- 1.48.25 Discuss the principles of HIV chemotherapy as per Nationalguidelines including HAARTregimen
- 1.48.26 Describe the mechanisms of action and resistance, the untoward effectsand the therapeutic uses of the drugs used to treat HIVinfections

Anticancer drugs

Lecture – 2 Hours Assessment: Written, Viva voce

PH 1.49 Describe mechanism of action, classes, side effects, indications and contraindications of anticancer drug

- 1.49.1 Discuss the general principles in chemotherapy ofCancer
- 1.49.2 Classify anticancerdrugs
- 1.49.3 Describe the mechanism of action of Anticancerdrugs
- 1.49.4 Describe the mechanisms of toxicity of cytotoxic antineoplastic agentson normal cells and strategies for reducing toxiceffects
- 1.49.5 Enumerate the classes of agents are typically used in treating specificcancers

Immunomodulators

Lecture – 1 Hour, Assessment: Written, Viva voce

PH 1.50 Describe mechanisms of action, types, doses, side effects, indications and contraindications of immunomodulators and management of organ transplant rejection

- 1.50.1 Differentiate between Immuno-suppressants and immuno-stimulants
- 1.50.2 Define immunosuppressants & Classify immuno-suppressants
- 1.50.3 Describe the mechanisms of action of Calcineurin inhibitors
- 1.50.4 Enlist m-Tor inhibitors and antiproliferative agents used as immunosuppressants
- 1.50.5 Enlist Biological agents used as immunosuppressants
- 1.50.6 Enumerate the adverse effects of immunosuppressants
- 1.50.7 Enlist clinical uses of immunosuppressants

Occupational and Environmental Pesticides, Food Adulterants, Pollutants and Insect Repellents

SDL – 1 Hour, Assessment: Written, Viva voce

PH- 1.51 Describe occupational and environmental pesticides, food adulterants, pollutants and insect repellents

- 1.51.1 Define the various toxicology terms
- 1.51.2 Define occupational pesticides and enlist them
- 1.51.3 Explain environmental pesticide and its management
- 1.51.4 Enlist food adulterants
- 1.51.5 Enlist insect repellents

Pharmacotherapy of Poisoning

Lecture – 1 Hour, Assessment: Written, Viva voce

PH 1.52- Describe management of common poisoning, insecticides, common sting and bites

- 1.52.1 Explain the general management of common poisoning
- 1.52.2 Enlist the specific antidotes used in treatment of common poisons
- 1.52.3 Explain the method of enhancing elimination of toxin using examples
- 1.52.4 Explain the management of Bee sting bite, Scorpion bite and Snake bite

Chelating agents

SGD – 1 Hour, Assessment: Written, Viva voce

PH 1.53 - Describe heavy metal poisoning and chelating agents

- 1.53.1 Define Chelating agents and enlist Chelating agents used in Heavy metal poisoning
- 1.53.2 Describe the mechanism of action of Chelating agents
- 1.53.3 Name the Chelating agents used in the management of Iron, Lead, Copper, and Arsenic intoxication
- 1.53.4 Enlist the clinical uses of penicillamine

Vaccines and Antisera

SGD – 1 Hour, Assessment: Written, Viva voce -

PH 1.54 - Describe vaccines and their uses

- 1.54.1 Define Vaccines and classify vaccines
- 1.54.2 Enlist the bacterial vaccines
- 1.54.3 Enlist the viral vaccines
- 1.54.4 Enlist Toxoids and Mixed Toxoids
- 1.54.5 Enlist antisera and immunoglobulins
- 1.54.6 Discuss the routine immunization schedule for infants and children as per IAP guidelines

National Health Programme

SGD – 2 Hours Assessment: Written, Viva voce -

PH 1.55 - Describe and discuss the following National Health Programme including Immunization, Tuberculosis, Leprosy, Malaria, HIV, Filaria, Kala Azar, Diarrhoeal diseases, Anaemia & nutritional disorders, Blindness, Non-communicable diseases, cancer and Iodine deficiency

- 1.55.1 Explain the universal immunization programme in India
- 1.55.2 Explain Revised National Tuberculosis Elimination Programme
- 1.55.3 Explain National Leprosy Eradication Programme
- 1.55.4 Enlist National Vector Borne Disease Control Programmes
- 1.55.5 Explain National AIDS Control Programme
- 1.55.6 Describe National programme for prevention and control of cancer, diabetes, cardiovascular diseases and stroke
- 1.55.7 Describe National Programme for Control of Blindness & Visual Impairment
- 1.55.8 Describe National Programme For Prevention and Control Of cancer
- 1.55.9 Discuss about the Diarrhoeal Disease Control Programme
- 1.55.10 Describe iodine deficiency disorders control programme

