Pharmacology & Therapeutics

Departmental Objectives:

The objective is to provide a need based integrated "Basic Pharmacology for a safe and effective prescribing" course so that the students on graduation will be competent to:

- Describe the pharmacological effects, mechanisms of action, pharmacokinetic characteristics and adverse reactions of drugs in order to be able to prescribe safely and effectively.
- Describe the basic principles and concepts considered essential for rational (effective, safe, suitable and economic) prescribing and use of medicines in clinical practice.
- Understand the principles of rational prescribing and the basis of utilizing the principles of rational evaluation of therapeutic alternatives.
- Recognize, manage and report the adverse drug reactions (ADRs) and drug interactions.
- Obtain informed consent by providing enough information about disease(s), treatment(s) and alternative options available, in order to allow the patients to make informed decision about their treatment.
- Identify and assess objectively the drug information sources.
- State the Essential Drug List and principles underlying the "Concept of Essential Drugs", and apply them appropriately in community oriented health care delivery service.
- Recognize the implications of poly pharmacy and other means of irrational prescribing, identify influences favouring irrational prescribing and develop means to resist them.
- Evaluate the ethical and legal issues involved in drug prescribing, development, manufacture and marketing.
- Acquire methods of learning needed for evaluation of existing and new drugs and to follow trends and approaches in pharmacological research.
- Develop attitude for continuous self learning and professional development throughout their practicing life.

List of competencies to acquire:

A) Knowledge and Understanding

- Basic pharmacodynamics (effects, mechanism), and clinical pharmacokinetics required for safe and effective prescribing.
- Adverse Drug Reactions (ADRs): recognizing, management & reporting
- Basic principles & concepts essential for rational (effective, safe, suitable and economic) prescribing and use of drugs in clinical practice.
- Concept of essential drugs and selection of essential drug list for use in community oriented health care services.
- Drug information sources: access to unbiased drug compendia and use of standard treatment guidelines , formularies to support safe and effective prescribing

- Ethics of Prescribing: Informed patient consent about disease, treatment given and alternative options available.
- The ethical and legal issues involved in drug prescribing, development and marketing.

B) Skill –

- Taking drug history.
- Prescription writing: choosing safe & effective drugs and appropriate dosage formulations.
- Selecting appropriate drugs (P Drug) to support rational prescribing considering efficacy, safety, suaitability and cost.
- Recognizing, managing and reporting Adverse Drug Reactions (ADRs) and drug interactions.
- Obtaining accurate objective information to support safe and effective prescribing.
- Prescribing drugs for special groups: elderly, children, pregnancy, breast feeding mothers, renal &/or hepatic impairment or failure.
- Getting informed consent from patients
- Analyzing new evidence:
    - Reading, assessing and critically analyzing clinical trial results
    - Practicing evidence based medicine
    - Assessing the possible benefits and hazards of new therapy

C) Attitude –

- Continuous self learning to keep their knowledge & skill uptodate through continuous professional development.
- Communicating with patients regarding disease, the drug treatment and alternative options to obtain informed consent and respecting patients' own views and wishes in relation to drug treatment.

Distribution of teaching - learning hours

Lecture	Tutorial	Practical and Demonstration	Clinical Case Report	Total teaching hours	Integrated teaching hour for Phase II	Formative Exam		Summative exam	
						Preparatory leave	Exam time	Preparatory leave	Exam time
100 hrs	30 hrs	50 hrs	15 hrs	195 hrs	15	10 days	15 days	10 days	15 days
Time for integrated teaching, examination, preparatory leave of formative & summative assessment is common for all subjects of the phase									
Related behavioral, professional & ethical issues will be discussed in all teaching learning sessions									

Teaching-learning methods, teaching aids and evaluation

Teaching Methods				Teaching aids	In course evaluation
Large group	Small group	Self learning	Others		
Lecture	Tutorial Practical & Demonstrations	Assignment	Integrated teaching/ Assignment with presentation, clinical case report Block Placement at the end of term II	Laptop, Multimedia, Microphone, Speaker, Overhead Projector with Screen, Laser pointer, Slide Projector, Black Board, White Board, Marker, Duster, Tracing paper, showing drug effect, reference books	Item Examination Card final (written) Term Examination Term final (written, oral and practical)

2nd Professional Examination:
Marks distribution of Assessment of Pharmacology & Therapeutics:

