

CURRICULUM AND SYLLABUS UNDER THE NEW REGULATIONS FOR THE M.B.B.S.
COURSE OF STUDIES OF PHARMACOLOGY.

THIRD SEMESTER:

<u>A. Didactic Lectures</u>	40hrs
I. General Consideration & Basic Principles	15hrs
(Introduction, Historical perspective, Pharmacokinetic principles, Pharmacodynamics, Issues relating to pharmacotherapeutics, Essential Drugs concept, Steps in New Drug Development: Ethics and Regulation).	
II. Autonomic Pharmacology	6hrs
(Introduction, Historical Perspectives, classification of drugs affecting ANS, Muscarinic receptor agonists and antagonists, Adrenergic receptor agonists and antagonists).	
III. Autacoids & Related Pharmacology	3hrs
(Introduction, Eicosanoids & NSAIDs, Histamine & Antihistaminics, Bradykinin & its antagonists, Renin-angiotensin system, 5HT & its antagonists).	
IV. Neuropharmacology	16hrs
(Benzodiazepines, Barbiturates, Anticonvulsants, Antiparkinsonian drugs, Neuroleptics, Anxiolytics, Lithium, Antidepressants, General Anaesthetics, Skeletal Muscle Relaxants, Local Anaesthetics, Opioid & Non-Opioid analgesics, Pharmacotherapy of pain & Gout).	
<u>B. Group Dynamics</u>	40hrs
(This includes continuous assessment of each student through Item Cards).	
I. Problem based Learning/Tutorials	25hrs
In these small group sessions (comprising of 25 students and one teacher facilitator in each group) the students will be required to resolve specific problems that would be designed by the faculty members of the department addressing issues covered in the didactic lectures in this semester.	
II. Student's seminar to be arranged.	15hrs
<u>C. Practicals / Demonstration</u>	40hrs
(All practical hours must be small group sessions. Students are required to maintain required to maintain record books which will be continuously assessed by teacher).	
<u>I. Prescription writing</u>	
Principles & format	2hrs
Abbreviations used, Weights & Measures	2hrs
Rational Selection of a Drug while prescribing (WHO P-drug concept)	4hrs
Writing specific problem-led prescriptions for common ailments.	10hrs
(A list of such specific problem-led prescriptions are given in Annexure-1 . These may be revised as per the need of the day)	
<u>II. Therapeutic problem-solving addressing the issues of clinically relevant adverse drug reactions (ADR's) and adverse drug interactions (DI's).</u>	10hrs
(Coloured photographs of some typical ARD's may be used additionally). (A list of such therapeutic problems are given in Annexure-2).	
<u>III. Pharmacy</u>	
Compounding & Dispensing of some common dosage forms eg. Mixture, Lotion/ ointment, Powder, etc.	12 hrs

- I) Alkali mixture/S.S. of Magsulph
- II) Carminative mixture.
- III) ORS Powder
- IV) Calamine lotion
- V) Atropine sulphate ointt.(1%)
- VI) Gamma-benzene hexachloride ointment(1%).

FOURTH SEMESTER

A. Didactic Lectures

30hrs

V. Renal Pharmacology.

4hrs

Diuretics & Anti Diuretics

Drugs for acid –base & Electrolyte balance.

VI. Cardiovascular Pharmacology.

9hrs

Angina pectoris, Myocardial infraction ,Cardiac arrhythmias, Hyperlipidemias, Hypertension, Heart failure.

VII. Gastrointestinal Pharmacology

6hrs

Laxatives & Non-specific antidiarrhoeals Pharmcotherapy of Peptic ulcer
Antiemetic & Prokinetic agents, Drugs for portal hypertension, Pancreatitis, Gall stones, Ulcerative colitis.

VIII. Haemato-pharmacology.

4hrs

Haematinics, Coagulants & Anticoagulants, Antithrombotics, Fibrinolytic, Antiplatelet agents.

IX. Endocrine Pharmacology.

7hrs

Insulin & Oral hypoglycemic agents, Thyroid and anti thyroid drugs, Corticosteroids, Oral contraceptives, Vitamin D, Parathormone, Calcium homeostasis.