Geriatric and Pediatric pharmacology

Lecture – 1 Hour

Assessment: Written, Viva voce

PH 1.56 - Describe basic aspects of Geriatric and Pediatric pharmacology

- 1.56.1 Describe physiological changes in Children and Elderly patients that influence the pharmacokinetic and Pharmacodynamic parameters of medications.
- 1.56.2 Discuss the common drugs to which children/elderly are likely to respond differently
- 1.56.3 Explain the principles that underlie the prescribing in children/elderly

Pharmacotherapy of Skin disorder

SDL – 1 hr Assessment: Written, Viva voce

PH 1.57- Describe drugs used in skin disorders

- 1.57.1 Discuss how drugs are absorbed through the skin.
- 1.57.2 Define demulcents, emollients, adsorbents & protectants, astringents, irritants and counter irritants and keratolytic, Melanising agents with examples, their uses and adverse reactions.
- 1.57.3 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.
- 1.57.4 Discuss the science behind use of sunscreen agents.
- 1.57.5 List the topical glucocorticoids, explain the rationale for use of glucocorticoids in skin disorders and their adverse effects.

Ocular Pharmacology

SGD – 1 Hour., Assessment: Written, Viva voce

PH 1.58 - Describe drugs used in Ocular disorders

- 1.58.1 Understand the principles of using drugs to treat ophthalmic disorders.
- 1.58.2 Describe the ocular toxicities of systemic drugs.
- 1.58.3 Explain the mechanisms of action, clinical uses, and toxicities of ophthalmic drugs.
- 1.58.4 Describe how ophthalmic drugs administered topically can cause systemic side effects.
- 1.58.5 Understand the pathophysiology of glaucoma and the role of pharmacotherapy in its management.

Essential medicines, Fixed dose combinations, Over the counter drugs, Herbal medicines

SGD– 2 Hours, Assessment: Written, Viva voce

PH 1.59- Describe and discuss the following: Essential medicines, Fixed dose combinations, Over the counter drugs, Herbal medicines

- 1.59.1 Define Essential medicines concept.
- 1.59.2 Discuss the criteria to prepare list of essential medicines for your community PHC.
- 1.59.3 Define fixed dose combination, advantages and disadvantages of FDC.
- 1.59.4 Describe the pharmacokinetic and pharmacodynamics parameters to be considered to combine two drugs in a FDC.
- 1.59.5 Discuss Rational and irrational prescribing drugs with examples.
- 1.59.6 Define over the counter medicines and prescription medicines.
- 1.59.7 Enumerate the similarities and differences between OTC medicines and prescription medicines.
- 1.59.8 Summarize how to responsibly use OTC medicines and prevent misuse.
- 1.59.9 List 10 Herbal medicines used in allopathic practice.
- 1.59.10 Enumerate advantages and disadvantages of Herbal medicines

Pharmacogenomics and Pharmacoeconomics

SGD - 1 Hour Assessment: Written, Viva voce

PH 1.60- Describe and discuss Pharmacogenomics and Pharmacoeconomics

- 1.60.1 Define Pharmacogenomics and Pharmacogenetics and Pharmacoeconomics with examples
- 1.60.2 Describe different types of pharmacoeconomic models with examples
- 1.60.3 Discuss the role of Pharmacogenomics and Pharmacoeconomics in modern therapeutics.

Dietary Supplements and Nutraceuticals

SDL – 1 Hours Assessment: Written, Viva voce

PH 1.61 - Describe and discuss dietary supplements and nutraceuticals

- 1.61.1 Describe the role of common vitamins and minerals in normal physiology and diseases.
- 1.61.2 Identify the potential toxic effects of vitamins and minerals.
- 1.61.3 List the fat soluble and water-soluble vitamins, and identify examples of how solubility affects the absorption, transport, storage and excretion of each type.
- 1.61.4 Describe how B vitamins assist with energy metabolism

- 1.61.5 Justify the statement “It is better to get vitamins from food than from supplements”
- 1.61.6 Enumerate anti-oxidant vitamins, list the food source and their functions
- 1.61.7 Analyze from the below list, valid reasons that some individuals require vitamin supplements
 - a. women in childbearing age
 - b. Pregnant and lactating women
 - c. Victims of AIDS or other wasting illness
 - d. Addicted to drugs or alcohol
 - e. Strict vegetarians
 - f. Recovering from surgery, burns and injury.

Antiseptics and Disinfectants

SGD – 2 Hours

Assessment: Written, Viva voce

PH 1.62 Describe and discuss antiseptics and disinfectants

- 1.62.1 Describe antiseptics and their use in wound care with examples
- 1.62.2 Describe disinfectants and their use in infection control with examples
- 1.62.3 Summarize the adverse effects of antiseptics and disinfectants
- 1.62.4 Describe Ecto-parasiticides with examples, use and adverse effects
- 1.62.5 Discuss hand hygiene using soap as per WHO guidelines
- 1.62.6 Information on hand sanitizers

Drug Regulation

SGD – 1 hr Assessment: Written, Viva voce

PH 1.63 Describe Drug Regulations, acts and other legal aspects

- 1.63.1 Explain why drugs need to be regulated
- 1.63.2 Identify the major regulatory authorities in India
- 1.63.3 Describe the approval process for New Drugs in simple terms.
- 1.63.4 Discuss the major legislation pertaining to drugs

