PHARMACOLOGY

1. Curriculum

The curriculum has been designed as per MCI recommendations. MCI has allocated approximately 300 hours for teaching pharmacology over a period of three semesters. The theory classes would comprise of 180 hours and the practical classes would comprise of 120 hours.

Goal

The goal of teaching the second year undergraduate students in Pharmacology is to impart a holistic approach to Pharmacology and inculcate a rational and scientific basis of therapeutics ,with regard to the basic domains of knowledge along with skill development , attitude and communication . It aims at building up of various competency levels at an undergraduate level with

* Focus on imparting a better insight into the clinical oriented training of the subject which would definitely benefit the student to be more confident and skilled to face the demands expected of him / her.

*And to include all clinically relevant aspects of the subject in the pharmacology assessment with appropriate testing and to include CAL exercise for must know aspects wherever applicable.

Specific learning objectives:

Knowledge:

At the end of the course the students shall be able to enumerate , describe ,analyse and acquire knowledge based on the following pharmacological aspects relevant to clinical practice.

1. The general principles of actions and effects of various drugs and their kinetics.

2. Dose related effects of drugs.

3. Indications, contraindications, interactions and adverse effects of must know drugs
for must know disorders , [therapeutically used drugs in day to day practice].

4. The concept of essential drugs, the essential drug list of our country, concept of P
drugs .

5. The importance of rational drug therapy.
6. To prescribe rationally based on the efficacy, safety and cost effectiveness for a
particular disease depending on both individual and community needs.

7. To prescribe drugs in special situations such as pregnancy, lactation, pediatric
population and old age.

8. To prescribe for mass therapy under National health programs.

9. The drugs of addiction and the management of addiction.

10. Antidotes and drugs used in common poisoning.

11. The various environmental and occupational pollutants, their effects on human health and their management.

12. The different types of biomedical waste, their potential risks and the management of health hazards caused by them.

13. The ethics and modalities in the development of new drugs and the ethics in clinical practice and animal ethics including evidence based medicine and practice oriented research .

14. Simple facts on legal aspects of drug use

Skills:

At the end of the course the student shall be able to demonstrate , show / show how competencies related to the following topics

1. Rational therapeutics : includes art of prescription writing, common prescribing errors and interpretation of drug labels
2. Demonstrate the ability in drug administration and drug loading skills in drug administration
3. Interpretation of clinically relevant problem based learning exercises based on prescription audit, pharmacoeconomics ,dose calculations ,drug interactions.
4. Demonstrate the ability to communicate in simulated models/ patients
5. Demonstrate attitudinal skills through simulated models / patients

6. Demonstrate the ability to interpret simple aspects on adverse drug reaction monitoring
7. Demonstrate the ability to interpret simple aspects of antibiotic policies
8. Interpretation of toxicological aspects in pharmacology

A. **Integration:** A knowledge of clinical presentation and therapy of common diseases will be imparted to the students by both horizontal and vertical integrated teaching methods , seminars and group discussions .

Example : Cardiovascular pharmacology related topics like acute myocardial infarction ,congestive cardiac failure . integrating departments Anatomy, Physiology, Pathology, Pharmacology, Medicine.

Teaching hours in pharmacology : phase 2 ,5th to 7th semester

s.no	Teaching methods	Detailed time distribution	Number of hours
1.	Interactive lectures		110
2.	Problem based learning	Must know aspects	20
3.	Small group discussions		14
4.	Integrated lectures		8
5.	Tutorials	At the end of each system	14
6.	Others [seminars,quiz,role play]		14
	Total		**180**
	Practicals [small group teaching]		

1.	Charts	Prescription writing Prescription audit Clinical problem solving exercise Dose calculation Pharmacoeconomics Clinical pharmacology Toxicology	15 10 10 5 5 10 10
2.	Spotters		5
3.	OSPE		20
4.	Computer assisted learning		20
	Practical exam		5
	Viva		5
	Total practical hours		**120**
	Grand Total		**300**

Teaching methodology

Theory :

1. Interactive Lectures
2. Problem Based Learning
3. Small group discussions
4. Integrated lectures
5. Tutorials.
6. Others [Seminars ,Mini quiz,Role play]

Practical teaching learning methods :

1. Small group teaching of charts
2. OSPE [includes mannequin models]
3. Computer Assisted Learning

Theory syllabus

General Guidelines :

- The important undergraduate based theory lectures can be scheduled to be taught based on different clinical postings and prescribing pattern of common drugs. The students can be instructed to collect prescription data on the common ailments to enable an interactive session for a forth coming lecture. The students of a particular clinical posting should be intimated at least 10 – 15 days earlier/ prior to the planned lecture. The other students should come with the Prepared theory background .