Total marks – 300

Formative assessment marks=10

- Written = 90
  [MCQ=20 (Multiple True False-10 + SBA-10),
  SAQ+SEQ = 70
  Making a total of 100 marks
- Structured Oral Examination (SOE) = 100
- Practical : 100
  OSPE =40 (08 procedure stations, each having 05 marks]
  Traditional =60 (Prescription writing 10, Drug interaction 05 x 02 =10,
  Tracing and plotting = 10, Integrated teaching and Case report = (5+15) = 20,
  Practical notebook =10)

Term I

Learning Objective	Core Contents	Teaching-Learning Strategies	Teaching Hours	* Evaluations
A. <u>GENERAL PRINCIPLES OF PHARMACOLOGY</u> At the end of the course students shall be able to: • describe the role and scope of pharmacology • understand the principles of drug disposition (kinetics)-absorption, distribution, metabolism and excretion • understand the basic principles related to cellular and molecular aspects of drug action (dynamics), selectivity, specificity and quantitative aspects of drug action • recognize adverse drug reactions, interactions and problems of drug misuse and abuse • describe the ethical, legal and economic aspects of prescription writing and compliance	**A. GENERAL PRINCIPLES OF PHARMACOLOGY** **Lectures:** **01: Introducion to Pharmacology** **02: Drug Compendia (Information sources)** Pharmacopoeiea, Formulary, Treatment guidelines (BP, INN, BNF and BDNF) **03. Drug Administration** Routes, drug delivery and formulations for local & systemic effects **04: Drug Absorption** Transfer of drugs across cell membrane & specialized barriers, Factors influencing absorption **05: Bio-availability** Studies to compare bio-equivalence & to monitor therapy **06: Drug Distribution** V_d, Plasma protein & tissue binding, redistribution **07: Drug Metabolism** Where, why and how of bio- transformation, hepatic microsomal enzymes- induction & inhibition Genetic influence on Drug metabolism (Pharmacogenetics)	**Lectures/ Practical/ Tutorials/ Assignments**	**12 hrs**	**Three item Examinations (Item 1,2,3)**

Learning Objective	Core Contents	Teaching-Learning Strategies	Teaching Hours	* Evaluations
	08: Drug Elimination Routes, Renal Excretion & factors influencing renal excretion **09: Clinical Pharmacokinetics** V_d, Cl, First & Zero order kinetics of Elimination, $t_{½}$, Steady state concentration, loading dose & maintenance dose **10: Pharmaco-Dynamics:** Specific and non specific mechanisms Receptors involved Second messenger system Enzyme mediated drug action **11: Quantitative aspects of drug action** Dose-response relationships & curves Therapeutic Index and window-importance Information obtained from D-R curves Agonists – efficacy, potency, shift of curves Antagonists - efficacy, potency, shift of curves **12:Individual variations in drug responses** **13. Drug Interaction at different levels** 14: **Drug safety and Pharmacovigilance** Adverse drug reactions: Types, detecting & managing ADR ADR monitoring & reporting			

Learning Objective	Core Contents	Teaching-Learning Strategies	Teaching Hours	* Evaluations
B. AUTONOMIC PHARMACOLOGY At the end of the course the students will be able to: ▪ Understand the organization of autonomic nervous system, physiology of neuro-chemical transmission, co-transmission and their pre and post synaptic modulation ▪ Understand the physiology of cholinergic neurotransmission, classify the cholinoceptors and identify the drugs affecting cholinergic transmission and cholinoceptors	**B. AUTONOMIC PHARMACOLOGY** **Lectures:** **01: Introduction** Organization of ANS – sympathetic, parasympathetic, and enteric NS. Transmitters in ANS (ACh, NA, NANCs) Co-transmission, pre and postsynaptic modulation Cholinergic neurotransmission & drugs modifying the events, Cholinergic receptors **02: Cholinergic Drugs** Effects of the stimulation of Cholinoceptors Classification of cholinergic drugs – cholinoceptor agonists and anti-cholinesterase **03: Drugs for Glaucoma** Role of Cholinergic drugs compared to other drugs **04: OPC insecticide poisoning** Manifestation & management **05: Anti-cholinergic Anti-muscarinic** Atropine and atropine substitutes **06: Anti-cholinergic anti-nicotinic** Classification – Neuromuscular blockers & their role as skeletal muscle relaxant during anaesthesia Ganglion blocker (names only) (No-6 red part to be deleted) **07: Adrenergic neurotransmission** Drugs modifying the events Adrenergic receptors Effects of stimulation of adrenoceptors	**Lectures/ Practicals/ Tutorials/ Assignments**	**10 hrs**	**Two item Examinations (Item 4,5)**