B. Group Dynamics

30hrs

I. Problem-based learning / Tutorials similar to 3rd Semester.

20hrs

II. Integrated teaching –learning / Student’s seminar.

Topics like Anaemia, Hypertension, Angina pectoris, Peptic ulcer, Oral contraceptives, Rickets, Diabetes mellitus etc. should be dealt in integrated sessions involving other para-clinical (and clinical) disciplines like pathology, Microbiology, Community Medicine etc. In such seminars students will take active part and teachers of different disciplines will act as facilitators. The seminars hours will be treated as common credit hours for the para –clinical disciplines that are directly involved in the concerned topic of discussion .For the logistic convenience, these sessions will not be required to attend at a time. Each session will be of 2 hours duration. They may be scheduled to be held on the last Saturday of each month. The minimum number of such integrated sessions will be 5 in this semester.

C. Practicals /Demonstrations

30hrs

I. Prescription writing.

6hrs

Writing specific problem led prescriptions (for common ailments)

II. Therapeutic problem solving

4hrs

Similar to 3rd Semester

III. Demonstration of different dosage forms, formulations and delivery systems.

6hrs

Tablets, Scored tablets, Capsules, Coated tablets, Drug suspensions, Suppositories, Enema, Eyedrops, Injectables(Ampoules & Vials), Transdermal systems(NTC Patch), Fluid transfusion bottles (Glass vs plastics), Blood Transfusion sets & Donor sets syringes (Tuberculin, Insulin, 2 ml, 5 ml, 10 ml, 50ml,) (Glass vs Disposable)

Needles –different sizes.

Butterfly canula

Scalp vein sets

Inhalers, Spacer devices, Nebulizers.

Different types of packaging: Blister packs, Coloured bottles.

IV. Experimentals.

14hrs

Demonstration of drug effects

A. Animal experiments

8hrs

1.Effects of mydriatics &miotics in Rabbit’s eye.

2.Demostration of drug effect in amphibian heart /cat blood pressure preparation.

3.Guinea pig ileum

B. Actual patient situation

6hrs

Visit to the indoor/ in patient’s deptt.

(General medicine, Pediatrics, or Maternity ward.) to oversee the drug prescribing and utilization.

FIFTH SEMESTER

A. Didactic Lectures

30hrs

X.Respiratory System Pharmacology

2hrs

Pharmacotherapy of Cough

Drug therapy of Bronchial Asthma.

XI. Chemotherapy & Anti-infectives

14hrs

General consideration ,Antiseptics and disinfectants

B-lactam antibiotic, Aminoglycosides, Tetracyclines, Chloromphenicol, Macrolides, Quinolones & Sulphenamides, Antiamoebic, Anti tubercular, Anti fungal and Antiviral drugs with pharmacotherapy of AIDS.

XII. Cancer Chemotherapy

2hrs

Principles & general consideration

Treatment approach in some common malignancies.

XIII. Immunopharmacology

1hrs

Immuno suppressants & Immunostimulants .

Vaccines & Sera.

XIV. Toxicology

3hrs

Drug overdose & poisoning

Heavy metals & Metal antagonist

Environmental toxicants & Drug dependence, Drug abuse, Adr monitoring

XV. Miscellaneous

8hrs

Vitamins & minerals

Dental Pharmacology

Dermatopharmacology

Ocular pharmacology

Drugs & uterine motility

Drugs used in medical emergencies
 Rational use of drugs/Rational therapy
 Gene therapy
 Drug prescribing in Pregnancy, Infants and Children, Geriatric patients and Hepato-renal insufficiency.

B. Group Dynamics **30hrs**

I. Problem-based learning / Tutorials **20hrs**

II. Integrated learning / Students seminar **10hrs**
 Similar to that in 4th Semester.

Seminar topics: **Bronchial asthma, Rational use of antibiotics, Tuberculosis, Malaria, Worm infestations, Management of poisons, Vaccine preventable diseases, Acute Respiratory Infection and Diarrhoeal Disorders in Children.**

C. Practicals/Demonstrations **30hrs**

I. Prescription writing

Writing specific problem related prescription (for common ailments) **8hrs**

II. Therapeutic problem solving **6hrs**

III. Pharmacy **10hrs**

a) Criticism of prescription **6hrs**

b) Developing critical appraisal skill in scanning information from **4hrs**

i) Pharmaceuticals Promotional Literature

ii) Package Inserts/ Patient Information Leaflets

iii) Published Documents in Independent Medical Journals.

