



PRAVARA INSTITUTE OF MEDICAL SCIENCES

(DEEMED TO BE UNIVERSITY)

Loni, Tal. Rahata, Dist. Ahmednagar 413736

NAAC Re-accredited with 'A' Grade

SYLLABUS

UG Programme- PHARMACOLOGY

MBBS- IInd year

(Competency Based Undergraduate Curriculum will be implemented from August 2019, i.e. MBBS batch admitted for first year in 2019)

**Course Code : Theory Paper I - MU 201
Theory Paper II - MU 202**

Teaching Hours : 11 Months 230 hours

1. GOAL:

To inculcate a rational and scientific basis of therapeutics in a medical graduate

2. OBJECTIVES:

a. Knowledge and intellectual skills

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

1. Understand the general principles of drug action and handling of drugs by the body in all the individuals including children, elderly, lactating and pregnant women and those having a renal and/or hepatic disease and genetic variations.
2. Prescribe drugs rationally by:
 - a. Understanding the importance of both the non-drug and drug treatment
 - b. Selection of drugs based on suitability, tolerability, efficacy and cost.
3. Apply pharmacokinetic principles in clinical practice pertaining to the drugs used in commonly encountered conditions, National Health Programmes and emergency medical conditions.
4. Foresee, prevent and manage adverse drug events and drug interactions.
5. Use antimicrobials judiciously for therapy and prophylaxis.
6. Understand and implement the concepts of essential medicines, pharmacoconomics and evidence-based medicine for improving the community health care.
7. Describe the clinical presentation and management of common poisoning including bites and stings.

8. Understand the basic concepts of new drug development with emphasis on design and conduct of clinical trials and interpretation of their results.

b. Psychomotor skills

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

1. Write a correct, complete and legible prescription for common ailments including those in the National health Programmes and emergency medical conditions.
2. Calculate the drug dosage using appropriate formulae for an individual patient.
3. Administer the required dose of different drug formulations using appropriate devices and techniques (.e.g injections, inhalestrs, transdermal patches etc.).
4. Advice and interpret the therapeutic monitoring reports of important drugs.
5. Identify, analyze and report adverse drug reactions to appropriate authorities.
6. Retrieve drug information from appropriate sources including the electronic resources.
7. Analyse critically drug promotional literature in terms of pharmacological actions of the ingredients, rational/irrational nature of the preparation, economics of the use and claims by the pharmaceutical companies.
8. Interpret data from in-vitro and in-vivo experiments designed to study the effect of drugs in animals and human beings.

c. Attitude and communication skills

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

1. Communicate with the patient regarding optimal use of drug therapy, devices and storage of medicines.
2. Follow the drug treatment guidelines laid down for common diseases including those covered under the national Health Programmes and emergency medical conditions and be capable of initiating and monitoring the treatment, recording progress and assessing the outcome.
3. Motivate patients with chronic diseases to adhere to the line of management as outlined by the health care provider.
4. Appreciate the relationship between cost of treatment and patient compliance.
5. Exercise caution in prescribing drugs likely to produce dependence and recommend the line of management.
6. Understand the legal and ethical aspects of prescribing drugs.
7. Evaluate the ethics, scientific procedures, social and legal implications involved in the development and introduction of new drugs.

3. DISTRIBUTION OF TEACHING HOURS

Method of Interaction		Teaching Hours	
Lectures			80
Small Group discussions			138
	Practical (27)	81	
	Small Group Discussions 20	20	
Integrated Teaching			37
Self-Directed Learning			12
Total			230