Learning Objective	Core Contents	Teaching-Learning Strategies	Teaching Hours	* Evaluations
	08: Adrenergic Drugs: Classification Adrenergic inotropic agents & their role in therapy Role of Adrenaline, Noradrenaline, Isoprenaline, Dopamine & Dobutamine in therapy Adrenergic vasoconstrictors, nasal decongestants **09: Selective β_2 agonists as Bronchodilators, Other bronchodilators** used in bronchial asthma **10: α–adrenoceptor antagonist** Role of selective α_1 antagonist in therapy **11: β- adrenoceptor antagonist** Role of **β** blockers in therapy			

Learning Objectives	Core-Content	Teaching-Learning Strategies	Teaching Hours	* Evaluations
RENAL & CARDIOVASCULAR PHARMACOLOGY Students will be able to: • Classify or list drugs which affect the Cardiovascular System • Identify their pharmacological effects • Interprete mechanisms of actions, kinetics and toxicity • Correlate these knowledge to form the basis for their rational use in a given clinical situation	**Renal & Cardiovascular Pharmacology Lectures :** 01: **Diuretics** Classification of diuretics: based on sites & mechanism of action and efficacy Pharmacology of Thiazides, Loop, Potassium sparing diuretics: their role in therapy edema and hypertension 02: **Drugs used in hypertension** Epidemiology and pathophysiology of hypertension, Objectives of anti-hypertensive therapy, Classification of anti-hypertensive drugs. Pharmacology of Diuretics, β blockers, Ca channel blockers, ACE inhibitors, Angiotensin receptor antagonists, α blockers, α methyl dopa, Vasodilaotrs Principles of selection of drug in different clinical situations 03: **Drugs used in congestive cardiac failure** Pathophysiology of heart failure Objectives of therapy Drugs used in CCF: Diuretics, ACE inhibitors & ARBs, Selective β-blockers, (Additional) Cardiac glycosides, vasodilators, Phosphodiasterase inhibitors. 04: **Antianginal drugs** Pathophysiology of angina, Objectives of therapy Drugs used in angina: Nitrates, **β-** blockers, Ca^{2+} channel blockers. **05. Antiarrhythmic Drugs** Pathophysiology of arrhythmia Pharmacology of antiarrhythmic drugs	**Lecture/ Tutorial/ Class Assignments**	**08 hrs**	**Two item Examinations (Item 6, 7)**

Learning Objectives	Core Contents	Teaching-Learning Strategies	Teaching Hours	* Evaluations
HEMATOPOIETIC PHARMACOLOGY Students will be able to: • Classify or list drugs which affect the hematopoietic system • Identify their pharmacological effects • Interprete mechanisms of actions, kinetics and toxicity • Correlate these knowledge to form the basis for their rational use in a given clinical situation	**HEMATOPOIETIC PHARMACOLOGY** **Lectures:** 01: **Anticoagulants & Thrombolytics** Pathophysiology of thrombo-embolism Pharmacology of Anti-coagulants: Heparin and LMW heparin, warfarin. Pharmacology of thrombolytics: Streptokinase, Alteplase, Reteplase etc. 02: **Antiplatelet drugs** Pharmacology of low dose aspirin, clopidogrel, glycoprotein IIb/IIIa inhibitors and their role in therapy 03: **Lipid regulating drugs** Pharmacology of statins. fibrates, nicotinic acid, resins etc. 04: **Drugs for anaemia** Pathophysiology of anaemia Pharmacology of hemopoeitics iron, folic acid, vit B_{12} Pharmacology of erythropoietin **ADDITIONAL CONTENTS (–SEEMS IRRELEVANT, PLEASE DELETE)**	**Lecture/ Tutorial/ Class Assignments**	**07 hrs**	**One item Examination (Item 8)**