IV. Experimentals **6hrs**

Actual Patient Situation

a) Visit to the General Emergency to oversee the management of any one Medical/Surgical Emergency.

b) Visit to the surgical Operation Theatre to over see the effects of drugs used anaesthetic practice.

Annexure-1. (A list of problem-led prescriptions)

1. A drug for "TYPHOID FEVER".
2. A drug for "BACILLARY DYSENTRY".
3. A drug for "DUDENAL ULCER".
4. A drug for "AMOEBIC DYSENTRY".
5. A drug for "TONIC CLONIC SEIZURES".
6. PURGATIVE FOR RADIOLOGICAL EXAMINATION.
7. A drug for "MULTI-BACILLARY LEPROSY".
8. A drug for "TINEASIS".
9. A drug for "URINARY TRACT INFECTION".
10. A drug for "ACUTE BACTERIAL CONJUNCTIVITIS".
11. A drug for "FILARIASIS."
12. A drug for "ACUTE GOUT".
13. A drug for "NAUSEA AND VOMITING".
14. A drug for "UNCOMPLICATED PULMONARY TUBERCULOSIS."
15. A drug for "MIXED WORM INFESTATION".

16. A drug for "MIGRAINE".
17. A drug for "SYPHILIS".
18. A drug for "GONORRHOEA".
19. A drug for "ACUTE ATTACK OF ANGINA PECTORIS".

Annexure-2 (DRUG INTERACTION)

1. Amoxicilin & Clavulanic Acid.
2. Metronidazole & Ethylalcohol .
3. Ciprofloxacin & Theophylline.
4. Aspirin & Warfarin.
5. Rifampicin & Cobined OCP.
6. Chloroquine & Alkali mixture.
7. Sucralfate & Antacid.
8. L-dopa & Pyridoxine.
9. Propranolol & Verapamil.
10. Digoxin & Hydrochlorothiazide.
11. Chlorpropamide & Dicommurrol.
12. Gentamycin & gallamine.
13. Lithium & Thiazide.
14. Propranolol & Insulin.
15. Enalapril & Spironolactone.

Annexure-3 (THERAPEUTIC PROBLEMS)

1. A 10 year old school girl suffering from mild exercise induced bronchial asthma has been treated with a metered dose inhaler containing 500 μ g of Terbutaline per inhalation as and when required, which effectively controls the individual attack. However, she has attacks of wheezing every 3 to 4 weeks occurring during exercise even after above treatment schedule.
What treatment should now be given to reduce the frequency of attacks?
2. A 16 years old girl has admitted to the emergency department with severe short of breath. She is diagnosed as acute bronchial asthma. She has been using metered dose inhalation of Salbutamol, Ipratropium and Beclomethasone. In spite of the above treatment, the present attack is not controlled.
What will be her immediate treatment?
3. A 69 year old woman suffering from congestive heart failure has been treated with 0.25 mg Digoxin tablet daily for last 3 months. But the heart failure is not controlled adequately.
What will be the treatment to control the heart failure adequately?
4. A 45 year old male patient with history of smoking presented with exertional retrosternal compressing pain radiating to the left arm and lasts for 2-5 minutes. The pain is relieved after taking rest. After proper investigation, he has been diagnosed as a case of stable angina pectoris.
What will be the treatment to control the attack?
5. A 45 old patient suffering from angina pectoris was on treatment with isosorbide dinitrate. He is admitted to the hospital with severe chest pain and sweating and diagnosed to be a case of acute myocardial infarction.
What will be the management of this patient?
6. An overweight middle aged man is found to be hypertensive while attending a clinic for medical check up. His B.P. is 170/105 mm of Hg on two successive observations.
What will be the treatment for this patient?