Drug development and GCP

SGD – 1 hr Assessment: Written, Viva voce

PH 1.64 - Describe overview of drug development, Phases of clinical trials and Good Clinical Practice

- 1.64.1 Enlist the stages in new drug development
- 1.64.2 Explain the approaches to drug discovery/invention
- 1.64.3 Discuss about the preclinical studies
- 1.64.4 Describe the phases of clinical trials
- 1.64.5 Describe the Principles of Good Clinical Practice

PANDEMIC MODULE 2.5

Therapeutic strategies including new drug development

Theory –1hour

Assessment: Written, Viva voce

PH 2.5 - Describe stages of new drug development and clinical trial during a pandemic.

- Enlist the stages in new drug development during a pandemic.
- Describe drug repurposing with its importance and benefits.
- What is off-label drug use? Risks, benefits and implications examples
- Describe the clinical trial conduct during a pandemic.

SGD –2 hours

Assessment: Written, Vivavoce

- New drug development – Challenges and solutions
- Urgency in procedures
- Need for monitoring – Pharmacovigilance activities of drugs approved for emergency use/clinical trials during Pandemic

PRACTICAL

Specific Learning Objectives in Pharmacology

(Skills and communication: Competency no-2.1 to 5.7)

Practical DOAP –14 Hours

Assessment: SkillAssessment

PH 2.1 Demonstrate understanding of the use of various dosage forms (oral/ local/ parenteral; solid/liquid)

- 2.1.1 Identify various dosage forms – solid, liquid, topical dosage forms
- 2.1.2 Describe the various types of solid dosage form in the given samples with merits and demerits of each
- 2.1.3 Describe the various types of liquid dosage form in the given samples with merits and demerits of each
- 2.1.4 Describe the various types of topical dosage form in the given samples with merits and demerits of each
- 2.1.5 Describe all the components of commercial label of the given dosage form and its importance

Practical DOAP – 4 Hours Assessment: SkillAssessment

PH 2.2 Prepare oral rehydration solution from ORS packet and explain its use

- 2.2.1 Define and enumerate causes of dehydration
- 2.2.2 Describe the clinical assessment of dehydration
- 2.2.3 Enumerate the different types of ORS along with their composition with actions of each ingredient
- 2.2.4 Choose the appropriate type of ORS for a given condition/patient
- 2.2.5 Calculate the quantity of ORS required to correct / prevent dehydration
- 2.2.6 Demonstrate preparation of ORS from sachet
- 2.2.7 Enumerate non-diarrheal uses of ORS

Practical DOAP – 4 Hours Assessment: SkillAssessment

PH 2.3 Demonstrate the appropriate setting up of an intravenous drip in a simulated environment

- 2.3.1 Open the infusion set following aseptic technique
- 2.3.2 Appropriately position the patient and select a vein.
- 2.3.3 Prepare the overlying skin with aseptic care.
- 2.3.4 Demonstrate correct IV injection technique and strap the cannula in place.
- 2.3.5 Identify any visible impurities if present in the IV fluids.
- 2.3.6 Adjust the flow rate according to the requirement
- 2.3.7 Routinely check patient's ID, drug name, date of expiry etc before injecting.
- 2.3.8 Monitor a patient on an IV drip and identify any reactions to it.

Practical DOAP – 4 Hours Assessment: SkillAssessment

PH 2.4 Demonstrate the correct method of calculation of drug dosage in patients including those used in special situations (integration with General medicine, Paediatrics)

- 2.4.1 Calculate appropriate doses for individual patients based on age, body weight, and surface area
- 2.4.2 Demonstrate the correct method of calculation of drug dosage in paediatric patients
- 2.4.3 Demonstrate the iv drip rate calculation & infusion time
- 2.4.4 Demonstrate the correct method of calculation of drug dosage in patient suffering from renal disease
- 2.4.5 Demonstrate the correct method of calculation of drug dosage in patient suffering from hepatic disease

Skill station – 6 Hours Assessment: Skill Assessment and Certification

PH 3.1 Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient (integration with General medicine)

- 3.1.1 Establish therapeutic goal/s, based on a diagnosis following standard treatment guidelines (STG)
- 3.1.2 Choose the appropriate drug/s for the given clinical condition
- 3.1.3 Choose the appropriate dose, route, frequency and duration of therapy for the chosen drug/s
- 3.1.4 Write a legible prescription as per MCI format
- 3.1.5 Provide appropriate information to the patient regarding the prescription
- 3.1.6 Review/alter prescription in the light of further investigation
- 3.1.7 Explain the legality (legal implications) of prescriptions.
Examples of 5 Exercises
 - 1. Iron deficiency anemia due to hook worm infestation
 - 2. Acute attack of Migraine
 - 3. Newly diagnosed obese type 2 DM with Hypertension
 - 4. UTI in pregnancy
 - 5. Typhoid fever in a child