Learning Objectives	Core Contents	Teaching-Learning Strategies	Teaching Hours	* Evaluations
ENDOCRINE PHARMACOLOGY At the end of the session the students will be able to: ▪ understand the physiology of endocrine and metabolic systems • List the pancreatic islet hormones and understand their role in the control of blood glucose; define and classify diabetes; understand the diagnostic criteria and monitoring tests and describe the pharmacology of insulin and oral antidiabetic drugs. • List and describe the physiology of adrenocortical hormones. Identify the synthesis inhibitors & their role in therapy; describe the pharmacology of adrenocorticosteroids to assess their role in therapy as anti-inflammatory and immunosuppressive drugs	**Endocrine Pharmacology** **Lectures:** 01: **Endocrine Pancreas and control of blood glucose** Islet hormones, control of blood glucose Diabetes mellitus – types, diagnostic criteria, monitoring Insulin & preparations Oral Hypoglycemic agents Hypoglycemic reactions & management 02: **Adrenal cortex and drugs used in therapy** Adrenocortical hormones: synthesis & blockers; Control of secretion, mechanism of action Pharmacological actions, uses and preparations Adverse effects 03: **Reproductive system** Hormonal control of female reproductive system Estrogens & anti-estrogens Progesterone & anti-progesterone Hormone replacement therapy **(HRT)** Drugs used for contraception 04: **The Uterus** Drugs that stimulate uterine contraction (oxytocics) Drugs that inhibit uterine contraction 05: **The Thyroid** Synthesis, storage & secretion of thyroid hormones Thyroid functions & regulations Abnormalities of thyroid function Drugs used in disease of thyroid	**Lectures/ Practicals/ Tutorials/ Assignments**	**07 hrs**	**One item Examination (Item 9)**

Learning Objectives	Core Contents	Teaching-Learning Strategies	Teaching Hours	* Evaluations
Gastrointestinal Pharmacology Students will be able to: • Classify or list the drugs affecting GIT • Identify pharmacological effects of the drugs • Interpret the mechanism of action, kinetics of the drugs and their toxicity • Correlate the gained knowledge to form the basis for rational use of medicines in a given clinical situation	**Gastrointestinal Pharmacology** **Lectures** 01: **Drugs used in Peptic ulcer** Pathophysiology of peptic ulcer Therapeutic goal and approach Antacids, H_2- blockers, Proton pump inhibitors, gastric cytoprotective agents, Helicobactor pylori eradication regimen Gastroprokinetic drugs and other agents 02: **Drugs to treat diarrhoea** Epideiology, Principles of management Fluid and electrolyte replacement Selection of route and preparations ORS and different IV fluids Role of Antimicrobial drugs Antimotility drugs 03:**Drugs used in helminthiasis** 04: **Laxatives** 05: **Drugs for Inflammatory Bowel Diseases (IBS) & Irritable Bowel Syndrome (IBS)** **06: Anti-emetic and Pro-kinetic drugs**	**Lecture/ Tutorial/ Class Assignment**	**06 hrs**	**One item Examination (Item 10)**

Term II

Learning Objectives	Core Contents	Teaching-Learning Strategies	Teaching Hours	* Evaluations
Pharmacology of Drugs Acting on CNS Students will be able to: • Classify or list of drugs acting on Central Nervous System • Explain the mechanisms of action, kinetics and toxicity of these drugs • Describe the uses, administration, adverse effects & precautions of drugs used in diseases of CNS	**Central Nervous System** **Lectures:** 01:**Introduction to CNS Drugs** Neurotransmitters of CNS (distribution, ion channel) general characteristics of CNS drugs 02: **Opioid analgesic** Pathophysiology of pain, Pain pathway, endogenous opioids and opioid receptors Opioids: morphine, codeine, pethedine, tramadol, fentanyl used as analgesics compared. Role of morphine in myocardial infarction and pulmonary edema. Other clinical uses of opioids 03: **Anxiolytics and hypnotics** Pathophysiology of sleep Benzodiazepines and other non-BDZ sedative-hypnotics Centrally acting muscle relaxants 04: **Antidepressant drugs** Neurochemical basis of depression TCAs, SSRIs, MAOIs and other atypical antidepressants, Anti-manic drugs 05: **Antipsychotic drugs** Neurochemical basis of psychosis Pharmacology of anti-psychotic drugs: 06: **Local anaesthetic** Drugs, mechanism of action, techniques of local anaesthesia, uses and hazards	**Lecture/ Tutorial/ Class Assignment**	**15 hrs**	**Three item Examinations (Item 11, 12, 13)**

Learning Objectives	Core Contents	Teaching-Learning Strategies	Teaching Hours	* Evaluations
	07: **General anaesthetics** Principles of General Anaesthesia Preanaesthetic medication, Balanced Anaesthesia Induction & Maintenance: Intravenous anaesthetics &Inhalation anaesthetics (nitrous oxides, halothane, fluranes) 08: **Skeletal muscle relaxation** Depolarizing and Non depolarizing 09: **Antiparkinsonian Drugs** Pathophysiology of Parkinson's diseases Pharmacology of antiparkinsonian drugs 10: **Antiepileptics/Anticonvulsants** Pathophysiology of epilepsy Pharmacology of antiepileptic drugs			