4. THEORY SYLLABUS

Comp ency Nos.	Topics&Subtopics
PH1.1	IntroductiontoPharmacology
PH1.2	
PH1.3	
PH1.9	
PH1.1 1	Routesofdrugadministration
PH1.4	Pharmacokinetics–Absorption,Distribution,Metabolism,Excretion
PH1.5	Pharmacodynamics
PH1.6	Adversedrugreactions–Types,mechanismsandprecautions
PH1.7	
PH1.5 2	PrinciplesofmanagementofPoisoning
PH1.8	Druginteractions-Mechanismsandclinicalrelevance
PH1.5 9	Essentialmedicines,FixeddosecombinationsOverthecounterdrugsHerbalm edicines
PH1.6 0	Pharmacogenomics,Pharmacoeconomics
PH1.6 3	DrugRegulations
PH1.6 4	Drugdevelopment,GoodClinicalPractice
PH1.1 0	Prescriptionwriting
PH1.1 2	Factorsmodifyingdrugdose-Dosecalculation
PH1.1 3	PharmacologyofAdrenergicdrugs,PharmacologyofAntiadrenergicdrugs
PH1.1	PharmacologyofCholinergicdrugs,PharmacologyofAnticholinergicdrugs

4	
PH1.1 5	Pharmacology of Skeletal muscle relaxants
PH1.1 6	Pharmacology of Histamine and antihistaminics, Pharmacology of Serotonin and drugs acting on serotonergic pathways, Pharmacotherapy of Migraine, Pharmacology of NSAIDs, Pharmacotherapy of Gout and Rheumatoid arthritis
PH1.1 7	Pharmacology of Local anaesthetics
PH1.1 8	Pharmacology of General anaesthetics and Preanesthetic drugs
PH1.1 9	Pharmacology of Sedatives & hypnotics Pharmacology of Antiepileptics Pharmacology of Antidepressants and anti-anxiety drugs Pharmacology of Antipsychotics and anti-manic drugs Pharmacology of Drugs used for neurodegenerative disorders Pharmacology of Opioids
PH1.2 0	Pharmacology of Alcohol and alcohol poisoning
PH1.2 1	
PH1.2 2	Pharmacology of drug dependence, drug abuse and Deaddiction
PH1.2 3	
PH1.2 4	Pharmacology of Diuretics and antidiuretics
PH1.2 5	Pharmacology of coagulants and anticoagulants Pharmacology of antiplatelets Pharmacology of thrombolytics and antifibrinolytics Pharmacology of plasma expanders
PH1.2 6	Pharmacology of Renin-Angiotensin-Aldosterone system
PH1.2 7	Pharmacology of calcium channel blockers Pharmacology of other vasodilators and sympatholytics Pharmacotherapy of Hypertension, Pharmacotherapy of Shock
PH1.2 8	Pharmacology of Antianginal drugs Pharmacotherapy of IHD Pharmacology of Drugs for PVD
PH1.2 9	Pharmacology of Drugs used in CCF
PH1.3 0	Pharmacology of Antiarrhythmics
PH1.3 1	Pharmacology of Drugs for dyslipidemia
PH1.3 2	Pharmacology of Drugs for bronchial asthma and COPD
PH1.3	Pharmacology of Drugs for cough

3	
PH1.3 4	Pharmacology of Drugs for acid peptic diseases Pharmacology of Antiemetics and prokinetics Pharmacology of Drugs for diarrhea and constipation
PH1.3 5	Pharmacotherapy of anemias
PH1.3 6	Pharmacology of Antidiabetic drugs Pharmacology of Drugs for thyroid dysfunction Pharmacology of Drugs affecting calcium metabolism
PH1.3 7	Pharmacology of Estrogen and antiestrogens Pharmacology of Progestins and anti-progestins Pharmacology of Androgens and antiandrogens Pharmacology of Anterior Pituitary hormones and their antagonists
PH1.3 8	Pharmacology of Corticosteroids and antagonists
PH1.3 9	Pharmacology of Hormonal contraceptives
PH1.4 0	Pharmacotherapy of infertility and erectile dysfunction
PH1.4 1	Pharmacology of Oxytocics and tocolytics
PH1.4 2	Introduction to Chemotherapy - General principles, Pharmacology of Sulfonamides and Trimethoprim Pharmacology of Fluoroquinolones, Pharmacology of Penicillin and its derivatives Pharmacology of Cephalosporins, Pharmacology of other Beta-lactam antibiotics Pharmacology of Aminoglycosides, Pharmacology of Macrolides Pharmacology of Broad spectrum antibiotics, Pharmacology of newer antibacterials
PH1.4 4	Pharmacology of Antitubercular drugs including MDR and XDRTB
PH1.4 5	
PH1.4 6	Pharmacology of Antileptics
PH1.4 7	Pharmacology of Antimalarials Pharmacology of Antiamoebic and other Antiprotozoal drugs Pharmacology of Anthelmintics
PH1.4 8	Pharmacotherapy of UTI Pharmacotherapy of STD Pharmacology of Antiretroviral drugs
PH1.4 9	Pharmacology of Anticancer drugs
PH1.5 0	Pharmacology of Immunomodulators
PH1.5 1	Occupational and environmental toxicology
PH1.5	Pharmacology of Chelating agents