Skill Lab – 6 Hours Assessment: Skill Assessment and Certification

PH 3.2 Perform and interpret a critical appraisal (audit) of a given prescription

– 3 no's

- 3.2.1 Demonstrate the understanding of importance of completeness of prescription
- 3.2.2 Demonstrate the understanding of clinical diagnosis for which drugs are prescribed
- 3.2.3 Demonstrate the understanding of MCI format of prescription
- 3.2.4 Identify and comment on any discrepancies in the completeness and legibility of the prescription
- 3.2.5 Identify and comment on any discrepancies in the selection of drug, drug form, dose, frequency, duration of the treatment, instructions according to STG
- 3.2.6 Re-Write the prescription correcting all the discrepancies identified

Skill Lab – 6 Hours, Assessment: Skill Assessment and Certification

PH 3.3 Perform a critical evaluation of the drug promotional Literature - Brainstorming followed by demonstration – 3 no.s (integration with General medicine)

- 3.3.1 Discuss the various types of sources of drug information
- 3.3.2 Demonstrate understanding of importance of critical evaluation of drug promotional literature
- 3.3.3 Critically evaluate the given drug promotional literature based on WHO criteria
 - a. Appropriateness of illustration
 - b. Relevance of references cited
 - c. Content of scientific information

Skill station – 4 Hours, Assessment: Skill Assessment – Log book

PH 3.4 To recognize and report an adverse drug reaction

- 3.4.1 Recognise an adverse drug reaction (ADR) in the given case
- 3.4.2 Perform causality assessment of the identified ADR using WHO & Naranjo's Scale
- 3.4.3 Fill the ADR reporting form (CDSCO form)
- 3.4.4 Explain the management of the ADR
- 3.4.5 Explain the methods to prevent the occurrence of the ADR
- 3.4.6 Report the ADR to the pharmacovigilance centre
- 3.4.7 Describe the Importance of reporting ADRs
- 3.4.8 Describe the various levels of reporting ADRs national and international centres
 - Example of 3 cases:
 - 1. Warfarin induced Bleeding
 - 2. Aspirin (NSAID) induced Peptic Ulcer
 - 3. Carbamazepine induced Steven Johnson Syndrome

Skill Station – 6 Hours, Assessment: Skill Assessment and Certification

PH 3.5 To prepare and explain a list of P- drugs for a given case/ condition – 3 no.s (integration with General medicine)

- 3.5.1 Define the diagnosis
- 3.5.2 Specify the therapeutic objective
- 3.5.3 Make an inventory of effective groups of drugs
- 3.5.4 Choose an effective group of drug according to efficacy, safety and suitability criteria
- 3.5.5 Choose the P-Drug for the given clinical condition
 - Example of 3 Exercises
 - 1. Angina Pectoris
 - 2. Amoebic Dysentery
 - 3. Anxiety

Skill Station – 2Hours, Assessment: Skill Assessment – Log book

PH 3.6 Demonstrate how to optimize interaction with pharmaceutical representative to get authentic information on drugs

- 3.6.1 Enumerate the key elements in the WHO guidelines on Ethical criteria for medicinal drug promotion.
- 3.6.2 Direct the discussion with pharmaceutical representative so as to get the information he needs about the drug effectively.
- 3.6.3 Collect a copy of data sheet of the product under discussion.
- 3.6.4 Compare the verbal statements with those in the official text during presentation effectively.
- 3.6.5 Perform a prior literature search and check quality of research methodology of the drug under discussion including cost comparison.
- 3.6.6 Decide effectively whether to include the drug in personal formulary with regard to efficacy, safety and cost-effectiveness of medicines

Skill Station – 4 Hours, Assessment: Skill Assessment – Log book

PH 3.7 Prepare a list of essential medicine for a health care facility

- 3.7.1 Understand the concept of Essential Medicines List for the nation/state/ healthcare facility
- 3.7.2 Identify the factors that determine the choice of drugs in an Essential Medicines List.
- 3.7.3 Prepare a list of essential medicines for a healthcare facility, with justification in a given scenario

Skill Lab – 4 Hours Assessment: Skill Assessment

PH 3.8 Communicate effectively with a patient on proper use of prescribe medication

- 1. **Insulins**
- 2. Proton pump inhibitors
- 3. **Statins**
- 4. Ferrous sulphate tablets
- 5. **Co-Amoxiclav or Cotrimoxazole**

- 3.8.1 Communicate about the effects of the prescribed drug with regards to the following
 - a. Why the drug is needed
 - b. Which symptoms will disappear, and which will not
 - c. When the effect is expected to start
 - d. When the effect is expected to end
- 3.8.2 Communicate about the adverse effects of the prescribed drug with regards to the following
 - a. Which side effects may occur
 - b. How to recognize them
 - c. How long they will continue
 - d. How serious they are
 - e. What action to take
- 3.8.3 Communicate about the instructions of drug use as following:
 - a. How the drug should be taken