  [Examples of important must know ailments : Hypertension, Diabetes Mellitus, Myocardial Infarction, Congestive Cardiac Failure ,Shock, Bronchial Asthma, Anemia, Peptic Ulcer ,Hypothyroidism , Hyperthyroidism , Epilepsy, Parkinsonism, Major Depression, Schizophrenia, Rheumatoid Arthritis, Glaucoma, Urinary Tract Infections, Tuberculosis, Typhoid, HIV, Amoebiasis, etc]
- Specific learning objectives and detailed time distribution for each teaching learning method should be framed for each system by the department in common, for uniform implementation and the theory classes should be based on that.
- The students can be divided into small groups and assigned into different subtopics of the subject to be dealt for the day . They should be given adequate preparatory time and each group can discuss their views on the

particular topic which can be summarized by the teacher/students in the end. This can be done for must know topics.

Theory Syllabus : Pharmacology for undergraduate curriculum

Topic	Must Know	Desirable To Know	Nice To Know

General Pharmacology	1.Terminologies 2. Definitions 3.Routes of drug administration 4.Pharmacokinetics Passage of drug across biological membranes, Absorption and bioavailability, Distribution redistribution and plasma protein binding, Biotransformation reactions , Enzyme inhibition and induction, First pass metabolism, Routes of excretion , Plasma half life 5. Pharmacodynamics – mechanism of drug action , Receptors, Combined effect of drugs, Factors modifying drug action 6.Adverse Drug effects and pharmacovigilance 7.Concepts of therapeutic index and margin of safety 8.Ethics – biomedical ethics on rational prescribing,biomedical ethics on medical research	1.Drug nomenclature 2.Sources of drugs 3.Pharmacokinetics -microsomal enzyme classes, First order and zero order kinetics Loading and maintenance doses, Prolongation of drug action Transducer mechanisms, Regulation of Receptors, Dose Response Relationship, Rational Use Of Medicines Drug Interactions, Pharmacogenomics, Pharmacogenetics	1.Pharmacopia 2.Essential Medicines Concept 3.Kinetics Of Elimination – Clearance ,Repeated Drug Administrations , Plateau Principle , Target Level Strategy, Monitoring Plasma Concentrations Evidence Based Medicine , New Drug Development Drug Regulations& Drug Acts Bioassays

Autonomic Nervous System 1.Neurohumoral Transmission		Neurohumoral Transmission – Steps , Cotransmission	Drug Dosage
2.Cholinergic System And Drugs	Cholinergic Transmission, Receptors, Cholinergic Drugs – Pharmacology, Anticholinesterases, Anticholinergic Drugs – Pharmacology		
		Drugs Acting On Autonomic Ganglia, Ganglion Blocking Agents	
3.Adrenergic System And Drugs	Adrenergic Transmission , Receptors, Adrenergic Drugs – Pharmacology, Antiadrenergic Drugs, Drugs For Glaucoma		
Autacoids and related Drugs 1.Histamine And Antihistamines	H1 Antagonists - Pharmacology	Histamine Actions And Role	Histamine Synthesis And Degradation
2. 5HT And Its Antagonists And Drug Therapy Of Migraine	Pathophysiological Roles Of 5 HT, 5HT Receptors, 5HT Antagonists, Ergot Alkaloids, Drug Therapy Of Migraine	Synthesis And Destruction, Actions Of 5HT	5HT Receptors – Distribution And Individual Roles Of Different Receptors
3.Prostaglandins, Leukotrienes And PAF	Biosynthesis And Degradation Of PGs And LTs, Uses Of PGs And LTs, PAF	Actions And Pathophysiological Roles Of PGs And LTs	Prostanoid Receptors And LTReceptors
4.NSAIDS	Classification, Mechanism Of Action, Actions, Uses, Adverse Effects Of NSAID Selective Cox – 2 Inhibitors	Pharmacology Of Individual NSAIDS	Choice Of NSAID And Analgesic Combinations

