Semester VII

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Pharmacology and Toxicology (BCH-DSE-12)	**4**	**2L**		**2P**	**Class XII with Science and Biology**	**-**

Learning Objectives

This is an introductory course to lay the foundation for understanding basic concepts in Pharmacology and the pharmacological basis of therapeutics. The objective of the course is to introduce students to the core principles of drug action in terms of bioavailability, pharmacokinetics, pharmacodynamics, and mechanism of action of drugs in the treatment of diseases. The course will also provide basic principles of toxicology, toxic substances and their effects on body systems.

Learning Outcomes:

At the end of the course, a student will be able to

1. Understand the basic scientific concepts and principles that serve as the foundational underpinnings of the pharmacological sciences including pharmacokinetics; pharmacodynamics; drug metabolism; and drug-drug interactions.
2. Learn an introduction to the processes by which new drugs are discovered.
3. Understand the specific pharmacology of the major drugs and drug classes currently used in medical practice including their indications, clinical use and mechanisms of action,

4. Discuss the basic principles of toxicology; the mechanisms by which excess exposure to certain drugs, toxins, chemicals, heavy metals and poisons can lead to adverse toxicological effects

SYLLABUS OF DSE-12
BCH-DSE-12: PHARMACOLOGY AND TOXICOLOGY
Semester – VII

Theory

Credits: 2 **Total Hours: 30**

Unit I: Introduction to Pharmacology **Number of hours: 5**

History and Scope of Pharmacology, Nature and source of drugs, Routes of drug administration, Drug receptors and receptor subtypes, Drug Discovery and Development, Computer Aided Drug Design

Unit II: Pharmacokinetics and Pharmacodynamics **Number of hours: 8**

Absorption, Distribution, Metabolism, and Excretion (ADME) of drugs. Bioavailability, First Pass metabolism, Biological half-life of drug and its significance, Drug-drug interactions.

Unit III: Drug Classification and their mechanism of action **Number of hours: 10**

Drugs of Inflammation*:* NSAIDs, Analgesics and Anti-inflammatory Drugs; Drugs of autonomic and central nervous system -Adrenergics: Isoprenaline, Propranolol; Dopaminergics, Dopamine, Syndopa; General Anesthetics: Halothane; Sedatives and Hypnotics: Diazepam; Cholinergics: Bethanechol, Rivastigmine ; Anticonvulsant, Drugs of Cardiovascular system*:* Anticoagulant, Blood Pressure Lowering Drugs, Lipid Lowering Drugs ;Drugs of Gastro-Intestinal tract*:* Antacid, Acid Blocker and Laxative ;Drugs of Renal functions: Diuretics ; and Anticancer Drugs.

Unit IV: Toxicology **Number of hours: 7**

Classification of toxic substances, Drugs, Toxins and Heavy metal poisoning, Xenobiotics, Mechanism of toxicity, Tolerance to toxicants, Dose-response relationship, Therapeutic Index, Bioaccumulation and Antidotes

2.3 Practical:

Credit: 2 **Total Hours: 60**

1. To study the presence of paracetamol (acetaminophen) in given sample by spectroscopic method
2. Calculation of LD50/LC50
3. Model Systems to study Dose-Response
4. Drug Binding assay to Albumin by Spectroscopic Analysis
5. Case Studies
6. Small Molecule Databases mining and Protein-ligand Docking

Essential Readings

- Tripathi, K.D. (2010). 7th Edition. Essentials of medical pharmacology. Delhi, India: Jaypee Brothers. ISBN-13:9788184480856.
- Katzung, Bertram G. , Basic &Clinical Pharmacology, 14th Edition, McGraw Hill Education, 2017
- Klaassen, C. D. and Watkins J. B. (2021), 4th Edition, Casarett & Doull's Essentials of Toxicology New York, USA: McGraw Hill.ISBN: 978-1-26-045229-7.
- Kulkarni, S.K. (2012). 4th Edition. Handbook of experimental pharmacology. Delhi, India: Vallabh Prakashan, ISBN-13: 97881857311.

3. Teaching Learning Process and Assessment Methods:

Facilitating the Achievement of Course Learning Outcomes**

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks

I	Students will learn about the history and scope of pharmacology. They will also learn about nature, source, administration routes, and receptors of various drugs. They will learn about various drug development strategies.	Teaching will be conducted both by chalk and board and power point presentation.	Students will be assessed through assignments, class tests, group discussions and paper presentations.
II	Students will understand about the absorption, distribution, metabolism and excretion of drugs. They will also learn about bioavailability of drugs and drug-drug interactions.	Teaching will be conducted both by chalk and board and power point presentation. .	Students will be assessed through assignments, class tests, group discussions and paper presentations.
III	Students will understand about mechanism of action of various classes of drugs.	Teaching will be conducted both by chalk and board and power point presentation.	Students will be assessed through assignments, class tests, group discussions and paper presentations.
IV	Students will learn about various toxins, their mechanism, tolerance and antidotes. Students will also learn about therapeutic index and bioaccumulation of various drugs.	Teaching will be conducted both by chalk and board and power point presentation.	Students will be assessed through assignments, class tests, group discussions and paper presentations.

(Assessment tasks enlisted here are indicative in nature)**

Keywords:
Pharmacology, Drug Discovery, Pharmacokinetics, Pharmacodynamics, ADME, Classes of Drug, Mechanism of action, Toxicity.