- b. When it should be taken
 - c. How long the treatment should continue
 - d. How the drug should be stored
 - e. What to do with left-over drugs
- 3.8.4 Communicate about the warnings of the prescribed drug with regards to the following
- a. When the drug should not be taken
 - b. What is the maximum dose
 - c. Why the full treatment course should be taken
- 3.8.5 Communicate about the future consultations with regards to the following:
- a. When to come back (or not)
 - b. In what circumstances to come earlier
 - c. What information the doctor will need at the next appointment
- 3.8.6 Conclude the consultation by asking the following questions:
- a. Ask the patient whether everything is understood
 - b. Ask the patient to repeat the most important information
 - c. Ask whether the patient has any more questions

DOAP sessions –10 Hours

Assessment: Skill Assessment

PH 4.1 Administer drugs through various routes in a simulated environment using mannequins

USE CHECKLIST FOR ASSESSMENT (refer WHO prescribing book)

Enteral

Oral route

- 4.1.1 Identify the different dosage forms administered through the Oral route and instructions given to the patient for administering it.
- 4.1.2 Present the merits and demerits of Oral route of drug administration.
- 4.1.3 Demonstrate the administration of the drugs through oral route.
- 4.1.4 Identify the different equipment required for Nasogastric tube (NGT) insertion
- 4.1.5 Demonstrate the Nasogastric tube insertion and present the purpose.
- 4.1.6 Demonstrate the positioning of the patient during NGT insertion.
- 4.1.7 Demonstrate the preparation of the feeds for NG feeding.

Sublingual/ Buccal

- 4.1.8 Demonstrate the administration of the drugs through Sublingual and Buccal route.
- 4.1.9 Present the instructions for administering the same and how to terminate the action of the drug.
- 4.1.10 Present the different examples with dosage forms for the same.

Transrectal

- 4.1.11 Identify the devices used to administer dosage forms through transrectal route.
- 4.1.12 Present the instructions to the patient before administering dosage forms through transcutaneous route.
- 4.1.13 Demonstrate the administration of suppositories by rectal route.
- 4.1.14 Demonstrate the administration of enema (Evacuant/ Retention) by rectal route.

Transvaginal

- 4.1.15 Identify the devices used to administer dosage forms through transvaginal route.
- 4.1.16 Present the instructions to the patient before administering dosage forms through transvaginal route.
- 4.1.17 Demonstrate the administration of pessary, creams and foams by vaginal route.
- 4.1.18 Demonstrate the administration of douche by vaginal route.
- 4.1.19 Identify different types of Intrauterine contraception
- 4.1.20 Present the instructions/counseling to the patients on intrauterine contraception.
- 4.1.21 Demonstrate the placement of intrauterine contraception using the stimulation setting

Parenteral

Intra Muscular injection

- 4.1.22 Identify the devices required for IM injection
- 4.1.23 Demonstrate the prerequisite preparations for injection along with aseptic precautions.
- 4.1.24 Present instructions to the patient about the injection procedure.
- 4.1.25 Identify the sites of IM injection on mannequin and present merits and demerits of each site.
- 4.1.26 Demonstrate the proper technique for IM injection.

Intravenous injection

- 4.1.27 Identify the devices required for IV injection
- 4.1.28 Demonstrate the prerequisite preparations for injection along with aseptic precautions
- 4.1.29 Present instructions to the patient about the injection procedure.
- 4.1.30 Identify the sites of IV injection on mannequin
- 4.1.31 Demonstrate the proper technique for IV injection.

Subcutaneous injection

- 4.1.32 Identify the devices required for SC injection.
- 4.1.33 Demonstrate the prerequisite preparations for injection along with aseptic precautions.
- 4.1.34 Present instructions to the patient about the injection procedure.
- 4.1.35 Identify the sites of SC injection on mannequin.
- 4.1.36 Demonstrate the proper technique for SC injection.

Intradermal injection

- 4.1.37 Identify the devices required for Intradermal injection.
- 4.1.38 Demonstrate the prerequisite preparations for injection along with aseptic precautions.
- 4.1.39 Present instructions to the patient about the injection procedure.
- 4.1.40 Demonstrate the proper technique for Intradermal injection.

Intracardiac injection

- 4.1.41 Demonstrate a proper technique for Intracardiac injection.
- 4.1.42 Demonstrate the prerequisite preparations for injection along with aseptic precautions.

Local/ Topical application

Transcutaneous – Iontophoresis, Inunction, Jet Injection, Transdermal delivery system

- 4.1.43 Identify the devices used to administer dosage forms through transcutaneous route.
- 4.1.44 Present the instructions to the patient before administering dosage forms through transcutaneous route.
- 4.1.45 Demonstrate the administration of dosage forms by Iontophoresis method.
- 4.1.46 Demonstrate the administration of dosage forms by Inunction method.
- 4.1.47 Demonstrate the administration of dosage forms by Jet Injection method.
- 4.1.48 Demonstrate the administration of Transdermal patches.