5.Antirheumatoid And Anti Gout Drugs	Classification And Pharmacology Of Drugs Used For Rheumatology And Gout	Individual Pharmacological Variations	
Respiratory System Drugs For Cough And Bronchial Asthma	Mucolytics, Drugs Used For Bronchial Asthma, Mechanism Of Drugs Used For Bronchial Asthma And Their Pharmacology, Status Asthmaticus	Individual Drugs, Pharmacological Variations	Choice Of Treatment In Bronchial Asthma, Drugs Used For Cough
Hormones 1.Anterior Pituitary Hormones	Somatostatin And Its Analogues, Gonadotropins, Gnrh Agonists	Growth Hormone, Prolactin, GNRH, TSH, ACTH	Pathophysiological Role Of Each Hormone
2.Thyroid Hormones	Actions, Uses Of Thyroid Hormones, Thyroid Inhibitors	Synthesis, Metabolism And Regulation Of Secretion Of Thyroid Hormones	Individual Drug Variations Among Antithyroid Drugs
3.Insulin, Oral Hypoglycemic Drugs And Glucagon	Insulin Actions, Mechanism, Types And Uses, Diabetic Ketoacidosis, Newer Insulin Delivery Devices, Oral antidiabetic agents – Classification And Pharmacology Of Individual Drugs	Insulin Resistance, Difference In Pharmacology Of Individual Drugs, Glucagon, Status Of Oral Antidiabetic In DM	
4.Corticosteroids	Actions, Mechanism, Uses, Adverse Effects, Contraindications Of Glucocorticoids	Mineralocorticoid Actions, Gene Mediated Cellular Actions Of Glucocorticoids	Biosynthesis, Individual Differences Among Steroids
5.Androgens	Actions, Mechanism, Adverse Effects Andd Uses Of Androgens, Anabolic Steroids, Antiandrogens	Drugs For Erectile Dysfunction	Regulation Of Secretion
6.Estrogen, Progestin And Contraceptive	Actions, Uses And Mechanism Of Estrogen And Progestinsantiestrogens And Serms, Aromatase Inhibitors, Antiprogestins, Contraceptive Pills– Types, Adverse Effects And Contraindications Biosynthesis And Regulation, Male Contraception, Contraceptives		Individual Drug Differences
7.Oxytocin And Drugs Acting On Uterus	Oxytocin, Ergot Alkaloids Pharmacology, Tocolytics	Uterine Stimulants	Individual Drug Differences Among Tocolytics

8.Drugs Affecting Calcium Balance	Calcitonin, Vitamin D, Bisphosphonates	Calcium – Physiological Role And Uses, Parathyroid Hormone	
Peripheral Nervous System 1.Skeletal Muscle Relaxants	Classification, Mechanism And Pharmacology Of Different Groups Of Peripheral And Centrally Acting Skeletal Muscle Relaxants	Differences Between Competitive And Depolarising Block	Notes On Individual Drugs
2.Local Anaesthetics	Classification, Mechanism Of Action, Uses And Techniques Of Local Anaesthetics	Adverse Effects, Individual Compounds	Chemistry,Kinetics And Comparative Properties Of Local Anaesthetics
Central Nervous System 1.General Anaesthetics	Stages Of Anaesthesia, Classification, Pharmacology Of General Anaesthetics, Pre Anaesthetic Medication	Mechanism Of General Anaesthesia, Kinetics Of Inhalational Drugs	Techniques Of Inhalational Anaesthetics, Individual Drug Variations
2.Alcohols	Acute Alcohol Intoxication, Chronic Alcoholism, Aldehyde Dehydrogenase Inhibitor, Methyl Alcohol Poisoning	Pharmacological Actions, Mechanism, Kinetics And Interactions Of Alcohol	Food Value And Alcoholic Beverages
3.Sedative Hypnotics	Classification, Pharmacology Of Barbiturates And Benzodiazepines, Z Compounds,Melatonin, Benzodiazepine Antagonist	Drugs Affecting GABA Receptor Gated Chloride Channel, Individual Drug Variations	Sleep Stages , Kinetics Of Drugs
4.Antiepileptic Drugs	Classification, Pharmacology Of Different Drugs, Status Epilepticus	Treatment Of Epilepsies ,Types Of Epilepsies	Kinetics Of Drugs
5.Antiparkinsonian Drugs	Classification , Pharmacology Of Individual Drugs	Pathophysiology Of Parkinsonism	Kinetics Of Drugs And Individual Drug Variations
6.Antipsychotics And Antimanic Drugs	Classification And Actions Of Antipsychotics, Atypical Antipsychotics, Adverse Effects And Uses Of Antipsychotics, Antimanic Drugs	Hallucinogens, Cannabinoids	Types Of Psychosis, Distinctive Features Of Neuroleptics
7.Antidepressant And Antianxiety Drugs	Classification Of Antidepressants, Pharmacology Of Each Group Of Drugs, Classification And Pharmacology Of Antianxiety Drugs	Differences Among Individual Drugs Treatment Of Anxiety	Comparison And Individual Properties Of Drugs
8.Opioid Analgesics	Classification, Pharmacology Of Morphine, Agonist Antagonists Of Opioid	Endogenous Opioid Peptides, Individual Drug Properties	

