Course No.	Course Name	L-T-P-Credits
CY 539	**Chemistry of Drug Design and Drug Action**	**3-0-0: 03**

Prerequisite: NIL

Course Objectives: The main objective to design this course is to provide information to the students about the drug discovery and development. The course will be useful in the understanding of protocols related to the drug design. Further this course will helped the students to get knowledge of chemical synthesis of various drugs and their specific actions.

Course Outcomes: After successful completion of the course, students will be able to:

1. Discuss about the lead discovery followed by drug design and development.
2. Describe the advantages and disadvantages of different methods related to drug design processes.
3. Explain the specific actions of different dug molecules.
4. Describe various laboratory methodologies related to the chemical synthesis of drugs.
5. Explain the process of drug metabolism and transportation.

SYLLABUS

Module	Contents	Hours
I	**Introduction** Historical outline of drug discovery, sources of drugs, leads and analogues, overview of rational design, pharmacokinetics and pharmacodynamics, classification of drugs.	05
II	**Principles of Drug Design** Lead discovery and lead modifications, structure activity relationship (SAR), QSAR, computational methods, theories and determination of receptor-drug interactions.	08
III	**Specific Drug Actions** Neuro-active drugs: neurons and neurotransmitters, brain-related disorders, chemotherapeutic agents interacting with cholinergic, adrenergic, dopaminergic and histaminic receptors. DNA interactive agents: reversible DNA binders, alkylating and chain cleaving agents. Anti-fungal drugs, therapeutic uses of anti-microbial and photoactivated metal complexes. Recombinant proteins as medicines and vaccines, gene-based medicines, anti-diabetic and anti-inflammatory agents.	11
IV	**Chemical Synthesis** Combinatorial libraries: solid phase syntheses, introduction to drug and analogue syntheses, general methods of asymmetric synthesis in drug design, utilization of disconnection approaches.	05
V	**Drug Metabolism** Concept of drug metabolism, biological and environmental factors, pharmacological implications, metabolic reactions, pharmacokinetics of metabolism, drug metabolism and drug design, prodrugs and drug delivery systems.	07

Essential Readings:

1. R. Silvermann, “The Organic Chemistry of Drug Design and Drug Action”, Academic Press, 2nd Edition, 2012.
2. G. Thomas, “Medicinal Chemistry: An Introduction”, John Wiley & Sons Ltd., 2nd Edition, 2007.

Supplementary Readings:

1. V. K. Ahluwalia, “Medicinal Chemistry”, Ane Books Pvt. Ltd., 2nd Edition, 2012.