3	
PH1.5 4	Vaccines and Antisera
PH1.5 5	National health programs
PH1.5 6	Geriatric and Pediatric pharmacology
PH1.5 7	Drugs used in skin disorders
PH1.5 8	Drugs used in Ocular disorders
PH1.6 1	Dietary supplements and Nutraceuticals
PH1.6 2	Antiseptics and Disinfectants
CLINICAL PHARMACY	
PH2.1	Drug dosage forms (Oral, local, parenteral)
PH2.2	ORS preparation
PH2.3	Intravenous drip setting
PH2.4	Dosage calculation
PH3.1	Prescription writing and communication
PH3.8	
PH5.1	
PH3.2	Critical appraisal of Prescription
PH3.3	Evaluation of Promotional Drug literature
PH3.4	Adverse drug reaction- Identification and reporting
PH3.5	Introduction to the concept of P-drugs and preparation of P-drug list
PH3.6	Interaction with a pharmaceutical representative and critical evaluation of Drug information
PH3.7	Introduction to the concept of Essential medicines
EXPERIMENTAL PHARMACOLOGY	
PH4.1	Drug administration on Maniquins
PH4.2	Study of effects of drugs on blood pressure using software
COMMUNICATION TOPICS	
PH5.2	Importance of optimal use of drug therapy, storage of medicines
PH5.3	Importance of Drug Compliance
PH5.4	
PH5.5	Problems associated with prescribing drugs with dependence liability
PH5.6	Problems associated with use of OTC drugs
PH5.7	Prescription: legal and ethical aspects
2.1	AETCOM-1
2.2	AETCOM-2
2.3	AETCOM-3

5. PRACTICAL SYLLABUS

1. Oral route and drug dosage forms
2. Parenteral routes and drug dosage forms
3. Topical route and drug dosage forms
4. New drug delivery systems
5. Pharmacokinetics I
6. Pharmacokinetics II
7. Dosage Calculations
8. Pharmacodynamics
9. Adverse Drug Reactions and ADR reporting
10. Clinical trials
11. Prescription Writing and Communication
12. Sources of drug information
13. Rational Pharmacotherapy
14. Effect of drugs on Dog's Blood Pressure and
15. Respiration
16. Fixed dose combinations
17. Prescription writing
18. Prescription criticism
19. Therapeutic problems

6. PAPER WISE DISTRIBUTION OF TOPICS FOR PRELIM UNIVERSITY EXAMINATION

Paper	Section	Topics
I	A	MCQsonalltopicsofthePaperI
	B	General Pharmacology
		Autonomic Nervous system including skeletal muscle relaxants
		Cardiovascular system
		Haematology
		Autacoids
		Respiratory system
		AETCOM-2.4, 2.6 (section Bone SAQ)
	II	A
	B	Central Nervous system including general/local anaesthesia
		Endocrine system
		Chemotherapy system
		Gastrointestinal drugs
		Misc. Topics: Chelating agents, Vaccines and Antisera, ocular pharmacology, dermatological pharmacology, nutraceuticals, occupational and environmental pharmacology, toxicology)