9.Cns Stimulants	Classification, Cognition Enhancers	Analeptics, Psychostimulants	Individual Drug Properties
Cardiovascular System 1.Renin Angiotensin System	ACE Inhibitors Pharmacology, ARBs Pharmacology	RAS, Actions, Pathophysiological Roles Of Angiotensin, Direct Renin Inhibitor	Plasma Kinins
2.Cardiac Glycosides	Pharmacology Of Digitalis, Drugs Used For CCF And Their Mechanisms	Properties Of Individual Drugs	Chemistry Of Cardiac Glycosides And Kinetics
3.Antiarrythmic Drugs	Classification, Pharmacology Of Each Group	Individual Drug Properties	Types Of Arrythmia, Choice And Use Of Antiarrythmic Drugs
4.Antianginal Drugs	Classification, Pharmacology Of Individual Groups, Treatment Of Myocardial Infarction	Individual Drug Properties Drugs For Peripheral Vascular Diseases	Types Of Angina
5.Antihypertensive Drugs 6.Shock	Classification, Pharmacology Of Individual Groups, Hypertensive Emergencies, Hypertensive In Pregnancy	Status Of Each Group As Antihypertensive, Treatment Of Hypertension Treatment Of Shock	Combination Therapy, Parenteral Therapy
Drugs Acting On Kidney 1.Diuretics	Classification, Pharmacology Of Individual Groups	Individual Drug Differences	
2.Antidiuretics	Vasopressin Analogues	ADH Pharmacology	Vasopressin Antagonists, Thiazides As Antidiuretics
Blood 1.Haematinics And Erythropoietin	Iron Preparations , Adverse Effects, Uses Of Iron, Iron Poisoning, Erythropoietin	Deficiency Manifestations, Uses Of Vit B12 , Folic Acid	Kinetics Of Iron, Kinetics Of Maturation Factors
2.Drugs Affecting Coagulation	Vit K , Classification Of Anticoagulants, Pharmacology Of Heparin , Oral Anticoagulants ,Fibrinolytics, Antiplatelet Drugs	Coagulants, Direct Thrombin Inhibitors, Direct Factor Xa Inhibitors, Antifibrinolytics	Kinetics And Properties Of Individual Drugs
3.Hypolipidemic Drugs	Classification, Pharmacology Of Individual Groups	Characteristics Of Individual Drugs, Plasma Expanders, Total Parenteral Nutrition	Lipid Transport And Lipoproteinemias