Learning Objectives	Core-Content	Teaching-Learning Strategies	Teaching Hours	* Evaluations
Student will be able to • describe:the role of biogenic amines & prostaglandins in health & diseases • explain their mechanism of actions, pharmacological effects, kinetics and toxicity • correlate these knowledge to form the basis for rational use of drugs in a given clinical situation	**Autacoids and drugs used in inflammation** **Lectures:** 01: **Autacoids** Definition and lists of autacoids **Histamine:** synthesis, storage & release, pharmacological actions & physiological role **Histamine antagonist:** H_1 antagonists: classification, role in allergic conditions & other clinical uses and adverse reactions H_2-receptor antagonists: role in peptic ulcer (covered with GIT Pharmacology) 02: **Ecosanoids** Prostaglandins, Leukotrienes, Platelet Activating Factor (PAF) Synthetic pathways & antagonists Physiological roles, pharmacological actions and possible clinical uses of synthetic analogues and antagonists 03: **NSAIDs / Non-opioid analgesics delete red part* of the line** Paracetamol (mechanism of antipyretic and analgesic action, adverse effects) Other NSAIDs (mechanism of action, adverse effects and precaution) Selective COX II inhibitors 04. **Drugs for Migraine**	**Lecture/ Tutorial/ Class Assignment**	**06 hrs**	**One item Examination (Item 14)**

Learning Objectives	Core Contents	Teaching-Learning Strategies	Teaching Hours	* Evaluations
CHEMOTHERAPY Students will be able to: • Classify or list each group/ class of antimicrobial drugs • Understand & explain the mechanism of action, kinetics and toxicity of the antimicrobial drugs • Describe the clinical uses, administration, adverse effects of different antimicrobial drugs used in different clinical situations and the precautions that should be taken before their use • Correlate the gained knowledge to form the basis for rational use of medicines in a given clinical situation	**CHEMOTHERAPY** **Lectures:** 01: **Introduction** General concept, Mode of action & Classification of antimicrobials Principles of antimicrobial therapy 02: **Drug Resistance** Mechanism of development of drug resistance by microbes 03: **Cell wall synthesis inhibitors** Penicillins Cephalosporins Other β-lactams Non β-lactam antibiotics 04: **Protein Synthesis Inhibitors** Aminoglycosides Tetracyclines Macrolides Chloramphenicol Newer Protein synthesis inhibitors 05: **Sulfonamides & Cotrimoxazole** Sulfonamides combinations, Topical uses Cotrimoxazole 06: **Quinolones & Fluoroquinolones** 07: **Anti Amoebic Drugs :** Metronidazole and other uses of Metronidazole 08: **Drugs used in Tuberculosis** 09: **Drugs used in Leprosy** 10: **Drugs used in Malaria & Kala-Azar** 11: **Drugs used in Fungal Infections** 12: **Drugs used in Viral Infections** 13: **Cancer Chemotherapy** **14. Anti Helminthic Drugs**	**Lecture/ Tutorial/ Class Assignment**	**25 hrs**	**Five item Examination (Item 15, 16, 17,18, 19)**

Learning Objectives	Core Contents	Teaching-Learning Strategies	Teaching Hours	* Evaluations
CLINICAL PHARMACOLOGY Students will be able to: • state the principles of rational prescription • identify means of irrational prescribing and consequences • take measures to prevent irrational prescribing • select essential drugs in common diseases from EDL • select P drug – in some clinical situation • correlate these knowledge to form the basis for rational use of drugs in a given clinical situation	**CLINICAL PHARMACOLOGY** **Lectures:** 01: **Rational Prescribing** General Principles, cuses & consequences of irrational prescribing, Measures to prevent irrational prescribing 02: **Essential Drug concept** Definition, Selection criteria, Essential Drug List Rationale for prescribing from this Drug List 03: **'P' Drug concept** Definition, Selection criteria, selection of 'P' Drug for some clinical situations 04: **Drug selection for some special clinical conditions:** Pregnancy, Lactating mother, elderly, children, renal / hepatic failure or impairment 05: **Anti Microbial Resistance and how to overcome the indiscriminate use of antimicrobials**	**Lecture/ Tutorial/ Class Assignment**	**04 hrs**	**One item Examination (Item 20)**

