GUJARAT TECHNOLOGICAL UNIVERSITY

CHEMICAL TECHNOLOGY (36)
PHARMACEUTICAL CHEMISTRY
SUBJECT CODE: 2153601
B.E. 5thSEMESTER

Type of Course: Chemical Technology

Prerequisite: Studied department electives of previous semesters. Basic knowledge of organic chemistry is required

Rationale: The main objective of this subject is to study Retrosynthesis, SAR, MOA of different drugs & Natural products. It also gives knowledge of drugs acting on hormonal system.
Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	3	6	70	20	10	20	10	20	150

Content:

Sr. No.	Topic	Teaching Hours	Module Weightage (%)
01.	Retrosynthetic analysis, Synthesis, SAR, MOA of drugs : Concepts, Retrosynthetic analysis, Synthesis, SAR & MOA of 20 drugs in the class of anti infective, antihistamines, CNS drugs, ANS drugs, CVS drugs, NSAIDs with aromatic structure	25	42
02	Drugs having heterocyclic & fused ring systems: Drugs having heterocyclic & fused ring systems giving approximate conditions & emphasis on techno commercial potential routes of synthesis.	8	13
03	Retrosynthetic analysis of natural products: Retrosynthetic analysis of relatively simple natural products and their Synthesis - to be selected from for example betalactam antibiotics, Antibiotics including stability & degradation products, Alkaloid drugs, etc those regarded as classics in synthesis.	7	12
04	Drugs acting on hormonal system: a). Anti diabetic agent, b). Steroid hormones- adrenocorticoids, c). Sex steroids & antagonists, oral contraceptives. d). Thyroid & anti thyroid agents, e). Drugs acting on Calcium haemostatic, Iron preparations.	20	33

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
60%	**10%**	**10%**	**10%**	**10%**	**-**

Reference Books:

1. Organic Synthesis- The Disconnection Approach; Ed.: Warren S.; John Wiley & Sons-Chichester
2. Organic Chemistry, Louden
3. Organic Chemistry, Carey
4. Logic of Chemical Synthesis, E.J. Corey
5. Classics in Organic Synthesis, K.C. Nicolaou
6. Synthesis of drugs-Synthon approach, R P Iyer, Mariam S Degani, Janhavi Rao
7. Strategies for Organic Drug Synthesis & Design, &Daniel Led nicer, John Willey &SonsInc. New York., 2nd Ed, 1998
8. Organic Chemistry of Drug Synthesis: Vol.1 to 6, Daniel Lednicer, John Wiley & Sons Inc.
9. Burger's Medicinal Chemistry & Drug Discovery: Vol. 1 to 6, A. Burger &M.E.Wolff,John Wiley & Sons – New Jersey,6th Ed, 2003
10. Foye's Principles of Medicinal Chemistry, W.O. Foye, Lippincott Williams & Wilkins-Philadelphia, Oxford, 6th Ed, 200
11. 11.Text book of Medicinal & Pharmaceutical Chemistry, Charles Owens Wilson LippincottWilliams & Wilkins – Philadelphia. 1962

Course Outcome: After learning this course the students can:

1. To know the retrosynthetic analysis, SAR, MOA of different drugs.
2. To know the retrosynthetic analysis of natural products
3. To carry out organic synthesis of drugs and intermediates, drugs having heterocyclic & fused ring system
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 Experiments:

1. Exploring a drug substance.
2. To calculate the assay, purity of a USP solution of reagent
3 To determine the percentage of Sodium Chloride in saline water
4. To determine the iron content in an iron tablet
5. To calculate the assay of Vitamin C
6. Extraction of Caffeine from tea leaves
7. Synthesis of Aspirin
8. Synthesis of a drug intermediate.
9. Monitoring of reaction by thin layer chromatography
10. To find out the concentration of solutions by UV spectroscopy.

Design based Problems (DP)/Open Ended Problem:

Students are free to select any area of science and technology based on chemical technology applications to define Projects.

Some suggested projects are listed below:

- Literature survey on synthesis of Heterocyclic & fused ring systems with emphasis on techno commercial potential routes
- Carry out synthesis of drug and intermediates

- Product profile and its manufacturing process of antihistamines, peptides etc

Major Equipment: Glasswares, heating mantles / water baths, UV spectrophotometer, UV cabinet for TLC, weighing scale, heating oven mechanical stirrers

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.