Gastrointestinal Tract 1.Drugs For Peptic Ulcer	Classification, Pharmacology Of Individual Groups, Anti H.Pylori Drugs	Characteristics Of Individual Drugs	Regulation Of Gastric Acid Secretion
2.Antiemetics And Prokinetics	Classification, Pharmacology Of Individual Groups, Prokinetic Drugs, 5HT 3 Antagonists, Nk1 Receptor Antagonists	Emetics, Other Antiemetics	Digestants, Gall Stone Dissolving Drugs
3.Antidiarrheal Drugs And Drugs For Constipation	Laxatives Classification, Lactulose, Stool Softeners, Drugs For Inflammatory Bowel Diseases	Treatment Of Diarrhea, ORS, Other Laxatives	Choice And Use Of Purgatives, Non Specific Anti Diarrheal Drugs, Antimotility Drugs
Antimicrobial Drugs 1.General Considerations	Drug Resistance, Super Infections,	Classification, Mechanism Of Action, Combined Use Of Antimicrobial	Problems With Use Of AMA, Choice Of Antimicrobial Agent
2.Sulfonamides and flouroquinolones	Classification, pharmacology of individual groups	Characteristics of individual drugs	
3.Beta Lactam Antibiotics	Classification, pharmacology of individual groups	Characteristics of individual drugs	
4.Aminoglycosides	Classification, Pharmacology Of Individual Groups	Characteristics Of Individual Drugs	
5.Macrolide, Lincosamide, Glycopeptide	Classification, Pharmacology Of Individual Groups	Characteristics Of Individual Drugs	Urinary Antiseptics
6.Antituberculous Drugs	Classification, Pharmacology Of Individual Groups, Short Course Chemotherapy	Characteristics Of Individual Drugs	
7.Antileprotic Drugs	Classification, Pharmacology Of Individual Groups	Characteristics Of Individual Drugs	
8.Antifungal Drugs	Classification, Pharmacology Of Individual Groups	Characteristics Of Individual Drugs	
9.Antiviral Drugs	Classification, Pharmacology Of Individual Groups	Characteristics Of Individual Drugs	HIV Treatment Principles And Guidelines
10.Antimalarial Drugs	Classification, Pharmacology Of Individual Groups	Characteristics Of Individual Drugs	
11.Antiamoebic And Other Protozoal Drugs	Classification, Pharmacology Of Individual Groups	Characteristics Of Individual Drugs, Other Antiprotozoal Drugs	
12.Antihelminthic Drugs	Classification, Pharmacology Of Individual Groups	Characteristics Of Individual Drugs	
Anticancer Drugs	Classification, Pharmacology Of Individual Groups	Characteristics Of Individual Drugs, General Principles Of Chemotherapy Of Cancer, Toxicity Amelioration	

Miscellaneous	1.Immunosuppressant Drugs 2.Treatment Of Scabies, Drugs For Psoriasis, Drugs For Acne Vulgaris 3.Chelating Agents, 4.Vaccines 5.Drug Interactions 6.Vitamins , Antioxidants	Enzymes In Therapy, Drugs Acting On Skin, Paediatric And Geriatric Pharmacology, Therapeutic Gases	Antiseptics And Disinfectants, Environmental Toxicants

Bio medical ethics: The pharmacology lecture classes should have an introductory class on biomedical code and values of ethics.

PRACTICAL SYLLABUS:

It was resolved to adopt compulsorily the Medical Council of India's Minimum standard requirements regulations 1999 amended upto July 2015 as per the terms of Notification published on 23.10.2008 in the Gazette, Government of India which is as follows:

"for teaching Physiology and Pharmacology in UG curriculum the required knowledge and skill should be imparted by using computer assisted module. Only an animal hold area, as per CPCSEA Guidelines is required."

PRACTICAL SCHEDULE

S.no	Contents	Mode of teaching	Student activity	10 point score
	Pharmacology – an ever changing science			
	Learning objectives			
A.	**General pharmacology**			
1.	Drug information resources	CAL	visit to library	1
2.	Sources of new drugs & common dosage forms / Spotter	CAL / Lecture	Exercise on identity /spotter	6
3.	Animal experiments in pharmacology	CAL /Lecture	Visit to animal house	3
4.	Clinical drug development and biomedical ethics	CAL / chart	OSPE / Exercise	3
5.	Therapeutic drug monitoring	CAL /Lecture	Exercise	3
6.	Instruments in pharmacology	CAL / Lab visit	Exercise	1
7.	Weights ,measures and pharmaceutical calculations	Lecture	Exercise	6
B.	**Clinical pharmacology**			
1.	Principles of prescription writing	Lecture	Exercise	6
2.	Interpretation of drug orders and labels	Lecture	Exercise	6
3.	Prescription writing exercise	Charts	Exercise	6
4.	Dose calculation & Standard doses of commonly prescribed drugs	Charts	Exercise	6
5.	Prescription audit	Charts	Exercise	6

6.	Pharmacoeconomics	Charts	Exercise	6
7.	Clinical problem solving exercise	Charts	Exercise	6
9.	Qualitative and quantitative pharmacology exercise	Charts	Exercise	6
	Toxicology	Chart	Exercise	6
10.	Adverse drug reaction assessment exercise	Students ADR assessment form	To collect at least 1 or 2 reports / discussion in small groups	1
11.	Antibiotic policy making exercise	Students Antibiotic policy form	To collect at least 1 or 2 reports / discussion in small groups	1
12.	P drug concept & exercise on common ailments	Lecture	Exercise on 5 must know disease	1
C.	**Pharmacological skill development exercises & experiments / Objective structured practical examination : Examples**			
1.	Test dose preparation of penicillin	OSPE 1	Prep	6
2.	Preparation of prefilled Adrenalin injection for emergency handling	OSPE 2	Prep	6
3.	Administration of eye drops	OSPE 3	Demonstrate skill with mannequin	6
4.	Identification of different syringes	OSPE 4	Exercise on identity	6
5.	Preparation of an IV line	OSPE 5	Demonstrate skill	6
6.	Insulin :Mixing of long acting and short acting insulin	OSPE 6	Demonstrate skill	6