7. EVALUATION

A. UNIVERSITY EXAMINATION & PRELIMINARY EXAMINATION MARK DISTRIBUTION

Type of exam		Maximum marks	Minimum Marks
SUMMATIVE			
Theory (Two Papers)	Paper I	100	40
	Paper II	100	40
	Total	200	100
Practicals		100	50
Total		300	150

B. Pattern of Theory Examination in final examination including Distribution of Marks, Questions, and Time.

- i. Two theory papers : 100 marks each
- ii Total duration : 3 hrs each (There will be 2 sections in each.)
- iii Paper I : General Pharmacology, Autonomic Nervous system including skeletal muscle relaxants, cardiovascular system, Haematology, Autacoids, Respiratory system.
- iv Paper II : Central Nervous system including general/local anaesthesia, Endocrine system, Chemotherapy system, Gastro intestinal drugs, Misc. Topics (Chelating agents, Vaccines and Antisera, ocular pharmacology, dermatological pharmacology, nutraceuticals, occupational and environmental pharmacology, toxicology) AETCOM- 2.4, 2.6.

C. QUESTION PAPER PATTERN

Paper I- General Pharmacology, Autonomic Nervous system including skeletal muscle relaxants, cardiovascular system, Haematology, Autacoids, Respiratory system,

Section	Question No	Type	No of Questions	Marks
A	Question 1.	MCQ	10	20
B	Question 2	Long Answer Question	1	12
	Question 3	Short Notes	3 / 4	18
	Question 4	Short Answer Question	5 / 6	10
C	Question 5	Long Answer Question	1	12

	Question 6	Short notes	3 / 4	18
	Question 7	Short Answer Question	5 / 6	10

Paper II- Central Nervous system including general/local anaesthesia, Endocrine system, Chemotherapy system, Gastro intestinal drugs, Misc. Topics (Chelating agents, Vaccines and Antisera, ocular pharmacology, dermatological pharmacology, nutraceuticals, occupational and environmental pharmacology, toxicology)AETCOM- 2.4, 2.6.

Section	Question No	Type	No of Questions	Marks
A	Question 1.	MCQ	10	20
B	Question 2	Long Answer Question	1	12
	Question 3	Short Notes	3 / 4	18
	Question 4	Short Answer Question	5 / 6	10
C	Question 5	Long Answer Question	1	12
	Question 6	Short notes	3 / 4	12
	Question 7	Short Answer Question	5 / 6	10
	Question 8	Short note (ATECOM module)	1	6

D. PRACTICAL EXAMINATION:

1	Viva a. Viva I- 15 marks b. Viva II- 15 marks	:	30 marks
2	Clinical Pharmacy a. Dosage form- 10 marks, b. ORS preparation/ IV drip setting- 5 marks c. Dose calculation - 5 marks	:	20 marks
3	Clinical Pharmacology a. Prescription writing- 10 marks b. Prescription criticism and rewriting / justification of FDC - 10 marks c. ADR identification / ADR reporting- 5 marks d. P- drug list- 5 marks.	:	30 marks
4	Experimental Pharmacology OSPE a. Drug administration using maniquin / drug effect using CAL software (or any other)- 10 marks	:	10 marks
5	Communication OSPE a. prescription communication / ethics- legal drug storage/ use of device/drug adherence-compliance/ drug dependence/OTC/ interaction with Medical representative- 10 marks	:	10 marks
	Total Marks		100 marks

E. INTERNAL EXAMINATION I and II**1. Theory and Practical including Viva Mark Distribution**

Internal Assessment	Theory	40	16
	Practical	40	16
	Log Book	20	08
	Total	100	50

2. Theory Examination Pattern

Question No	Type	No of Questions	Marks
Question 1.	MCQ	10	10
Question 2	Long Answer Question	1	12
Question 3	Short Notes	3 / 4	18
Question 4	Short Answer Question	5 / 6	10

