

GUJARAT TECHNOLOGICAL UNIVERSITY

PHARM.D

3rd Year

Subject Name: Pharmacology-II

Subject Code: 838801

Scope: This subject will provide an opportunity for the student to learn about the drug with regard to classification, pharmacodynamic and pharmacokinetic aspects, adverse effects, uses, dose, route of administration, precautions, contraindications and interaction with other drugs. In this subject, drugs acting on blood and blood forming agents, renal system, chemotherapy, immune system, animal toxicology, cell structure and functions, genome structure and functions and biotechnology methods will be concentrated. Pharmacology of chemotherapeutic agents, vitamins, essential minerals and principles of toxicology are taught. In addition to theoretical knowledge, the basic practical knowledge relevant to therapeutics will be imparted.

Objectives:

- a) understand the pharmacological aspects of drugs falling under the above mentioned chapters
- b) carry out the animal experiments confidently
- c) appreciate the importance of pharmacology subject as a basis of therapeutics, and
- d) correlate and apply the knowledge therapeutically

Theory (3 Hours/ Week, Total: 90 Hours)

Teaching Scheme				Evaluation Scheme				Total Marks
Theory	Tutorial	Practical	Total	Theory		Practical		
				External	Internal	External	Internal	
3	1	3	7	70	30	70	30	200

Sr.	Topic	Hr	% Weightage
1.	Pharmacology of Drugs acting on Blood and blood forming agents a) Anticoagulants b) Thrombolytics and antiplatelet agents c) Haemopoietics and plasma expanders	8	8.88%
2.	Pharmacology of drugs acting on Renal System a) Diuretics b) Antidiuretics	7	7.77%
3.	Chemotherapy a) Introduction b) Sulfonamides and co-trimoxazole c) Penicillins and Cephalosporins d) Tetracyclins and Chloramphenicol e) Macrolides, Aminoglycosides, Polyene & Polypeptide antibiotics f) Quinolines and Fluroquinolines g) Antifungal antibiotics h) Antiviral agents i) Chemotherapy of tuberculosis and leprosy j) Chemotherapy of Malaria k) Chemotherapy of protozoal infections (amoebiasis, Giardiasis) l) Pharmacology of Anthelmintic drugs m) Chemotherapy of cancer (Neoplasms)	30	33.3 %
4.	Immunopharmacology Pharmacology of immunosuppressants and stimulants	4	4.4%
5.	Principles of Animal toxicology Acute, sub acute and chronic toxicity	6	6.7%
6.	The dynamic cell: The structures and functions of the components of the cell a) Cell and macromolecules: Cellular classification, subcellular organelles, macromolecules, large macromolecular assemblies b) Chromosome structure: Pro and eukaryotic chromosome structures,	15	16.7%

	chromatin structure, genome complexity, the flow of genetic information. c) DNA replication: General, bacterial and eukaryotic DNA replication. d) The cell cycle: Restriction point, cell cycle regulators and modifiers. e) Cell signaling: Communication between cells and their environment, ion-channels, signal transduction pathways (MAP kinase, P38 kinase, JNK, Ras and PI3-kinase pathways, biosensors).		
7.	The Gene: Genome structure and function: a) Gene structure: Organization and elucidation of genetic code. b) Gene expression: Expression systems (pro and eukaryotic), genetic elements that control gene expression (nucleosomes, histones, acetylation, HDACS, DNA binding protein families). c) Transcription and Transcription factors: Basic principles of transcription in pro and eukaryotes. Transcription factors that regulate transcription in pro and eukaryotes.	10	11.1%
8.	RNA processing: rRNA, tRNA and mRNA processing. Protein synthesis: Mechanisms of protein synthesis, initiation in eukaryotes, translation control and post-translation events Altered gene functions: Mutations, deletions, amplifications, LOH, traslocations, trinucleotide repeats and other genetic abnormalities. Oncogenes and tumor suppressor genes. The gene sequencing, mapping and cloning of human disease genes. Introduction to gene therapy and targeting. Recombinant DNA technology: principles. Processes (gene transfer technology) and applications	10	11.1%

Text books (Theory)

- Tripathi, K. D. Essentials of medical pharmacology. Latest Edition. Publisher: Jaypee, Delhi.
- Satoskar, R.S. and Bhadarkar, S.D. Pharmacology and pharmacotherapeutics. Latest Edition. Publisher: Popular, Dubai.
- Rang, H.P. and Dale, M.M. Pharmacology. Latest Edition. Publisher: Churchill Livingstone
- Gerald K., Janet I. and Wallace M. Cell and Molecular Biology: Concepts and Experiments by Latest Edition. Publisher: Wiley

