GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3153601
Semester – V
Subject Name: Pharmaceutical Chemistry

Type of Course: Chemical Technology

Prerequisite: The student should have **s**tudied subject PEC-I & PEC-II (Introduction to Physiology, Medicinal Chemistry, Biochemistry and Medicinal Chemistry-I & Microbiology). Basic knowledge of Organic Chemistry is required.

Rationale: The main objective of this subject is to offer an overview over the retro synthesis, heterocyclic drugs, drugs acting on hormonal system, anti-diabetic drugs, Iron preparations.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE Viva(V)	PA (I)	
4	0	2	5	70	30	30	20	150

L-Lectures; T-Tutorial/Teacher Guided Student Activity; P-Practical; C-Credit; ESE-End Semester Examination; PA-Progressive Assessment

Content:

Sr. No.	Content	Total Hrs.
1	**Retrosynthetic analysis**: Concepts, Retrosynthetic analysis, Synthesis of 20 drugs in the class of anti-infective, antihistamines, CNS drugs, ANS drugs, CVS drugs, NSAIDs with aromatic structure.	20
2	**Drugs acting on hormonal system:** Steroid hormones- adrenocorticoids, c). Sex steroids & antagonists, oral contraceptives. Thyroid & anti thyroid agents, Drugs acting on Calcium homeostasis,	14
3	**Heterocyclic & fused ring systems:** Drugs having heterocyclic & fused ring systems giving approximate conditions & emphasis on techno commercial potential routes of synthesis.	8
4	**Anti-diabetic agents & Iron preparations**: Synthesis, MOA & SAR of oral anti-diabetic drugs & Iron preparations	8
5	**Antibiotics:** Betalactam antibiotics, Antibiotics including stability & degradation products.	6
6	**Retrosynthetic analysis of natural products:** Retrosynthetic analysis of relatively simple natural products and their Synthesis	4

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Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**20**	**10**	**10**	**5**	**5**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

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. Burger's Medicinal Chemistry & Drug Discovery: Vol. 1 to 6, A. Burger &M.E.Wolff,John Wiley & Sons – New Jersey,6th Ed, 2003
9. Foye's Principles of Medicinal Chemistry, W.O. Foye, Lippincott Williams & Wilkins-Philadelphia, Oxford, 6th Ed, 200
10.Text book of Medicinal & Pharmaceutical Chemistry, Charles Owens Wilson LippincottWilliams & Wilkins – Philadelphia. 1962

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
1	To describe the retro synthesis concept & retrosynthetic analysis of different drugs.	33
2	To illustrate the organic synthesis of drugs acting on hormonal system	24
3	To demonstrate the techno-commercial synthesis of drugs having heterocyclic & fused rings.	13
4	To analyse the synthesis, SAR, MOA of anti-diabetic drugs, Iron preparation	13
5	To explain the MOA, synthesis, degradation products of β- lactam antibiotics	10
6	To evaluate Retrosynthetic analysis of relatively simple natural products and their Synthesis	7

List of experiments:

1. Synthesis of Aspirin
2. Synthesis of a drug intermediate -Benzil
3. Exploring a drug substance
4. Synthesis of Acetophenone

5. Synthesis of PABA
6. To find out the concentration of solutions by UV spectroscopy
7. To calculate the assay, purity of a USP solution of reagent
8. To synthesis Acetanilide by Green process.
9. To understand bromination reaction
10. To synthesis Sulphanilamide

Major Equipment:

1. Reflux/ distillation assembly
2. Dryer
3. UV spectrophotometer
4. UV chamber

List of Open Source Software/learning website:

1) Literature available in any laboratory manual of Pharmaceutical Industries.
2) Literature available on internet
3) Medical dictionaries
4) Delnet
5) Pharmacopoeia