Pharmacology Practicals

Learning Objectives	Core Contents	Teaching Hours
GENERAL PRINCIPLES OF PHARMACOLOGY **PRACTICALS:** Laboratory experiments and demonstrations have been designed to help students to achieve: - the ability to relate the principles and concepts to specific clinical situations At the end of the course, students shall be able to: • identify different dosage formulations and their usage • understand, interpret and analyze experimental data relating to drug disposition • oberve, analyse and compare the drugs action using the previously developed printed papers on experimentally prepared isolated and whole animal tissue	**GENERAL PRINCIPLES OF PHARMACOLOGY** **1. Prescription writing** Format, legal & ethical aspects, drug nomenclature, compliance and Exercise on Prescription Writing **2. Drug Dosage Formultions** Source & Routes of drug administration Drug Formulation & Delivery Techniques Exercise on Drug Dosage Formulations **3. Clinical Pharmacokinetics** Study of Time-Plasma Concentration Curves Determination of $t_{½}$, V_d, Cl, K_e, steady-state concentration, Loading & Maintenance dose **4. Study of Pharmacodynamics** **i. Study of Dose Response Relationship** Construction of Log Dose-Response Curves **ii. Study of Drug Antagonism** Construction of Log Dose-Response Curves in presence of Antagonists **5. Adverse drug Reaction** – Exercise on ADRs reporting & monitoring	 05 hrs 05 hrs 04 hrs 04 hrs 04 hrs

Learning Objectives	Core Contents	Teaching Hours
AUTONOMIC PHARMACOLOGY **PRACTICALS:** Laboratory experiments and demonstrations have been designed to help students to achieve: - the ability to relate the principles and concepts to specific clinical situations At the end of the session , students shall be able to: • understand, interpret and analyze experimental data relating to drug disposition • oberve, analyse and compare the drugs action using the previously developed printed papers on experimentally prepared isolated and whole animal tissue	**AUTONOMIC PHARMACOLOGY** **1. Interpretation of Tracings on Blood Pressure** Demonstration of presence of Autonomic receptors **2. Study of Effect of Drugs on Skeletal Neuromuscular Junction** Demonstration of presence of Nicotinic receptors & effect of competitive reversible & irreversible neuromuscular blockers on them	06 hrs 02 hrs

Learning Objectives	Core Contents	Teaching Hours
CLINICAL PHARMACOLOGY **PRACTICALS:** Exercises have been designed to help students to understand the principles and concepts related to rational prescription. At the end of the session, students shall be able to: • evaluate drug information sources • understand the principles of rational prescription & essential drug concept • select P drug • interprete and analyse the prescription supplied	**CLINICAL PHARMACOLOGY** **1. Drug Information Sources** Acomparative study of the 'Prescribing binformation of Drugs' as probided by the Manufacturers' Product Literatures and the authentic Drug Compendia (British National Formulary/ Bangladesh National Formulary) 2. **Essential Drug Concept** Exercise on selection Essential Drugs 3. **'P Drug' Concept** Exercise on selection 'P Drugs for different clinical situations & preparation of student formulary 4. **Prescription Audit** Exercise on 'Prescription Audit' using INRUD indicators	05 hrs 05 hrs 04 hrs 06 hrs

Pharmacology Tutorial

Learning Objectives		Contents	Teaching Hours
Students will be able to: • list each group/class of dugs • explain the mechanisms of action and Describe the uses, administration, kinetics, adverse effects & precautions of used in different clinical conditions • state the principles of rational prescription	**TERM I**	**General Pharmacology:** Pharmacokinetics and Pharmacodynamics **Autonmic Pharmacology:** • Review of Cholinergic–Anticholinergic drugs • Revives of Adrenergic–Antiadrenergic drug • Drugs acting on Renal & CVS • Review on Endocrine drug • Drugs for Bronchial asthma, PUD, Anemia	20 hours

	Term II	• Drugs ued in Anxiety, sleep disorder • Drugs used in depression, epilepsy and parkinsonism • Autacoids & NSAIDs • Chemotherapy for specific infections: Shigellosis, Enteric fever, ARIs, UTIs, malaria, tuberculosis, fungal infections • RUM: Principles of Rational prescribing & means to resist pressure for irrational prescribing, Essential Drug Concept	10 hours
	Clinical case studies & presentation – 5 clinical Cases		**15 hours**

Department of Pharmacology & Therapeutics

Clinical Pharmacology Case Report

Name of the Student :

Class Roll no :

Remarks of the Batch Teacher :

Signature of Professor of Pharmacology & Therapeutics

Particulars of the Patient

Personal history

Name of the patient: Age:

Education: Occupation:

Socio-economic Status: Ward/Bed:

Date of Admission: Date of discharge:

History of past illness (including Drug History)

Description of present illness (History & Clinical Findings)

Investigation done with results:

Provisional diagnosis:

Treatment given:

