

STUDY GUIDE OF PHARMACOLOGY

MBBS COURSE

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INTRODUCTION

Pharmacology and therapeutics is very important basic subject which is covered during 3rd year of MBBS. Pharmacology is taught with its clinical application. Due to nature of this subject, educational strategies of diverse approaches are employed. Educational resources like video, biological specimens, microscopy slides, books and journals are used to learn this diverse subject. Clinical exposure is used for clinical application of pharmacology

Thrid year are divided in three educational terms which conclude at with formative assessment test. End of year is University exam for summative assessment.

EDUCATIONAL HOURS

Year	Theory	Practical	Total
3rd year	150 hours	150 hours	300
Total	150 hours in 36 weeks/year	150 hours	300 hours
Strategy	Lectures Problem based learning Small group discussion Case based discussion	Laboratory session Prescription Writing Clinical sessions	

LEARNING OUTCOMES

AT THE END OF CURRICULUM STUDENT WILL BE ABLE TO

- Identify different types of groups of medicine.
- Explain pharmacokinetics of different drugs.
- Discuss indications of different drugs in clinical use.
- Enlist side effects of different drugs in clinical use.
- Write prescription for common diseases.
- Performed practicals of different drugs effects.
- Demonstrate skills to identify and manage drugs allergies.
- Describe different routes of drugs administrations.

EDUCATION STRATEGIES

The educational strategies in this curriculum are multiple and aligned with domain of learning and according to the desired outcome

Interactive lectures

One-third of the curriculum will be delivered in a traditional didactic format including PowerPoint presentations and case discussions. Didactic education is considered to be a one-way transmission of material from teacher to learner, we cannot overlook the possibility of meaningful interaction between experts and learners during live lectures. This type of interaction, which allows for immediate clarification of concepts and extension of knowledge, may be particularly important for novice learners who have relatively little exposure to the subject matter, such as our study population.

Problem based learning

A lot of emphasis is on case based discussion. Problem-based learning (PBL) is complex and heterogeneous. A wide variety of educational methods are referred as PBL. These include Lecture-based case, Case based lecture, Case based discussions, Problem or inquiry based and Closed loop or reiterative. Incorporation of case based discussion in teaching enhances the critical thinking and problem-solving skills. It also helps in developing a broader prospective of clinical case scenarios.

Small Group Discussion

Small group discussion provides a unique environment to achieve high standards in medical education. Activation of prior knowledge, exchange of ideas, and engagement at a higher cognitive level are assumed to result in deeper learning and better academic achievements by students.

Video sessions

Pharmacology is a subject which involves visual learning and formulating concepts. Video assisted learning sessions also provides opportunities to learn effects of drugs.

Laboratory Sessions

Laboratory sessions are important as they provide opportunity for experiential learning in terms of study of slides and identification of tissues.

Early clinical Exposure (ECE)

Clinical skills session are important part of curriculum to achieve psychomotor and affective outcomes. This provide opportunity for medical students in early years and will stimulate contextual learning.

ASSESSMENT

MCQ's and SEQ's

Multiple choice question and short essay question test will be used at the end of part of curriculum to assess the learning of knowledge. These all assessment exercises will be formative. The written tests like Multiple-Choice Questions (MCQs) and Short-Essay Questions (SEQs) test formats are used for the assessment of cognitive domain. The MCQs are more objective and essentially select type of item response format. MCQs have a cueing effect, which promotes guessing and leads to higher scores. In addition, writing MCQs of higher cognitive level of problem solving is challenging. On the contrary, the SEQs are more subjective and have a supply or construct type item response format, which does not have any cueing effect and can effectively assess problem solving skills.

Clinical exam and OSCE

Short case and OSCE will be used to evaluate clinical skills and procedural skills at the ward end of placement. The OSCE is a method of clinical skill assessment, and it has been reported to be appropriate for assessing learning achievement levels in the psychomotor and emotional domains, which are difficult to evaluate with written examinations.

Viva Voce

Viva voce is used for assessment of knowledge and problem solving ability of students. This method is useful evaluating cognitive domain.