7. A 58 year old man with history of severe hypertension for 20 years, which was well controlled with medication. He stopped taking drugs for a prolonged period. His blood pressure is found to be 240/135 mm of Hg with papillaedema.
What will be the management of this case?
8. A 25 year old lady is brought to emergency unit by her family members. She is unconscious with constricted pupils and froth coming out of her mouth. She is reported to consume an organo-phosphorus insecticide.
How will you manage the case?
- 9 A middle aged person was watching T.V. in dark ,suddenly develops pain in right eye, vomiting and blurring of vision. On examination, right pupil is dilated, sluggishly reacting to light with raised intra-ocular pressure. The condition is diagnosed as a case of acute congestive glaucoma.
What will be the medical management of this clinical condition?
10. A 20 year old diabetic man on insulin therapy suddenly developed fever and Missed his usual doses of insulin and became unconscious.
What measures will you take to manage this condition?
11. A middle aged diabetic patient with oral anti-diabetic agent (Tolbutamide) underwent prolonged exercise and missed his usual breakfast. He developed unconsciousness, respiratory distress and profuse sweating with tachycardia.
How will you manage the case?
12. A person is willing to travel an endemic area of malaria. What chemoprophylaxis has to be given to him?
Subsequently, he developed chloroquine-resistant malaria. How will you manage the case?
13. A male patient develops fever with chill and rigor. P. vivax is found in his blood smear.
What will be the management of this case?
14. A woman in 2nd trimester pregnancy is found to be moderately anemic on routine antenatal check-up.
What will be the management of this case ?
15. A 6 year old boy while playing in a village ground was beaten by a snake. The snake was identified as a poisonous one.
How will you manage this case?
16. A patient with chronic psychiatric illness was treated with largactil (chlorpromazine) for a prolonged period. He developed tremor, bradykinesia and rigidity
What treatment should be given to the patient without stopping the drug ?

**ITEM CARD OF PHARMACOLOGY
CONTINUOUS DAY-TO-DAY ASSESSMENT**

NAME:

COLLEGE:

ROLL NO:

BATCH:

SESSION

Signature of teacher-in-charge

Signature of the H.O.D.

THIRD SEMESTER:THEORETICALS				
ITEM	DATE	TOTAL MARKS	MARKS OBTAINED	EXAMINER
<u>I. GENERAL PHARMACOLOGY</u> Historical considerations, Steps of drug development, Dosage forms, Drug delivery systems Routs of drug administration, Pharmacokinetics, Phamacodynamics, Factors affecting therapeutic outcome, Drug		15		

prescribing in altered physiological states (Pregnancy and lactation, neonates and elderly, hepatic and renal impairment), Essential drugs concept, Rational use of drugs and Good prescribing practice.				
II. <u>AUTONOMIC PHARMACOLOGY</u> Basic considerations, Muscarinic & Adrenergic receptor agonists and antagonists.		15		
III. <u>AUTACOIDS & RELATED PHARMACOLOGY</u> Eicosanoids, Histamine & antihistaminics, 5HT & drugs used in Migraine, Kinins and Angiotensin.		15		
IV. <u>NEUROPHARMACOLOGY</u> Benzodiazepines & Barbiturates, Drug treatment of Parkinsonism & Epilepsy, Neuroleptics & Anxiolytics, Antidepressants & Lithium, Drugs used in Anaesthetic practice including Neuromuscular blocker, Opioids & non-opioid analgesics and Pharmacotherapy.		15		

THIRD SEMESTER: PRACTICALS

ITEM	DATE	TOTAL MARKS	MARKS OBTAINED	EXAMINER
I. Prescription writing		15		
II. Therapeutic problem solving		15		
III. Pharmacy		15		
IV. Experimentals		15		
V. Criticism of prescription		15		

FOURTH SEMESTER: THEORETICALS

ITEM	DATE	TOTAL MARKS	MARKS OBTAINED	EXAMINER
I. <u>RENAL PHARMACOLOGY</u> Diuretics & Antidiuretics, Drugs for BHP; Drugs for ACID-BASE and Electrolyte imbalance,		15		
II. <u>CARDIOVASCULAR PHARMACOLOGY</u> Drug therapy of CHF, Hypertension, Hyperlipidemias, Cardiac Arrhythmias and in Ischaemic heart diseases.		15		
III. <u>GASTROINTESTINAL PHARMACOLGY</u> Drug treatment for peptic ulcer, laxatives & anti-diarrhoeals, Antiemetics & prokinetics agents and drugs for portal hypertension, pancreatitis, Gallstones and ulcerative colitis.		15		
IV. <u>HAEMAPHARMACOLOGY</u> Iron, folic acid, Treatment of anaemias, Heparin and anticoagulants; Antithrombotic and fibrinolytic & antiplatelet agents.		15		