Drug therapy given

(mention the exact brand name written in the treatment sheet and their corresponding generic name):

Result &Outcome of the treatment:

Make a Summary of the Case Report (Stating personal history, complaints, clinical findings, reports of investigations done, diagnosis made, treatment given & outcome of the treatment)

A. Discussion about therapeutic problem & drug therapy given

1. Define the therapeutic problem(s) of the case you have reported.
2. Did the drug(s)/ treatment given address all the therapeutic problem?
   Yes/No
   Relate the treatment/drugs given to specific therapeutic problem.
   If no, explain why?
3. For each drug given, was their other alternatives?
4. Considering the drug(s) given & the alternatives, whether the choice was MOST appropriate **(**Consider effectiveness of drug, Risk & Cost, Route of Administration, Dosage, Frequency & Duration of Therapy and Patient's Factors like Age, Pregnancy & Diseases**).**

B. Comments on Prescription

1. Were the drug (s) written in capital letters?
2. Was the route of administration, dosage, frequency & duration of therapy properly mentioned?
3. Was the patient warned about possible adverse effects of each drug & how to avoid them?
4. Was the antimicrobials prescribed rationally (when given) ?

C. Report on Adverse Effects

Was there any reported adverse effects in this case?

If yes, what are the clinical manifestations & how they have been managed?

D. Final Comments

E. Drug Discussion

Brief information about the drug(s) used in the therapy (including Generic name/ International Non-proprietary name, Pharmacological effects, Mechanism of action, Metabolism and Elimination, Important drug-drug and drug-food interactions)

Signature of the student

Department of Pharmacology & Therapeutics

In-Course Evaluation Card of the Student

Name of Student:

Year: Roll No.: Batch: Session:

Address:

SSC Exam Year: GPA:

HSC Exam Year: GPA:

Admission in Medical College:

First Professional Examination Passed in_____at first/second/third chance

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For Official Use Only

	TERM I		TERM II		FINAL	
	Held	**Attended**	**Held**	**Attended**	**Held**	**Attended**
Lecture						
Practical						
Tutorial						
Seminar/ Integrated teaching						

Head of the Department

Department of Pharmacology & Therapeutics

_____ Medical College

In-Course Evaluation Card of the student

TERM I

SL No	Title and contents	Marks	Initial of teacher
	TERM I		
01.	General Pharmacology • Introduction to Pharmacology and its branches • Important definitions • Sources of Drug, Nomenclature and Dosage Formulation • Drug compendia (BNF, BDNF) • Routes of Drug Administration		
02.	Pharmakokinetics • Absorption, Bio-availability and drug distribution • Biotransformation and Excretion		
03.	Pharmacodynamics • Mechanism of Drug Action • Enzyme mediated drug action		
04.	Quantitative aspects of drug action • Dose response relationship and curve • Therapeutic Index and Window • Drug Antagonism • Adverse drug reaction (ADR)		
05.	Drug interaction at different level		
06,	Drug safety and Pharmacovigilance		
07.	Autonomic Pharmacology • Cholinergic agonists and antagonists • Adrenergic agonists and antagonists • Drugs used in Glaucoma • Drugs used in different types of Shock • Respiratory Pharmacology		
08.	Diuretics and Drugs used in Hypertension		
09.	Antianginal, Antiarrhythmic, Antiplatelet, Anticoagulant, Fibrinolytic, lipid regulating drugs Drugs used in heart failure		
10.	Hematinics		
11.	Drugs used in Diabetes Mellitus Steroidal agents Drugs for hypothyroidism and Anti-thyroid Drugs Hormonal Contraceptives Drugs acting on Uterus and HRT		
12.	Gastrointestinal Pharmacology • Drugs used in PUD • Antidiarrhoeal agents • Laxatives and purgatives • Drugs used in IBD • Anti-emetic and prokinetic drugs		
FIRST TERM EXAMINATION			

Students' In-Course Evaluation Card (contd.)