**3. Practical Examination:
For Ist and IInd term examinations**

1	Viva	:	10 marks
	Journal/ Logbook	:	5 marks
2	Clinical Pharmacy a. Dosage form b. ORS preparation/ IV drip setting c. Dose calculation	:	10 marks
3	Clinical Pharmacology a. Prescription writing b. Prescription criticism and rewriting / justification of FDC c. ADR identification / ADR reporting- 5 marks d. P- drug list	:	15 marks
4	Experimental Pharmacology a. Drug administration using maniquin / drug effect using CAL software (or any other)	:	5 marks
5	Communication OSPE a. prescription communication / ethics- legal drug storage/ use of device/drug adherence-compliance/ drug dependence/OTC/ interaction with Medical representative	:	5 marks
	Total Marks		50 marks

Log Book:

Sr. No	Head of activity	Marks
1	Day to day assessment	7
2.	Journal completion	3
3	Reflection on ATECOM module 2.4 and 2.6	4
4	Activities like seminar, symposia, quiz, block end exam & other academic activities	3
5	Achievement of certifiable competencies.	3
Total		20

Mark distribution for Theory and Practical Exam

Exam	Examination Head			Total
	Theory	Practical	Log Book	
Internal Examination I	50	50		
Internal Examination II	50	50		
Preliminary Examination	200	100		
Total No. of marks	300	200		
To be converted to	40	40	20	100
Minimum marks for eligibility	16	16	08	50

F. PLAN FOR INTERNAL ASSESSMENT:

- There will be 3 internal assessment examinations in Pharmacology. The structure of the internal assessment theory examinations will be similar to the structure of University Examinations.
- It is mandatory for the students to appear for all the internal assessment examinations.
- There will be only one additional examination for absent students (due to genuine reason) after approval by the Institutional Grievances Committee. It shall be taken after preliminary examination and before submission of internal assessment marks to the University.
- Internal assessment marks for theory will be out of 300 and practical will be out of 200.
- Total theory internal assessment will be reduced to 40 marks and total practical internal assessment will be reduced to 40 marks.
- Log Book will have 20 marks. It will include day to day assessment, Journal completion, Reflection on ATECOM module 2.4 and 2.6, all activities like seminar, symposia, quizzes and other academic activities and Achievement of certifiable competencies.
- Students must secure at least 50% marks of the total marks 100 of internal assessment (**combined in theory, practical and Log Book; not less than 40 % marks in theory, practical or Log Book**) to be eligible for appearing University examination
- Internal assessment marks will reflect as separate head of passing at the summative examination.
- Internal assessment marks will not to be added to marks of the University examinations and will be shown separately in mark list.
- If any candidate fails in internal assessment, his / her result will be withheld by university and One theory and one Practical exam will be conducted within 60 days of result as Internal exam.

8. BOOKS RECOMMENDED :

1. Basic & Clinical Pharmacology. Katzung BG (Ed), Publisher: Prentice Hall International Ltd., London.
2. Pharmacology & Pharmacotherapeutics. Satoskar RS, Bhandarkar SD (Ed), Publisher: Popular Prakashan, Bombay.
3. Essentials of Medical Pharmacology. Tripathi KD (Ed), Jaypee Brothers, publisher: Medical Publishers (P) Ltd.
4. Clinical Pharmacology. Laurence DR, Bennet PN, Brown MJ (Ed). Publisher: Churchill Livingstone

Reference books:

1. Goodman & Gilman S The Pharmacological Basis of Therapeutics. Hardman JG & Limbird LE (Ed), Publisher: McGraw-Hill, New York.
2. A Textbook of Clinical Pharmacology. Roger HJ, Spector RG, Trounce JR (Ed), Publisher: Hodder and Stoughton Publishers.

