

# GUJARAT TECHNOLOGICAL UNIVERSITY

## CHEMICAL TECHNOLOGY (36)

### INTRODUCTION TO MEDICINAL CHEMISTRY & BIOCHEMISTRY

**SUBJECT CODE:** 2133601

B.E. 3<sup>RD</sup> SEMESTER

**Type of Course:** Chemical Technology

**Prerequisite:** Fundamental knowledge of Organic Chemistry

**Rationale:** The main objective of this subject is to study the classification of drugs, drug synthesis, drug metabolism, structural activity relationship. The study of this subject gives knowledge of enzymes & its mechanism of action, role of hormones, and importance of Good Manufacturing Practice in Pharmaceutical Industries.

#### Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
			ESE (E)	PA (M)		PA (V)		PA (I)		
			PA	ALA	ESE	OEP				
4	0	0	4	70	20	10	0	0	0	100

#### Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1.	<b>Introduction to Medicinal &amp; Pharmaceutical Chemistry:</b> Methods of classification of drugs based on structure & biological activity, Concept of acidity & basicity of drugs & pKa values. Introduction of absorption & distribution of drugs based on physicochemical properties, Drug metabolism chemistry.	10	15
2.	<b>Anti – infective:</b> Study of the chemistry of the following classes of drugs: nomenclature, classification, SAR: - Anti-infective agents: antiseptic & disinfectant, antibacterial–sulfonamides, quinoline, DHE antagonists, antibiotics including stability & degradation products, antiparasitic agents – antimalarial, antiamoebic, anthelmintic, antimycobacterial agents, antifungal agents, anticancer agents, diagnostic agents, antiviral agents. Non – steroidal anti – inflammatory agents.	24	40
3	<b>Cellular level cell &amp; cell organelles:</b> Coenzymes & cofactors: role of vitamins as coenzymes. Enzyme: structure, classification, mechanism of enzyme action, enzyme kinetics, enzyme inhibitors.	9	15
4.	<b>Oxidative metabolism:</b> Biological oxidation, respiratory cycle, oxidation phosphorylation ,metabolism of carbohydrates: Photosynthesis, glycolysis, pentose phosphate cycle, TCA cycle. Metabolism of proteins & amino acids, urea cycle. Metabolism of	16	30

	lipids: formation of fatty acids, beta oxidation of fatty acids: DNA as carrier of genetic information, transfers of information, protein biosynthesis. Miscellaneous: role of hormone & other body fluids. Introduction, importance general application in pharmaceutical industry concept of GMP.		
--	---	--	--

### Reference Books:

1. Strategies for Organic Drug Synthesis & Design, & Daniel Led nicer, John Willey & Sons Inc. New York., 2nd Ed, 1998
2. Burger's Medicinal Chemistry & Drug Discovery: Vol. 1 to 6, A. Burger & M.E. Wolff, John Wiley & Sons – New Jersey, 6th Ed, 2003
3. Foye's Principles of Medicinal Chemistry, W.O. Foye, Lippincott Williams & Wilkins-Philadelphia, Oxford, 6th Ed, 2008.
4. Text book of Medicinal & Pharmaceutical Chemistry, Charles Owens Wilson Lippincott Williams & Wilkins – Philadelphia. 1962
5. Organic Synthesis – The Disconnection Approach, Warren S., John Wiley & Sons – Chichester., 1st Ed., 2005
6. Pharmaceutical Substances: Synthesis, Patents, Applications (N-Z), A. Kleemann, Georg Thieme Verlag, Stuttgart. 4th Ed, 2001
7. Textbook of Medicinal & Pharmaceuticals Chemistry, Wilson & Gisvold ., Williams & Wilkins, 1st Ed, 2004.
8. Principles of Biochemistry, Lehninger, Freeman & Company, 5th Ed, 2008
9. Biochemistry, J.M. Berg, J.L. Tymoczko & L. Stryer, W H Freeman, 5th Ed, 2002
10. Organic Chemistry of drug synthesis by Lednicer
11. Medicinal chemistry by Ashutosh Kar
12. Text book of Medicinal Chemistry by Alagarsamy

### Course Outcomes:

At the end of this course students will be able to:

1. To express the SAR of various drug molecule and the metabolites of drugs.
2. To carry out organic synthesis of drugs and intermediates
3. To be able to utilize the knowledge of GMP in the Pharmaceutical Industries.
4. To be able to apply this knowledge in the API manufacturing & Pharmaceutical Formulation industries
5. To build a bridge between theoretical and practical concept used in industry.

### List of Open Source Software/learning website:

- 1) Literature available in any laboratory manual of Pharmaceutical Industries.
- 2) Literature available on Internet etc...
- 3) Delnet

**ACTIVE LEARNING ASSIGNMENTS:** Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.