Reference books (Theory)

- Goodman Gilman, A., Rall, T.W., Nies, A.I.S. and Taylor, P. Goodman and Gilman's. The pharmacological Basis of therapeutics. Latest Edition. Publisher: Mc Graw Hill, Pergamon press.
- Craig, C.R. and Stitzel, R.E. Modern Pharmacology. Latest edition. Publisher: Little Brown and company.
- Katzung, B.G. Basic and clinical pharmacology. Latest edition. Publisher: Prentice Hall, International.
- Gupta, P.K. and Salunkhe, D.K. Modern Toxicology. Volume I, II and III. Latest edition. Publisher: B. V. Gupta, Metropolitan Book Co. (p) Ltd, New Delhi.
- Alberts B., Bray, D., Lewis, J., Raff M., Roberts, K and Watson, JD. Molecular Biology of the Cell, Latest edition. Publisher: W W Norton and Company.
- Lodish, H., Baltimore, D., Berk, A et al.,Molecular Cell Biology Latest edition. Publisher: W H freeman and Company Ltd.
- Turner, PC., McLennan, AG., Bates, AD and White MRH. Instant notes in molecular Biology. Latest edition. Publisher: Bios scientific publisher, Oxford
- Lewin, B . Genes XII ., (2018) Publishers: Jones and Bartlett Publishers Inc.
- Crommelin, DJA and Sindelar RD. Pharmaceutical Biotechnology. Latest Edition. Publisher Springer.
- Watson, JD., Gilman, M., et al. Recombinant DNA Latest Edition. Publisher: W H Freeman.
- Walsh, G Biopharmaceutical: Biochemistry and Biotechnology., Latest Edition. Publisher: Wiley.

Text books (Practical)

- Kulkarni, S. K. and Dandia, P. C. Hand book of experimental pharmacology. Latest edition, Publisher: Vallabh, Delh

Reference books (Practical):

- a. Macleod, L.J. Pharmacological experiments on intact preparations. Latest edition, Publisher: Churchill livingstone.
- b. Macleod, L.J. Pharmacological experiments on isolated preparations. Latest edition, Publisher: Churchill livingstone.
- c. Ghosh, M.N. Fundamentals of experimental pharmacology. Latest edition, Publisher: Scientific book agency, Kolkata.
- d. Ian Kitchen. Textbook of in vitro practical pharmacology. Latest edition, Publisher: Black well Scientific.

List of Experiments:

1. Study of laboratory animals and their handling (a. Frogs, b. Mice, c. Rats, d. Guinea pigs, e. Rabbits).
2. Study of physiological salt solutions used in experimental pharmacology.
3. Study of laboratory appliances used in experimental pharmacology.
4. Study of use of anesthetics in laboratory animals.
5. To record the dose response curve of Ach using isolated ileum/rectus abdominis muscle preparation.
6. To carry out bioassay of Ach using isolated ileum/rectus abdominis muscle preparation by interpolation method.
7. To carry out bioassay of Ach using isolated ileum/rectus abdominis muscle preparation by three point method.
8. To record the dose response curve of Histamine using isolated guinea-pig ileum preparation.
9. Study of agonistic and antagonistic effects of drugs using isolated guinea-pig ileum preparation.
10. To carry out bioassay of Histamine using isolated guinea-pig ileum preparation by interpolation method.
11. To carry out bioassay of Histamine using guinea-pig ileum preparation by three point method.
12. To study the routes of administration of drugs in animals (Rats, Mice, Rabbits).
13. Study of theory, principle, procedure involved and interpretation of given results for the following experiments: a) Analgesic property of drug using analgesiometer. b) Antiinflammatory effect of drugs using rat-paw edema method. c) Anticonvulsant activity of drugs using maximal electroshock and pentylene tetrazole methods. d) Antidepressant activity of drugs using pole climbing apparatus and pentobarbitone induced sleeping time methods. e) Locomotor activity evaluation of drugs using actophotometer and rotorod. f) Cardiotonic activity of drugs using isolated frog heart and mammalian heart preparations.

Scheme of Practical Examination:

	Sessional	Annuals
Identification	02	10
Synopsis	04	10
Major Experiment (Bioassay)	08	30
Minor Experiment (Interpretation of given Graph or simulated experiment)	04	10
Viva	02	10
Max Marks	20	70
Duration	3hrs	4hrs

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).