

4.3 PHARMACOLOGY & TOXICOLOGY (THEORY)

75 hours ; 3 hours/week

- 1. Bio Assays:** Scope, General Principles and Methods **2 hours;5-10 marks**
- 2. Drug discovery and development:** a. Preclinical evaluation (Regulatory Toxicity Studies) b. Clinical evaluation including pharmacovigilance **3 hours;4-5 marks**
- 3. Pharmacology of Drugs Acting on Central Nervous System :** General consideration (Introduction), Alcohol, General anesthetics, Sedatives and hypnotics, Anti-Epileptics, Psychopharmacological agents, Classification and mechanism of action of drugs used in psychosis, Pharmacology of Chlorpromazine (a prototype drug), Salient features of Antipsychotics including atypical Antipsychotics. Drugs used in Parkinsonism and Alzheimer's disease. Antidepressants: Classification and mechanism of action of drugs used in Depression, Pharmacology of imipramine (a prototype TCA), Salient features of other Antidepressants, including SSRIs and atypical antidepressants, Pharmacology of Lithium and other agents used in bipolar disorder. Anxiolytics, Drug dependence and drug abuse **19 hours;17-20 marks**
- 4. Analgesics and anti-inflammatory agents :** Pain pathway, classification and mechanism of action of centrally acting analgesics, Pharmacology of Morphine (a prototype Opioid), Salient features of other opioids including antagonists, Classification and mechanism of action of NSAIDs, Pharmacology of Aspirin (a prototype NSAID), Salient features of other NSAIDs including COX-2 inhibitors **8 hours; 9-10 marks**
- 5. Pharmacology of Drugs Acting on Gastro Intestinal Tract:** Antiulcer drugs, Antacids, Laxatives and Purgatives, Emetics and Antiemetics, Appetizers, Digestants, Carminatives **4 hours; 8-10 marks**
- 6. Chemotherapy:** Introduction and principles of chemotherapy including general mechanisms of antimicrobials, mechanism of resistance, super infections, antimicrobial combinations. Classification, mechanism of action, spectrum of activity, resistance development, adverse drug reactions and therapeutic use of the following: 1. Sulfonamides and Co-trimoxazole, 2. Penicillins and Cephalosporins, 3. Tetracyclines and Chloramphenicol, 4. Macrolides, 5. Aminoglycosides, 6. Polyene & Polypeptide antibiotics, 7. Quinolones and Fluoroquinolones, 8 Lincosamides, Glycopeptides, urinary antiseptics, 9. Antifungal agents, 10. Antiviral agents including anti-HIV, 11. Chemotherapy of Tuberculosis and Leprosy, 12. Chemotherapy of Malaria, 13. Chemotherapy of Protozoal infections (amoebiasis, Giardiasis), 14. Pharmacology of Anthelmintic drugs, 15. Chemotherapy of Cancer **31 hours; 17-20 marks**
- 7. Immunopharmacology** Pharmacology of immunosuppressants and stimulants **2 hours; 4-5 marks**
- 8. Principles of Toxicology:** General principles of treatment of acute toxicity and acute poisoning Signs, Symptoms and treatment of acute and chronic poisoning due to i) Barbiturates ii) Alcohols iii) Benzodiazapines iv) Antidepressants, v) Neuroleptics vi) Insecticides vii) Snake bite viii) Heavy metals (iron, lead, mercury, arsenic). **4 hours; 4-5 marks**
- 9. Pharmacology of Local anesthetics** **2 hours; 2-5 marks**

PHARMACOLOGY & TOXICOLOGY (PRACTICALS)

75 hours ; 3 hours/week

1. To record the dose response curve of Histamine using isolated chick/rat/guinea pig ileum preparation.**
2. To carry out bioassay of Histamine using isolated chick/rat/guinea pig ileum preparation by matching method.**
3. To carry out bioassay of Histamine using isolated chick/rat/guinea pig ileum preparation by interpolation method.**
4. To carry out bioassay of Histamine using isolated chick/rat/guinea pig ileum preparation by three point method.**
5. To record the dose response curve of Acetylcholine using isolated ileum preparation.**
6. To carry out bioassay of Ach using isolated chick/rat/guinea pig ileum preparation by interpolation method.**
7. To carry out bioassay of Acetylcholine using isolated ileum preparation by matching method.**
8. To carry out bioassay of Acetylcholine using isolated ileum preparation by three-point method.**
9. To carry out MAO inhibitory activity using chick/rat liver homogenate.*
10. To carry out amylase/ α -glucosidase inhibitory activity using *in vitro* technique.*
11. Study of principle, procedure involved and interpretation of given results for analgesic property of drug using analgesiometer*
12. Study of principle, procedure involved and interpretation of given results for Anti inflammatory effect of drugs using rat-paw edema method.*
13. Study of principle, procedure involved and interpretation of given results for Anti convulsant activity of drugs using MES method.*
14. Study of principle, procedure involved and interpretation of given results for Anti convulsant activity of drugs using pentylenetetrazole method.*
15. Study of principle, procedure involved and interpretation of given results for antidepressant activity of drugs using pole climbing apparatus.*
16. Study of principle, procedure involved and interpretation of given results for hypnotic and sedative property using Pentobarbitone induced sleeping time method.*
17. Study of principle, procedure involved and interpretation of given results for locomotor activity evaluation of drugs using Actophotometer.*
18. Study of principle, procedure involved and interpretation of given results for evaluation of muscle grip strength/relaxant effect of drugs using rotarod.*
19. Study of principle, procedure involved and evaluation of anthelmintic activity of drugs using earthworm as a model.*