Transmucosal/ Inhalational

- 4.1.49 Document the inhalational devices used to administer inhalational dosage forms.
- 4.1.50 Present the merits and demerits of inhalational devices over one another
- 4.1.51 Present the instructions to the patient before using inhalational devices.
- 4.1.52 Demonstrate the administration of inhalational dosage forms.
- 4.1.53 Identify the different types of airway masks and intubation tubes.
Present a method for selection of intubation tubes.
- 4.1.54 Demonstrate the administration of anesthetic/ therapeutic gases through airway masks and intubation tubes

Transnasal

- 4.1.55 Identify dosage forms administered transnasally.
- 4.1.56 Identify the devices used for administering dosage forms transnasally.
- 4.1.57 Present the merits and demerits of Transnasal route of drug administration.
- 4.1.58 Present the instructions to the patient before administering dosage forms by transnasal route.

Ophthalmic/ Ear route

- 4.1.59 Identify dosage forms administered by ophthalmic/ ear route.
- 4.1.60 Present the instructions to the patient before administering dosage forms by ophthalmic/ ear route.

Skill Lab – 6 Hours Assessment: Skill Assessment

PH 4.2 Demonstrate the effects of drugs on blood pressure (vasopressor and vasodepressors with appropriate blockers) using computer aided learning

- 4.2.1 Choose the appropriate animal experiment to study the effects of drugs on blood pressure
- 4.2.2 Explain the differences in actions of different vasopressor (adrenaline, noradrenaline)
- 4.2.3 Explain the differences in actions of different vasodepressors (ACh, alpha blockers, histamine)
- 4.2.4 Analyse and interpret the graph obtained accurately on application of various drugs
- 4.2.5 Enumerate the therapeutic uses of vasopressors and vasodepressors

□ **SGD – 2 Hours**

Assessment: Skill Assessment

PH 5.1 Communicate with the patient with empathy and ethics on all aspects of drug use (integration with General medicine)

5.1.1 Describe what information should be given to patients to allow them to make informed decisions

5.1.2 Communicate treatment plan and instructions to patient, at a suitable level of information

5.1.3 Engage in shared decision making where appropriate

SGD – 4 Hours **Assessment: Skill Assessment**

PH 5.2 Communicate with the patient regarding optimal use of

1. Drug therapy
2. Devices
3. Storage

5.2.1 Communicate about the effects of the prescribed drug with regards to the following:

- i. Why the drug is needed
- ii. Which symptoms will disappear, and which will not?
- iii. When the effect is expected to start
- iv. What will happen if the drug is taken incorrectly or not at all

5.2.2 Communicate about the adverse effects of the prescribed drug with regards to the following:

- i. Which side effects may occur?
- ii. How to recognize them
- iii. How long they will continue
- iv. How serious they are
- v. What action to take

5.2.3 Communicate about the instructions of drug use as follows:

- i. How the drug should be taken
- ii. When it should be taken
- iii. How long the treatment should continue
- iv. How the drug should be stored
- v. What to do with left-over drugs

5.2.4 Communicate about the warnings of the prescribed drug with regards to the following:

- i. When the drug should not be taken
 - ii. What is the maximum dose?
 - iii. Why the full treatment course should be taken?
- 5.2.5** Communicate about the future consultations with regards to the following:
- i. When to come back (or not)
 - ii. In what circumstances to come earlier
 - iii. What information the doctor will need at the next appointment
- 5.2.6** Conclude the consultation by asking the following questions:
- i. Ask the patient whether everything is understood
 - ii. Ask the patient to repeat the most important information

Devices

5.2.7 The student should be able to communicate to patients on

- i. Step wise points or instructions on use of device
- ii. Communicate list of do's and don'ts on the device
- iii. Demonstrate the proper use of device and ask the patient to show the same.
- iv. Methods on handling, cleaning and storage of device
- v. Dangers of use of device on other persons, without the prescription of doctor
- vi. Importance of keeping the device away from reach of the children
- vii. Contact number of manufacturers to be communicated on troubleshooting

Storage of Medicines

5.2.8 The student should be able to communicate to patients on

- i. Ideal storage condition of a pharmaceutical product as per product label
- ii. Ideal storage condition of a pharmaceutical product as per product label
- iii. Effect of storage condition on potency and efficacy of the drug
- iv. ill effects of improper storage condition on human consumption
- v. Factors to be taken in to consideration for drug storage like sanitation, temperature, light, moisture, ventilation and segregation.
- vi. Importance of storage of medicines away from reach of the children
- vii. Disposal of expired drugs

SGD –4Hours

Assessment: Skill Assessment/ Shortnote

PH 5.3 Motivate patients with chronic diseases to adhere to the prescribed management by health care provider