Assignments

Students of different year will be given assignment of different nature such as research and literature search and surveys

INTERNAL ASSESSMENT

- i. The weightage of internal assessment shall be 10% of totals marks.
- ii. Continuous internal assessment shall consist of evaluation at the end of each assignments, e.g. Practical, class tests etc., attitudinal assessment from educational supervisors.
- iii. Assessment of knowledge, Skills and Attitude shall contribute toward internal assessment. Methods used to assess these domains shall include Multiple Choice Questions of one-best type, Short essay questions, Oral/Viva, and Practical/Clinical examinations.
- iv. The score of internal assessment shall contribute to the score in the final examination, Final university examination of each subject shall contribute to total score, and the candidate shall pass in aggregate.
- v. Proper record of continuous internal assessment shall be maintained.

LEARNING RESOURCES

The department of pharmacology will require following resources for implementation resources:

- Human resource
- Instructors (faculty members)
- Curriculum coordinator curriculum secretary
- Infrastructure
- Lecture hall with AV aids
- Tutorial room with AV aids
- Pharmacology Lab
- Simulated patients and simulated manikins
- Computers

LISTS OF CONTENT RESOURCES

- Basic and Clinical Pharmacology by Katzung, 10th Ed., Mc Graw-Hill.
- Pharmacology by Champe and Harvey, 2nd Ed., Lippincott Williams & Wilkins.

CONTENTS MODULES

S.No	Topic
1	Module 1 General Pharmacology
2	Module 2 Dermatological and topical drugs
3	Module 3 Drugs acting on Gastrointestinal Tract
4	Module 4 Cardiovascular Drugs
5	Module 5 Diuretics
6	Module 6 Autocoids
7	Module 7 Drugs Acting on Autonomic Nervous system
8	Module 8 Central Nervous system
9	Module 9 Analgesics
10	Module 10 Drugs Acting on Respiratory system
11	Module 11 Drugs Acting on Endocrine system
12	Module 12 Drugs Acting on Uterus
13	Module 13 Experimental Phamacology
14	Module 14 Prescription Writing

IMPLEMENTATION

The curriculum will be spread over 1 year with 36 working weeks each year. During this period student will be exposed to various education strategies to achieve the learning objectives.

3rd Year.

In this year student will be exposed to pharmacology lab, Prescription writing and clinical exposure to develop understanding of phamacology and its applied aspects.

Theory (Lecture, SGD and PBL)	Practical (Early clinical exposure, Histo-Lab, Museum)
150 Hours (36 Weeks)	150 Hours

Third Year			
	First term	Second term	Third term
1st Term			
2nd Term			
3rd Term			
Assessment			

PROGRAMME EVALUATION

Purpose of Evaluation

The major goals of the evaluation are to provide information that the students can use to achieve curricular objectives and that the faculty can use to monitor quality of and improve curriculum.

Design of Evaluation

The evaluation design as only posttest.

Users of evaluation: students, curriculum faculty, Principal Office

Resources: Curriculum faculty and departmental secretaries. No additional funding

Evaluation question:

- What percentage of students achieved 75% mandatory attendance?
- What percentage of students achieved pass marks in university exam?
- What are the strengths of the curriculum? What are the weaknesses? How can the curriculum can be improved?

Because of limited resources, the evaluation was kept simple. Data Collection was integrated into the curriculum schedule. The major goals of the evaluation are to provide information that the students can use to achieve curricular objectives and that the faculty can use to monitor quality of and improve curriculum. The evaluation design as only posttest.

End of curriculum evaluation form:

This will be filled by students and faculty members for evaluation of adequacy with each content was covered, whether they would recommend the curriculum to others and written comments on curriculum strengths, weaknesses and suggestions for improvements.

Annual Report:

Based on evaluation of the educational programe report will be generated annually and submitted to Medical Educational Department.

PHARMACOLOGY AND THERAPEUTICS

TABLE OF SPECIFICATION (Theory)			
Sr. No.	Topic Specification	MCQ's	SEQ's
1	General Pharmacology	01	05
2	Drugs Acting on autonomic nervous system / Skeletal muscle system	01	25+01
3	Drugs acting on central nervous system	01	06
4	Autacoids / NSAID's/ Anti-Gout drugs / Anti-Rheumatoid drugs	01	06
5	<ul style="list-style-type: none"> • Drugs acting on cardiovascular system • Diuretics • Drygs acting on blood 	0.5	10
6	<ul style="list-style-type: none"> • Drugs acting on gastrointestinal Tract • Drugs Acting on respiratory system 	0.5	02
7	Antimicrobial drugs and antibiotics of general use	01	06
8	Antimycobacterial drugs/ Antiprotozoal Drugs Anthelmintics	01	06
9	Anti-Neoplastic / Antiviral drugs / Antifungal Drugs	0.5	05
10	Drugs acting on endocrine system	01	06