V. ENDOCRINE PHARMACOLOGY Insulin & Oral hypoglycemics, Thyroid & antithyroid drugs, Estrogens & Antiestrogens, Oral contraceptives, Androgens & antiandrogens, Corticosteroids, Calcium, Vitamin D, Parathormone & calcitonin.		15		
FOURTH SEMESTER: PRACTICALS				
ITEM	DATE	TOTAL MARKS	MARKS OBTAINED	EXAMINER
I. PRESCRIPTION II. THERAPEUTIC PROBLEM SOLVING III. PHARMACY IV. EXPERIMENTALS V. CRITISM OF PRESCRIPTION		15 15 15 15 15		
FIFTH SEMESTER: THEORETICALS				
ITEM	DATE	TOTAL MARKS	MARKS OBTAINED	EXAMINER
I. RESPIRATORY SYSTEM Pharmacotherapy of cough and Pharmacotherapy of bronchial asthma.		15		
II. CHEMOTHERAPY & ANTI-INFECTIVES Beta-lactam antibiotics, Quinolones & Sulfonamides, Aminoglycosides, Tetracyclines, Chloramphenicol & Macrolides, Drug therapy of tuberculosis and leprosy, Antivirals and drug treatment of AIDS, Antifungals, Anthelmintics & antiamebics and drug treatment of malaria & Kala-azar.		15		
III. CANCER CHEMOTHERAPY Principles & general considerations & Methotrexate, Cyclophosphamide, vinca alkaloids and Corticosteroids and others		15		
IV. IMMUNOPHARMACOLOGY Vaccines & sera, Immuno modulators.		15		
V. TOXICOLOGY Heavy metal poisoning & drug poisoning & treatment, Drug dependence & treatment and ADR monitoring center & poisoning information center.		15		
VI. MISCELLANEOUS Drugs & uterine motility and Vitamins & Nutrients		15		
FIFTH SEMESTER: PRACTICALS				
ITEM	DATE	TOTAL MARKS	MARKS OBTAINED	EXAMINER
I. PRESCRIPTION II. THERAPEUTIC PROBLEM SOLVING III. PHARMACY IV. EXPERIMENTALS V. CRITISM OF PRESCRIPTION		15 15 15 15 15		

ASSESSMENT OF STUDENTS:

1. Internal Assessment:

Theoretical15marks
Practical15 marks

Assessment of theoretical and practical are to be done through day-to-day assessment (Weekly /fortnightly) through ITEM CARDS and THREE PERIODICAL Examination at the end of 3rd, 4th & 5th Semester .

Assessment for practical will also be done through day to day evaluation of the students' performance in the Practical Record Book. No Marks should be separately allocated for Practical Record Book- but its maintenance must be made mandatory.

Marks of Theory + oral and Practical are to be computed separately.

Written/Oral			Practical	
	Full marks	Marks obtained	Full marks	Marks obtained
At the end of first semester	50		25	
At the end of second semester	50		25	
At the end of third semester	50		25	

Periodical Institutional Assessment Examination:

Final Internal Assessment: PHARMACOLOGY

Continuous day to day Assessment		Periodical Assessment		Total Internal Assessment	
Theory/oral(a)	Practical(b)	Theory/oral(c)	Practical(d)	Theory/oral(a+c)	Practical(b+d)
7.5	7.5	7.5	7.5	7.5+7.5=15	7.5+7.5=15

Signature of thePrincipal

Signature of the H.O.D

PHARMACOLOGY

Module of Questions:

Paper-I

Total : 40 Marks

- 1.General Pharmacology
- 2.Autonomic Pharmacology
- 3.Cardiovascular Pharmacology
- 4.Renal Pharmacology including Acid-base and fluid-electrolyte balance
- 5.Respiratory Pharmacology
- 6.Haematopharmacology
- 7.Vitamins and micronutrients
- 8.Toxicology including Heavy metals antagonist

Q. 1 Applied part of Pharmacology(Therapeutics) 10 marks

Q. 2 + Q. 3 + Q. 4 (9+9+12) 30 marks

(Each question to be answered in a separated answer script)

Explain why? Short note; Mechanism of action.

Compare and Contrast; Effects of etc; Short questions of above

types may be set for the examination. No question shall carry more than 3 marks.