7.	Preparation of emergency tray in Anaphylaxis	OSPE 7	Demonstrate skill	6
9.	Preparation of emergency tray in Acute myocardial infarction	OSPE 8	Demonstrate skill	6
	Picking out the drugs used in must know disorders and their rationale	OSPE 9	Exercise	6
10.	Interpretation of drug labels	OSPE 10	Exercise	6
11.	Identification of common prescribing errors	OSPE 11	Exercise on identity	6
12	Identification of banned drugs	OSPE 12	Exercise on identity	6
13	Identification of Preanaesthetic medications	OSPE 13	Exercise on identity	6
14	Identifying the drug producing the toxicity/specific adverse drug reaction	OSPE 14	Exercise on identity	6
15	Clinical drug development model blocks arrangement	OSPE 15	Arrange assorted block models	6
16	Aspiration from a vial	OSPE 16	Demonstrate skill	6
17	Aspiration from an ampoule	OSPE 17	Demonstrate skill	6
18	Reconstitution of dry powder form of drug	OSPE 18	Demonstrate skill	6
19	Intramuscular drug administration	CAL / mannequin	Demonstrate skill with mannequin	6
20	Intravenous drug administration	CAL / mannequin	Demonstrate skill with mannequin	6
21	Subcutaneous drug administration	CAL / mannequin	Demonstrate skill with mannequin	6

22	Metered dose inhaler	CAL	Demonstrate skill with inhaler	6
23	Nebulizer	CAL / mannequin	Demonstrate skill with mannequin	6
D.	**Toxicology & Small animal experiments / techniques for undergraduates**			
1.	Identification of picture [Plant Poisons & symptoms]	CAL / Chart	Exercise/spotter	6
2.	Effect of drugs on rabbit eye : Miotic	CAL	Exercise	3
3.	Effect of drugs on rabbit eye : Mydriatic	CAL	Exercise	3
4.	Effect of analgesics on albino mice : physical method	CAL	Exercise	3
5.	Effect of GA on rat	CAL	Exercise	3

Note : 10 Point Score [6: 3: 1], 6 : Must Know , 3 : Desirable To Know , 1 : Nice To Know

Requirements for practical classes :

- Updated charts on must know drugs for must know disorders as per syllabus
- **10 computers for 125 students**
  Mannequins: IM model deltoid , IM model gluteal . IV model forearm, subcutaneous model / intradermal model. [at least 2 of each for training on rotation]
- Inhalers and Nebulizer for demonstration
- Other necessary material as per OSPE model [e.g.: drug tray, drugs , syringes , drug development block models , beakers ,test tubes , test tube holders ,vials, ampoules etc.]

CAL station:

- Each module: 15 -20 minutes
- Computers needed: 10 for 125 students
- No. of instructors: 10 [at least 8]
- E.g. 250 students can be divided into 3 batches: A, B, C [84 +83+ 83 posted on rotational basis to pharmacology ,microbiology, pathology during practical hours]
- CAL can be conducted for one batch of around 84 students at a time
- Each batch will further be divided into smaller groups of 8 – 12 students

REFERENCE BOOKS : Latest Editions

1. Basics and Clinical Pharmacology : Bertram G. Katzung
2. Essentials Of Medical Pharmacology : K.D.Tripathi
3. Pharmacology And Pharmacotherapeutics : Satoskar
4. Clinical Pharmacology : Bennet And Brown
5. Goodman & Gilmans Pharmacological Basis Of Therapeutics

THEORY EXAMINATION

Theory examination :

Theory Question Paper Pattern

	No. of Questions	Marks
1. Essay	1 x 10 marks	10
2. Brief answers	6 x 4 marks	24
3 Short answers	6 x 1 marks	6

