Program	Bachelor of Pharmacy (BPharm)	**Semester - 4**
Type of Course	-	
Prerequisite		
Course Objective	-	
Effective From A.Y.	2023-24	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		
Lecture	Tutorial	Lab	Credit	External Marks (T)	Internal Marks (T)	External Marks (P)	Internal Marks (P)	Total Marks
3	1	4	6	75	25	35	15	150

SEE *- Semester End Examination,* ***CIA*** *- Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
1	**UNIT-1** 1. General Pharmacology a. Introduction to Pharmacology- Definition, historical landmarks and scope of pharmacology,nature and source of drugs, essential drugs concept and routes of drug administration, Agonists,antagonists (competitive and non-competitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy. b. Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion ofdrugs. Enzyme induction, enzyme inhibition, kinetics of elimination	8	18
2	**UNIT-2** 2. General Pharmacology a. Pharmacodynamics- Principles and mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms, G-protein–coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor and receptors that regulate transcription factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action. b. Adverse drug reactions. c. Drug interactions (pharmacokinetic and pharmacodynamic) d. Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.	12	26
3	**UNIT-3** 3. Pharmacology of drugs acting on peripheral nervous system a. Organization and function of ANS. b.Neurohumoral transmission, co-transmission and classification of neurotransmitters. c.Parasympathomimetics,Parasympatholytics, Sympathomimetics, sympatholytics. d.Neuromuscular blocking agents and skeletal muscle relaxants (peripheral). e. Local anesthetic agents. f.Drugs used in myasthenia gravis and glaucoma	10	22
4	**UNIT-4**	8	18

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
	4.Pharmacology of drugs acting on central nervous system a. Neurohumoral transmission in the C.N.S special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine. b. General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants. d. Anti-epileptics e. Alcohols and disulfiram		
5	**UNIT-5** 5. Pharmacology of drugs acting on central nervous system a. Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens. b. Drugs used in Parkinsons disease and Alzheimer's disease. c. CNS stimulants and nootropics. d. Opioid analgesics and antagonists e. Drug addiction, drug abuse, tolerance and dependence	**7**	**16**
	Total	**45**	**100**

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	20	35	25	10	10	0

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:	
CO1	Basic knowledge of various terms used in pharmacology and understanding of drug pharmacokinetics and its relevance in drug responses
CO2	Knowledge about drug pharmacodynamics and understanding of drug interactions, adverse drug reactions and new drug discovery
CO3	Ability to learn pharmacology of various drugs acting on peripheral nervous system with knowledge of receptors involved in and their role in drug action.
CO4	Pharmacology of various drugs acting on central nervous system with knowledge of receptors involved in and their role in drug action
CO5	Understanding of various aspects of experimental pharmacology and ability of various selected in-vivo pharmacological studies in animals

Reference Books

1.	**Rang and Dale's Pharmacology** By Rang H. P., Dale M. M., Ritter J. M., Flower R. J. | Churchil Livingstone Elsevier
2.	**Basic and Clinical Pharmacology** By Bertram G. Katzung | McGraw-Hill Education
3.	**Goodman and Gilman's, The Pharmacological Basis of Therapeutics** By Goodman and Gilman
4.	**Lippincott Williams & Wilkins: Applied Therapeutics, The Clinical use of Drugs** By Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W. | The Point
5.	**Lippincott's Illustrated Reviews- Pharmacology** By Mycek M.J, Gelnet S.B and Perper M.M
6.	**Essentials of Medical Pharmacology (TextBook)** By K.D.Tripathi | Jaypee Brothers Medical Publishers
7.	**PRINCIPLES OF PHARMACOLOGY (TextBook)** By HL SHARMA, KK SHARMA | PARAS PUBLICATION | 3rd, Pub. Year 2008
8.	**Modern Pharmacology with clinical Applications** By Charles R. Craig & Robert
9.	**Fundamentals of Experimental Pharmacology (TextBook)** By Ghosh MN | Hilton & Company, Kolkata.
10.	**Handbook of experimental pharmacology (TextBook)** By Kulkarni SK | Vallabh Prakashan

List of Practical

1.	Introduction to experimental pharmacology.
2.	Commonly used instruments in experimental pharmacology.
3.	Study of common laboratory animals.
4.	Maintenance of laboratory animals as per CPCSEA guidelines.
5.	Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
6.	Study of different routes of drugs administration in mice/rats.
7.	Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
8.	Effect of drugs on ciliary motility of frog oesophagus
9.	Effect of drugs on rabbit eye
10.	Effects of skeletal muscle relaxants using rota-rod apparatus.
11.	Effect of drugs on locomotor activity using actophotometer.
12.	Anticonvulsant effect of drugs by MES and PTZ method.
13.	Study of stereotype and anti-catatonic activity of drugs on rats/mice.
14.	Study of anxiolytic activity of drugs using rats/mice.
15.	Study of local anesthetics by different methods

List of Tutorial	
1.	Pharmacokinetics
2.	Pharmacokinetics 1
3.	Pharmacokinetics 2
4.	Adverse drug reactions
5.	Drug interactions pharmacokinetic
6.	Drug interactions pharmacodynamic
7.	Neuromuscular blocking agents
8.	skeletal muscle relaxants
9.	Local anesthetic agents
10.	Anti-epileptics
11.	Alcohols
12.	disulfiram
13.	Drug addiction, drug abuse, tolerance and dependence
14.	Opioid analgesics
15.	Opioid antagonists