- 5.3.1 Explain the term medication adherence
- 5.3.2 Explain the consequences of non-adherence in chronic diseases
- 5.3.3 Explain the methods to measure the medication adherence
- 5.3.4 Elicit the barriers affecting medication adherence
- 5.3.5 Explains the measures to be taken to motivate the patient to adhere to medications in chronic diseases

SGD –2Hours

Assessment: Shortnote/ Viva Voce

PH 5.4 Explain to the patient the relationship between cost of treatment and patient compliance

- 5.4.1 Assess the cost of the treatment

- 5.4.2 Enumerate various factors influencing patient compliance (patient related, disease condition related, therapy related and health system related factors).
- 5.4.3 Explain the consequences of medication non-compliance in terms of cost to the patient
- 5.4.4 Communicate clearly to the patient about relationship between cost of treatment and compliance

SGD – 4 Hours, Assessment: Short Note, Viva voce

PH 5.5 Demonstrate an understanding of the caution in prescribing drugs likely to produce dependence and recommend the line of management (integrate with Psychiatry)

- 5.5.1 Describe the term drug dependence
- 5.5.2 Enumerate the drugs that produce dependence
- 5.5.3 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)
- 5.5.4 Describe the clinical including psychosocial assessment of the patient before prescribing
- 5.5.5 Describe the importance of documentation of prescribing process
- 5.5.6 Describe the importance of periodic review of prescriptions
- 5.5.7 Describe the basic treatment regimens for various addictions and withdrawal states along with psycho-social rehabilitation

SGD – 4 hrs (Practical), Assessment: Short notice, Viva voce

PH 5.6- Demonstrate ability to educate public & patients about various aspects of drug use including drug dependence and OTC drugs (integrate with Psychiatry)

- 5.6.1 The importance of complying with the doctor's instructions
- 5.6.2 The demerits of self-prescription
- 5.6.3 The importance of identifying and reporting ADRs to concerned authorities
- 5.6.4 Caution be taken while using drugs causing dependence
- 5.6.5 Safe use of OTC

SGD – 2 Hours, Assessment: Short notice, Viva voce

PH 5.7 Demonstrate an understanding of the legal and ethical aspects of prescribing drugs (integrate with Forensic Medicine)

Legal aspects

- 5.7.1 Explain who is entitled to prescribe medicines and the legal requirements involved
- 5.7.2 Describe the legal requirements associated with prescribing controlled drugs
- 5.7.3 Describe the legal implications of irrational prescription that could endanger the life of patients

Ethical aspects

- 5.7.4 Describe the importance of rational prescription
- 5.7.5 Explain the responsibilities of prescribing in a resource limited setting
- 5.7.6 Describe what information should be given to patients to allow them to make informed decisions
- 5.7.7 Explain why it is important to recognize limits of competence and to ask for help when needed
- 5.7.8 Explain the responsibility of all prescribers to update knowledge
- 5.7.9 Describe the importance of following clinical guidelines, protocols and formularies where appropriate

PANDEMIC MODULE 2.5

Therapeutic strategies including new drug development

SGD – 2 Hours

Assessment: Short notice, Vivavoce

PH 5.8 Demonstrate the use of drugs during a pandemic. (Integrate with General Medicine)

- Prepare a plan for evaluation of off-label use of a drug – repurposing
- Emergency use authorization – Compliance with regulatory authorities
- CDSCO/DCGI and US FDA
- Pharmacovigilance during a pandemic
- Ethical aspects of clinical trials in pandemic
- Visit to a pharmaceutical firm/ pharmacy lab to show various stages of drug development or an ADR monitoring exercise in clinical wards

DISTRIBUTION OF ATTITUDE ETHICS AND COMMUNICATION SKILLS(AETCOM) MODULE

SI NO	M O D U L E	TOPIC	DEPARTMENT					No. of hour s	Formative assessment	Summative assessment
			PA	MI	PH	CM	FM			
1	2.1	Foundation of communication				<input type="checkbox"/>		5	<input type="checkbox"/>	-
2	2.2	Foundation of bioethics					<input type="checkbox"/>	2	-	<input type="checkbox"/>
3	2.3	Health care as a right				<input type="checkbox"/>		2	-	<input type="checkbox"/>
4	2.4	Working in ahealth careteam	<input type="checkbox"/>					6	<input type="checkbox"/>	-
5	2.5	Bioethics- case studies on patient autonomy and decision making (patient rights and shared responsibility in health care)			<input type="checkbox"/>			6	<input type="checkbox"/> <input type="checkbox"/>	
6	2.6	Bioethics- Case studies on patient autonomy and decision making (refusal of care including do not resuscitate And			<input type="checkbox"/>			5	<input type="checkbox"/> <input type="checkbox"/>	

		withdrawal of life Support)							
7	2.7	Bioethics- Case studies on patient autonomy and decision making (consent for surgical procedure s)		<input type="checkbox"/>			5	<input type="checkbox"/> <input type="checkbox"/>	
8	2.8	What does it mean to be a family member of sick patient				<input type="checkbox"/>	6	<input type="checkbox"/> <input type="checkbox"/>	

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

CERTIFIABLE COMPETENCIES

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: 4 no.