Paper-II

1. Pharmacology of Central nervous system.
2. Endocrine Pharmacology
3. Autacoids and immuno-pharmacology.
4. Skeletal muscle relaxants and local anaesthetics.
5. Gastrointestinal Pharmacology.
6. Drugs acting on uterus.
7. Anti infective and cancer chemotherapy.
8. Antiseptics, Disinfectants and ecto -parasiticides.
9. Dermat mucosal agents.

Q. 1. Applied part of Pharmacology (Therapeutics.) 10 marks

Q.2 + Q.3 + Q.4 30 marks

Shall be of Explain Why? Short Notes; Mechanism of action, Compare and Contrast; Effects of etc; Short questions of above types may be set for the examination. No question shall carry more than 3 marks.

PHARMACOLOGY ORAL: 15 marks

PHARMACOLOGY PRACTICAL: Total 25 marks

1. Prescription-one	Total	
Format-	1	
Writing-	1	
Oral Crossing-	2	
Total:	4	
2. Pharmacy- one item		
Preparation & Labeling-	2	
Oral Crossing-	2	
Total:	4	
3. Therapeutic Problem – One		
Correct interpretation of Therapeutic Situation		
In writing	2	
Oral Crossing	2	
Total:	4	
4. Drug interaction-one		
Interpretation in writing-	2	
Oral Crossing-	2	
Total:	4	
5. Experimental Pharmacology		
Chart and diagram on Experiments demonstrated In Practical classes & charts on pharmacokinetics	Identification-2 Interpretation-2	
Total:	4	
6. Sample based Knowledge testing-	2	
Two samples per question in writing		
7. <u>Criticism of prescription</u> -	3 (Oral table)	
Total:	25	

Practical Notebooks- Two

One-Therapeutics Record Book-Containing patterns utilization of drugs in emergency and in-patient departments.

One-Pharmacy.

Practical Note-books must be submitted in practical Examination- without which students are **NOT ALLOWED** to appear.

MODEL QUESTION

PHARMACOLOGY

FIRST PAPER

FULL MARKS - 40

Time 2 hrs

The figure in the margin indicate full marks.

Candidates are required to give their answer s in their own words as far as practicable.

1. Outline the therapeutic regime for a case of hypertension with reference to the advantages and disadvantages of ACE inhibitors. 7+3

Or

How do you treat a case of anaemia in Pregnancy (Early pregnancy term & late pregnancy)?

How will you treat Drug induced anaemias ?

2. Explain why (any three)

- a) salbutamol is used in bronchial asthma.
- b) Presumide is called high ceiling diuretic.
- c) Dimercaprol is used in heavy metal poisoning.
- d) Atropin substitutes are used in Drug induced Parkinsoniism.

3. What are the effects of (any three) :

3+3+3

- a) atropine on eye
- b) aspirin on platelet function.
- c) Mannitol in the treatment of oedema.
- d) Digoxin in atrial flutter.

4. Write short notes on (any four) :

3+3+3+3

- a) fixed dose combination
- b) sublingual route of administration
- c) 'P' - drug concept
- d) zero-order kinetics of drug elimination
- e) neostigmine

PHARMACOLOGY
SECOND PAPER

Full marks - 40

Time - 2 hrs

The figures in the margine indicate full marks

Candidate s are required to give their answer s in their own words as far as practicable

1. Discuss briefly the drug treatment of Chloroquin sensitive and Chloroquin resistant falcifarum malaria. How will you treat a case of cerebral malaria. **3+3+4**

Or

Describe the drug treatmant of acute thyrotoxicosis. How do you prepare the Patient for surgery ?

6+4

2. Explain why (any three) **3+3+3**

- a) oxotocin is used for induction of labour.
- b) Calvulanic acid combined with amoxicillin.
- c) Morphine is contradicted in head injury.
- d) Allopurinol is used in chrinic gout.

3. What are the effects of (any three) : **3+3+3**

- a) iodides and iodine in thyroid disorders.
- b) Benzhexol in parkinsonian disease.
- c) Morphine in respiratory function.
- d) Methotrexate in autoimmune disorders.

4. Write short notes on any four of the following : **3+3+3+3**

- a) d-penicillamine.
- b) Clofazimine
- c) Norfloxacin
- d) Rosiglitazone
- e) Emergency contraceptives.