

**20CY214 MEDICINAL CHEMISTRY**

Hours Per Week :

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**Course Description and Objectives:**

This course familiarizes students with the fundamental concepts of drug discovery and development. The course is intended for students who have a background in chemistry and interested in the process of drug discovery. The intended outcome is to train students on various aspects of new drug discovery/development, drug screening, synthetic methodologies adopted for a few antibiotics.

**Course Outcomes:**

The goal of this course is to provide an overview of the methods and techniques which are used within modern molecular modeling. Upon completion of the course the student will be able to gain the knowledge and able to:

COs	Course Outcomes
1.	Analyze various physico - chemical properties of the drugs.
2.	Apply various synthetic methods and strategies for synthesis of the drugs.
3.	Illustrate the drug metabolic pathways and adverse effect.
4.	Evaluate various antibiotic molecules and examine their synthetic procedures.
5.	Analyze DNA-protein interaction and its importance in Medicinal Chemistry.

**UNIT-I :**

**Introduction** : Medicinal chemistry, intermolecular binding forces, Introduction to various drug targets; Drug activity and physico-chemical properties: Solubility, partition coefficient, hydrogen bonding, chelation, bioisosterism, optical and geometrical isomerism, prodrugs and soft drugs. Drug-receptor interaction forces, mechanism of action.

**UNIT-II :**

**Drug Synthesis:** Introduction -The drug discovery and Development process, combinational & parallel synthesis, Solid Phase techniques, mix and split method in combinational synthesis, dynamic combinational synthesis, solid phase synthesis, diversity-oriented synthesis, strategies for the synthesis of small molecule libraries, structure-activity relationships, QSAR.

**UNIT-III :**

**Drug Metabolism:** Drug metabolism principles- Phase I and Phase II reactions, factors affecting drug metabolism, analytical methods in metabolism, ADME, bioavailability, pre-clinical and clinical development, therapeutic index & therapeutic window, Drug resistance mechanisms and synergism.

**UNIT-IV :**

**General Introduction to Antibiotics:** Mechanism of action of lactam antibiotics and non-lactam antibiotics, antiviral agents, stereochemistry, biosynthesis and degradation of penicillins - An account of semisynthetic penicillins - acid resistant, penicillinase resistant and broad spectrum semisynthetic penicillins; Synthesis of Penicillin G, Penicillin V.

**UNIT-V :**

**Interactions:** DNA-protein interaction and DNA-drug interaction. Introduction to rational approach to drug design, physical and chemical factors associated with biological activities, mechanism of drug action.

**TEXT BOOKS :**

1. JH Block & JM Beale (Eds), Wilson & Giswold's Text book of organic Medicinal Chemistry and pharmaceutical chemistry, 11th Ed, Lippcott, Raven, Philadelphia, 2004.
2. S. N. Pandeya, Textbook of medicinal chemistry, SG Publ. Varanasi, 2003.
3. A. Burger, Medicinal Chemistry, Wiley Interscience, New York, Vol. I and II, 1970

**REFERENCES :**

1. D. Abraham (Ed), Burger Medicinal chemistry and Drug discovery, Vol. 1 & 2. John Wiley & Sons, New York 2003, 6th Ed.
2. A. Gringauz, Introduction to Medicinal Chemistry, How Drugs Act and Why?, John Wiley and Sons, 1997.
3. B.N. Lads, MG.Mandel and F.I. way, Fundamentals of drug metabolism & disposition, William & welking co, Baltimore USA.
4. C. Hansch, Comprehensive medicinal chemistry, Vol 1 – 6 Elsevier pergmon press, Oxford.
5. G. L. Patrick, Introduction to Medicinal Chemistry, Oxford Univeristy Press, 2001.