	Total	40

Practical examination including OSPE: 25 Marks

Practical 1 : 15 Marks

Practical 2 : 5 Marks

OSPE: 5 Marks

Total 25 marks

Viva : 15

Internal assessment : 30 marks (Theory 15, Practical 10 &Record 5)

Practical 1 :

1.Spotters 2 marks

2.Prescription writing - - 3 marks

3.Prescription audit - - 3 marks

4.Clinical problem solving exercises - - 3 marks

(Therapy oriented problems of

drug adverse reactions and

interaction of commonly used drugs)

5.Dosage calculation - - 2 marks

6. Pharmacoeconomic problems - - 2 marks

Practical 2:

1.Toxicology	- -	2.5 marks
2.Clinical pharmacology	- -	2.5 marks
OSPE	- -	5x1 = 5 marks

Viva topics : Total 15 marks

I . General Pharmacology 4 marks

Autonomic Nervous system

Central Nervous system

Ocular Pharmacology

II . Autacoids 4 marks

Drugs acting on Kidney

Cardiovascular system including Blood

Respiratory system

Therapeutic gases

Gastrointestinal system

III. Chemotherapy 4 marks

Dermatological Pharmacology

Immunomodulators

IV. Endocrines 3 marks

Enzymes in therapy

Vitamins

Toxicology

Internal assessment

- Each chapter will be followed by a theory written test and viva voce. Average of all the test marks should be considered for the final internal assessment. If the student is absent himself for any test, a repeat test can be given according to the departmental decision.
- At the same time practical exams should be conducted at periodic intervals on the topics covered as per syllabus. The internal assessment marks will be an average of theory, viva voce and practical exams including the completed record work .
- Internal assessment based on the above should be forwarded to the university at quarterly intervals along with attendance for theory and practical's .

Internal assessment test: unit wise

Unit	Topics	Month
1.	General pharmacology	2nd week of December
2.	Autonomic nervous system and peripheral nervous system	1st week of February
3.	Central nervous system	1st week of April
4.	Cardiovascular system ,Blood and Diuretics	1st week of June
5.	RS,GIT ,Autacoids	4th week of July
6.	Endocrine	3rd week of September
7.	Chemotherapy 1	3rd week of October
8.	Chemotherapy 2	3rd week of November

Maintenance of records and log books

- A documentation of the must know knowledge gained by the student in the subject is mandatory. Every student should submit a record notebook at the end of his course for certificate of completion during his examination with assessment at periodic intervals .
- A log book with regard to day to day progress should be submitted every month to the concerned staff / mentor for verification. [Attitude assessment eg .visit to library, participation in quiz, seminars ,CMEs etc]

Research activities:

Research must be implemented during the course of the undergraduate study**.** A basic knowledge about preclinical studies and clinical trials along with the basics of protocol writing, biostatistics should be introduced through workshops/ seminars/guest lectures/ assignment/ mini projects [eg. Drug utilization studies], to all the undergraduate students. The students can be motivated on the importance of attending CME s, Conferences ,Symposias etc.

Note: Samples of antibiotic policy form, adverse drug reaction monitoring form, feedback form are provided for uniform implementation. The record note book should be indexed uniformly in all the medical colleges ensuring all relevant and important topics are implemented in the curriculum for all the medical under graduates students without fail as per practical schedule.

ASSIGNMENT ON ANTIBIOTIC POLICY [sample form]

Students Reporting Form , Department of Pharmacology & Microbiology

Name of the patient : Department / ward:

Age & sex : OP No / IP No. :

Address :

Provisional diagnosis :

Empirical antibiotic therapy given: 1.

with dose and duration 2.

3.

Culture & Sensitivity recommended : yes / no

If yes, result of report:

Any change in the treatment after C&S report:

Rationale behind the choice of treatment, dose & duration before and after culture and sensitivity:

Classification, mechanism of action, uses, most common and serious adverse effects of the prescribed antibiotic:

ASSIGNMENT ON ADVERSE DRUG REACTION MONITORING [sample form]

Department of pharmacology, students reporting form

Patient name:

Age/Sex :

OP/IP No:

Ward / Unit:

Group of the drug considered:

Adverse event noted:

Analysis of the report:

1. Known ADRs reported (**Expected**) :

2. Other ADRs reported (**Unexpected**) :

3. Relationship of the ADR with administered drugs:

Certain ☐	Probable ☐	Possible ☐
Unlikely ☐	Unclassified ☐	Unclassifiable ☐

4. Comments:

Followed by small group discussion.