TERM II

01.	**Central Nervous System** • Drugs used in anxiety and sleep disorder: • Benzodiazepines and Non-Benzodiazepines • Antipsychotic, Antidepressant, Antiparkinsonian and Anticonvulsant drugs • Opioid Analgesics, Anesthetics, Skeletal muscle relaxants • Drug dependence, Tolerance, Addiction & Tachyphylaxis		
02.	**Autacoids** • Ecosasnoids • Prostaglandin analogues • Antihistamines • Serotonin agonist and antagonists • Drugs used for Migraine		
03.	NSAIDs		
04.	**General aspects of chemotherapy** • Principles of AMA • Hazards of AMA, Superinfection, Masking of Infections & PAE • Chemoprophylaxis		
05.	**Cell wall synthesis inhibitors** • Penicillin, Cephalosporin, other β-lactams • Non β lactam antimicrobials		
06.	**Protein Synthesis Inhibitors** • Aminoglycosides • Tetracyclines • Macrolides • Chloramphenicol • Newer Protein synthesis inhibitors		
07.	**Sulfonamides & Cotrimoxazole** • Sulfonamides combinations, Topical uses • Cotrimoxazole		
07.	**Quinolones & Fluoroquinolones**		
08.	Drugs used in Tuberculosis, Leprosy, Malaria, Kala-azar, Amebiasis (Also other uses of Metronidazole),Filariasis and Helminthiasis		
09.	Antifungal, Antiviral, Anti-scabies and Cancer Chemotherapy		
10.	**Clinical Pharmacology** • Essential drug concept • Rational prescribing • "P" drug concept • Drug selection for some special clinical conditions • Antimicrobial resistance		
SECOND TERM EXAMINATION			

Summative Assessment of Pharmacology & Therapeutics
Assessment Systems and Mark Distribution

Components	Marks	Total Marks
Formative assessment	10	10
WRITTEN EXAMINATION MCQ(Multiple True-False+SBA) SAQ+SEQ	 20 70	90
PRACTICAL EXAMINATION Traditional Practical Examination OSPE	 60 40	100
ORAL EXAMINATION (Structured) 2 Boards	50+50	100
	Grand Total	**300**

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- There will be separate Answer Script for MCQ
- Pass marks 60 % in each of theoretical, oral and practical

Summary of the Pharmacology Academic Program

	Term I	Term II	Total Teaching hours
Lectures/Revision	50 hours	50 hours	100 hours
Practicals & Demonstrations	30 hours	20 hours	50 hours
Tutorials	20 hours	10 hours	30 hours
Clinical case report Assignment with presentation		15hours	15 hours
Total	100 hours	95 hours	**195 hours**

PHARMACOLOGY COURSE ORGANIZATION

TERM I		TERM II	
REGULAR		REGULAR	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	21–26	27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46	47-52
Total hours for lecture	**= 50 hours**	**Total hours for lecture**	**= 50 hours**
General Principles of Pharmacology	= 12 hours	Central nervous System	= 15 hours
Autonomic Nervous System	= 10 hours	Autacoids and Dugs used in Inflammation	= 06 hours
Renal and Cardiovascular Pharmacology	= 08 hours	Chemotherapy	= 25 hours
Haemopoietic Pharmacology	= 07 hours	Clinical Pharmacology	= 04 hours
Endocrine Pharmacology	= 07 hours		
Gastrointestinal Pharmacology	= 06 hours		
Total hours for Practicals	**= 30 hours**	**Total hours for Practicals**	**= 20 hours**
Prescription writing	= 05 hours	Drug information Sources	= 05 hours
Dosage Formulations & Drug delivery techniques	= 05 hours	Essential Drug List	= 05 hours
Pharmacokinetic Study	= 04 hours	Exercise on selection of "P" drugs	= 04 hours
Pharmacodynamic Study	= 04 hours	Prescription Audit	= 06 hours
Exercise on ADR reporting form fillup	= 04 hours		
Study of autonomic receptor function	= 06 hours		
Study of drugs on Skeletal N-M junction	= 02 hours		

TERM I cont.			TERM II cont.	
Total hours for Tutorials	**= 20 hours**		**Total hours for Tutorials**	**= 10 hours**
General Pharmacology:			• Drugs ued in Anxiety, sleep disorder,	= 01 hours
Pharmacokinetics and	= 02 hours		• Drugs used in depression, epilepsy and parkinsonism	= 01 hours
Pharmacodynamics	= 02 hours		• Autacoid & NSAIDs	= 02 hours
Autonmic Pharmacology:			• Chemotherapy for specific infections: Shigellosis, Enteric fever, ARIs, UTIs, malaria, tuberculosis, fungal infections	= 04 hours
• Review of Cholinergic & Anticholinergic drugs	= 02 hours		• RUM: Principles of Rational prescribing & means to resist pressure for irrational prescribing Essential Drug Concept	= 02 hours
• Revives of Adrenergic& Antiadrenergic drug	= 02 hours = 04 hours			
• Drugs acting on Renal & CVS				
• Review on Endocrine drug	= 04 hours			
• Drugs for Bronchial asthma, PUD, Anemia	= 04 hours			