L Needs Maintenance of a log book: 3 no.

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

EXAMINATION SCHEDULE

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
							Foundation Course	I MBBS			
I MBBS								Exam I MBBS	II MBBS		
II MBBS								Exam II MBBS	III MBBS		
III MBBS Part I									Exam III MBBS Part I	Electives & Skills	
III MBBS Part II											
Exam III MBBS Part II		Internship									
Internship											

TOPICS FOR VERTICAL INTEGRATION

	COMPETENCY	
No.	The student should be able to	Vertical Integration
PH 1.15	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of skeletal muscle relaxants	Anesthesiology, Physiology
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-histaminic, 5-HT modulating drugs, NSAIDs, drugs for gout, anti-rheumatic drugs, drugs for migraine	General Medicine
PH 1.17	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of local anesthetics	Anesthesiology
PH1.18	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of general anaesthetics, and pre- anesthetic medications	Anesthesiology
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, anti- depressant drugs, anti-maniacs, opioid agonists and antagonists, drugs used for neurodegenerative disorders, anti-epileptics drugs)	Psychiatry, Physiology
PH1.20	Describe the effects of acute and chronic ethanol intake	Psychiatry
PH1.21	Describe the symptoms and management of methanol and ethanol poisonings	General Medicine
PH1.22	Describe drugs of abuse (dependence, addiction, stimulants, depressants, psychedelics, drugs used for criminal offences)	Psychiatry
PH1.23	Describe the process and mechanism of drug deaddiction	Psychiatry
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	Physiology, General Medicine

PH1.26	Describe mechanisms of action, types, doses, sideeffects, indications and contraindications of the drugs modulating the renin- angiotensin and aldosteronesystem	Physiology, General Medicine
PH1.27	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antihypertensive drugs and drugs used in shock	General Medicine
PH1.28	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in	General Medicine
	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	General Medicine
PH1.30	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the antiarrhythmics	General Medicine
PH1.31	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in the management of dyslipidemias	General Medicine
PH1.32	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in bronchial asthma and COPD	Respiratory Medicine

PH1.33	Describe the mechanism of action, types, doses, side effects, indications and contraindications of the drugs used in cough (antitussives, expectorants/ mucolytics)	Respiratory Medicine
PH1.34	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs used as below:	General Medicine
	1. Acid-peptic disease and GERD	
	2. Antiemetics and prokinetics	
	3. Antidiarrhoeals	
	4. Laxatives	
	5. Inflammatory Bowel Disease	
PH1.35	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in hematological disorders like:	General Medicine, Physiology
	1. Drugs used in anemias	
	2. Colony Stimulating factors	
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)	General Medicine
PH1.39	Describe mechanism of action, types, doses, side effects, indications and contraindications the drugs used for contraception	Obstetrics & Gynaecology

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	Obstetrics & Gynaecology
PH1.41	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of uterine relaxants and stimulants	Obstetrics & Gynaecology
PH1.43	Describe and discuss the rational use of antimicrobials including antibiotic stewardship program	General Medicine, Pediatrics
PH1.44	Describe the first line antitubercular drugs, their mechanisms of action, side effects and doses.	Respiratory Medicine
PH1.45	Describe the drugs used in MDR and XDR Tuberculosis	Respiratory Medicine
PH1.46	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antileprotic drugs	Dermatology, Venereology & Leprosy
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	General Medicine
PH1.52	Describe management of common poisoning, insecticides, common sting and bites	General Medicine
PH1.56	Describe basic aspects of Geriatric and Pediatric pharmacology	Pediatrics
PH1.57	Describe drugs used in skin disorders	Dermatology, Venereology & Leprosy
PH1.58	Describe drugs used in Ocular disorders	Ophthalmology

PH2.4	Demonstrate the correct method of calculation of drug dosage in patients including those used in special situations	Pediatrics, General Medicine
PH3.1	Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient	General Medicine
PH3.3	Perform a critical evaluation of the drug promotional literature	General Medicine
PH3.5	To prepare and explain a list of P-drugs for a given case/condition	General Medicine
PH5.1	Communicate with the patient with empathy and ethics on all aspects of drug use	General Medicine
PH5.4	Explain to the patient the relationship between cost of treatment and patient compliance	General Medicine
PH5.5	Demonstrate an understanding of the caution in prescribing drugs likely to produce dependence and recommend the line of management	Psychiatry
PH5.6	Demonstrate ability to educate public & patients about various aspects of drug use including drugdependence and OTCdrugs	Psychiatry

Column C: K- Knowledge, S – Skill, A - Attitude / professionalism, C- Communication.

Column D: K – Knows, KH - Knows How, SH - Shows how, P- performs independently,

Column F: DOAP session – Demonstrate, Observe, Assess, Perform.

Column H: If entry is P: indicate how many procedures must be done independently for certification/ graduation