Contents	Objectives	Do- main	Strategy	Assess- ment
Module 1: General Pharmacology.				
	<ul style="list-style-type: none"> • Definition of pharmacology, objectives of learning pharmacology, definition of drug and drug nomenclature. • Branches/divisions of pharmacology. • Sources of drugs. • Active principles of drugs and pharmacopoeias. • Dosage forms and doses of drugs. • Route of drug administration. • Absorption of drugs and processes involved in drug absorption. • Factors modifying absorption of drugs. • Transport of drugs across cell-membrane. • Bio-availability, its clinical significance and factors affecting bioavailability. • Drug reservoirs, distribution and redistribution of drugs, plasma protein binding. • Pro-drug, bio-transformation of drugs, enzyme induction, enzyme inhibition and entero-hepatic circulation. • Plasma half-life of drugs, steady state concentration, its clinical importance and factors affecting it. • Excretion of drugs. • Mechanism of drug action. • Dose response curves, structure-activity relationship. • Factors modifying action and doses of drugs. • Pharmacokinetics, pharmacodynamics and receptors. • Pharmacogenetics. 	C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3	LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD	SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ/ OSPE SEQ/MCQ/ OSPE SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ

Contents	Objectives	Domain	Strategy	Assessment
Module 2: Dermatological and topical drugs (Locally Acting Drugs)				
	<ul style="list-style-type: none"> • Demulcents, emollients, irritants, counter irritants, astringents. • Antiseborrheics, locally acting enzymes. • Antiseptics and disinfectants. • Ectoparasitocides. 	C3 C3 C3 C3	LEC/SGD LEC/SGD LEC/SGD LEC/SGD	SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ
Module 3: Drugs Acting on Gastrointestinal Tract:				
	<ul style="list-style-type: none"> • Emetics and anti emetics. • Drugs affecting motility of GIT. • Ulcer healing drugs. • Purgatives/ laxatives. • Antidiarrhoeals. 	C3 C3 C3 C3 C3	LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD	SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ
Module 4: Cardiovascular Drugs				
	<ul style="list-style-type: none"> • Antiarrhythmic drugs. • Inotropic drugs. • Antihypertensive drugs. • Thrombolytics/ anticoagulants/ antiplatelets. • Antihyperlipidemic drugs. • Anti-anginal drugs. • Drug management of CCF. 	C3 C3 C3 C3 C3 C3 C3	LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD	SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ
Module 5: Diuretics				
Module 6: Autocoids				

Contents	Objectives	Domain	Strategy	Assessment
Module 7: Drugs Acting on Autonomic Nervous System Cholinergic Drugs.	<ul style="list-style-type: none"> Choline esters. Anticholine-esterases cholinomimetic alkaloids. Anti-cholinergic drugs Anti muscarinic Anti nicotinic Sympathomimetics / adrenergic drugs: Catecholamine Non catecholamine Sympatholytics/antiadrenergics Alpha adrenergic receptor blockers. Beta adrenergic receptor blockers Adrenergic neuron blockers Autonomic ganglionic blockers Skeletal muscle relaxants A) neuromuscular blocking agents - dtubocurarine, suxamethonium, etc. B) central muscle relaxants , meprobamate, mephenesin, diazepam, etc. Central Nervous System 	C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3	LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD	SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ
Module 8: Central Nervous System	<ul style="list-style-type: none"> Sedative-hypnotics. Anti-epileptics. General anaesthetics. Local anesthetics. Drugs for movement disorder/ muscle relaxant. Alcohol. Drugs for migraine. Stimulants of the central nervous system: Caffeine, theophylline, theobromine, Brain stem stimulants: picrotoxin, nikethamide, Ethamivan, doxapram, Spinal cord stimulants: strychnine. Psychopharmacology: Anti-psychotics, Anxiolytics, Anti-depressant / anti mania drugs, Alcohol and drugs of abuse, Anti-parkinson drugs, Anti epileptic drugs 	C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3	LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD	SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ

Contents	Objectives	Domain	Strategy	Assessment
Module 9: Analgesics				
	<ul style="list-style-type: none"> Opioids and narcotics analgesics. Nonsteroidal anti-inflammatory drugs (nsaid). Antigout drugs. 	C3 C3 C3	LEC/SGD LEC/SGD LEC/SGD	SEQ/MCQ SEQ/MCQ SEQ/MCQ
Module 10: Drugs Acting on Respiratory System				
	<ul style="list-style-type: none"> Drugs used in treatment of bronchial asthma. Expectorants. Mucolytics. Antitussives. 	C3 C3 C3 C3	LEC/SGD LEC/SGD LEC/SGD LEC/SGD	SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ
Module 11: Drugs Acting on Endocrine System				
	<ul style="list-style-type: none"> Pituitary-hypothalamic drugs. Adrenocorticoids. Sex hormones Thyroid/ parathyroid drugs. Pancreatic hormones and oral anti diabetic drugs. Oral contraceptives and anabolic steroids. 	C3 C3 C3 C3 C3 C3	LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD LEC/SGD	SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ SEQ/MCQ
Module 12: Drugs Acting on Endocrine System				
	<ul style="list-style-type: none"> Ergometrine, Terbutaline, Dinoprostone, Carboprost, Ritodrine, Oxytocin, Antimicrobial Drugs, Sulfonamides, Penicillins, Cephalosporins, Aminoglycosides, Tetracyclines, Macrolide, Chloramphenicol, Quinolones, Anti-tuberculous drugs, Antileprosy drugs, Anti fungal drugs, Antiviral drugs, Anti-protozoal drugs, Anti- malarial drugs, Anti-amoebic drugs, Urinary tract antiseptics, Anti cancer drugs, Immunosuppressive agents, Miscellaneous, Vaccines and immunoglobulin drug interaction. 	C3	LEC/SGD	SEQ/MCQ

Contents	Objectives	Domain	Strategy	Assessment
Module 13: A - EXPERIMENTAL PHARMACOLOGY				
	<ul style="list-style-type: none"> Experiments designed to observe the action of drugs on animals and isolated tissue. Experiments on the actions of selected drugs to be demonstrated to the students. Effects of drugs on reflex time. Effects of drugs on frog's heart in situ. Effects of drugs on rabbit's eye. Effects of Acetylcholine and Atropine on isolated rabbit's ileum. Effects of histamine and antihistamines on isolated rabbit's ileum. Schemes to find out unknown drug having stimulatory or inhibitory effect on isolated rabbit's ileum. Effects of neuromuscular blocking agents on frogs rectus abdominus muscle. Methodology of clinical trials. Introduction to Biostatistics. 	C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1 C3P2A1	Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD Lab/SGD	Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE
Module 14: B. PRESCRIPTION WRITING				
	<ul style="list-style-type: none"> General principles Guideline for rational use of drugs, Prescription writing for common ailments, Acute watery diarrhea, Bacillary dysentery, Amoebic dysentery, Ascariasis, Tape-worm infestation, Acute streptococcal pharyngitis, Iron deficiency anemia, Allergic rhinitis, Scabies, Acute malarial fever, Cerebral malaria, Typhoid fever, Bronchial asthma, Hypertension, Migraine, Cardiac failure, Shock Clinico-Pharmacological Seminars on Rational Drug Therapy and Drug Interaction should be conducted Antibiotics: Frequency distribution of antibiotic prescribed in different clinical settings/units. Rational prescribing pattern of antibiotics. Parameters: provisional diagnosis, investigation, empirical therapy. Prescribing after culture and sensitivity. Vitamins: Parameters, Groups of vitamin prescribed, Vitamins prescribed on basis of therapeutic indication or empirical, Single / multiple vitamins, Frequency of prescribing and rational use of vitamins/ otherwise. Analgesics, Parameters, Frequency distribution of various groups of analgesic prescribed. Single / multiple drug prescription, Non specific indications of analgesic prescription. Adverse Drug Reactions, Anti-microbials, Cytotoxic drugs , Steroids etc. 	C3 C3 C3 C3 C3 C3 C3 C3 C3 C3	SGD/WARD SGD/WARD SGD/WARD SGD/WARD SGD/WARD SGD/WARD SGD/WARD SGD/WARD SGD/WARD SGD/WARD	Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE Prac/OSPE

Domain	Level
Knowledge	C1 Knowledge C2 Comprehension C3 Application C4 Analysis C5 Synthesis C6 Evaluation
Psychomotor	P1 Observe P2 Practice P3 Adjust P4 Master P5 Develop P6 Construct
Affect	A1 Receiving A2 Responding A3 Valuing A4 Organization A5 Characterization