Note: ** Denotes major experiments

*** Denotes minor experiments**

SCHEME OF EXAMINATION

1. Identification	-	10 Marks
2. Synopsis	-	10 Marks
3. Major Experiment	-	25 Marks
4. Minor Experiment	-	15 Marks
5. Viva	-	<u>10 Marks</u>
Total	-	<u>70 Marks</u>

PHARMACOLOGY & TOXICOLOGY TEXT BOOKS

1. Tripathi KD, Essentials of Medical Pharmacology, 7th Edition, Jaypee Brothers, 2010.
2. Satoskar R.S., Bhandarkar S.D. and Rege N.N., Pharmacology and Pharmacotherapeutics, 21st Edition, Popular Prakashan Pvt Ltd, 2010.
3. Chaudhary S.K., Quintessence of Medical Pharmacology, 3rd Revised Edition, Central Book Agency Pvt. Ltd., 2010.
4. Sharma H.L. and Sharma K.K., 2nd Edition, Principles of Pharmacology, Paras Medical, 2011.
5. Ghosh M.N., Fundamentals of Experimental Pharmacology, 5th Edition, Hilton & Company, 2011.
6. Kulkarni S.K., Hand book of Experimental Pharmacology, 3rd Edition ,Vallabh Prakashan, 2005.
7. Medhi B. and Prakash A., Practical manual of experimental and clinical pharmacology, 1st Edition, Jaypee Brothers, Medical Publishers, 2010.

PHARMACOLOGY & TOXICOLOGY REFERENCE BOOKS

1. Brunton L.L., Chanbner B.A., and Knollmann B.C., Goodman and Gilman's The Pharmacological Basis of Therapeutics, 12th Edition, McGraw-Hill Professional, 2010.
2. Katzung B.G., Masters S.B. and Trevor A.J., Basic and Clinical Pharmacology, 12th Edition, McGraw-Hill, 2011.
3. Rang H.P., M.M. Dale, J.M. Ritter., Flower R.J. and Henderson G., Pharmacology, 7th illustrated Edition, Elsevier Science Health Science Division, 2011.
4. Craig C.R. and Stitzel R.E., Modern Pharmacology with Clinical Applications, 6th Edition, Lippincott Williams and Wilkins, 2003.
5. Harvey R.A., Clark M.A., Finkel R, Jose A.R. and Whalen K, 5th Edition, Lipponcott's Illustrated Reviews: Pharmacology, Lippincott Williams and Wilkins, 2011.
6. Barar F.S.K., Essentials of Pharmacotherapeutics, 6th Revised Edition, S.Chand & Co. Ltd, 2011.
7. DiPiro J, Talbert R.L., Yee G., Matzke G., Wells B. and Posey L.M., Pharmacotherapy: A Pathophysiologic Approach, 8th Edition, McGraw-Hill Medical, 2011.

LIST OF MINIMUM EQUIPMENT REQUIRED

(For a batch of 20 students)

1. Pharmacology appliances	Sufficient
2. Sherrington's Kymograph Machine	20
3. Sherrington's Drum	20
4. Perspex bath assembly (single unit)	20
5. Aerators	20
6. Dissection trays	20
7. Dissection boards	20

8. Haemostatic arterial forceps	20
9. Hypodermic syringes and needles of size 18, 24, 26G	20
10. Computers	10
11. LCD Projector	01
12. Software package for experiments	01
13. Standard graphs for various drugs	Sufficient
14. Levers	20
15. Cannulae	20
16. Analgesiometer (Radiant heat)	01
17. Eddy's Hot Plate	01
18. Plethysmometer	01
19. Electro-Convulsiometer	01
20. Pole climbing apparatus	01
21. Actophotometer	01
22. Rotarod apparatus (03 / 05 compartments)	01