



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3143509

Semester – IV

Subject Name: ORGANIC CHEMISTRY AND INDUSTRIAL PROCESSES

Type of course: Basic Science

Prerequisite: A good fundamental backup of basics of organic chemistry.

Rationale: The main objective of this subject is to make students aware about the basics of organic chemistry and the fundamentals of synthetic chemistry which are very useful in knowing the actual industrial process and its impact on environment.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (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.	Organic functional groups & their applications : IUPAC nomenclature Basic reactions in chart format for following functional groups : Phenols, Amines, Carboxylic acids, Nitro compounds, Aldehydes, Ketones, Organo halo compounds Environmental impact of above compounds	12
2.	Introduction to various Industrial Processes : Nitration, Sulphonation, Halogenation, Hydrolysis, Oxidation, Reduction, Alkylation, Acylation, Polymerization	12
3.	Toxic Organic Compounds of Environmental Concern and fate of organic compounds in environment Organophosphates, Organochloro and carbamate insecticides; herbicides: atrazines .Dioxins, Furans, and PCBs, PAH, phthalates; fire retardants and perfluorinated compounds.	12
4.	Green chemistry : Future of industrial processes Basic concept of green chemistry, Twelve principles, Atom economy, Green solvents and solvent free systems, Super critical fluids, Microwave and sonochemistry.	12



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Suggested Specification table with Marks (Theory):

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:

- Organic Chemistry, Volumes I & II, I L Finar, ELBS & Longman Ltd., 5th Ed., 1996
- Industrial Aromatic Chemistry: Raw materials, processes, products, H. G. Franck & J. W. Stadofer, Berlin Springer Verlag, 1st Ed., 1988
- Organic Chemistry, Morrison & Boyd, Pearson, 7th Ed, 2011
- Organic Building Blocks of the Chemical Industry, H HSzmant, John Wiley and Sons, 1989
- Organic chemistry : Bahl and Bahl
- Fundamentals of Organic chemistry : Puri & Sharma
- Anastas & Warner, Green Chemistry: Theory & Practice ,Oxford Univ. Press, New York, 1998
- Baird, C.; Cann, M. Environmental Chemistry, Fifth Edition; W. H. Freeman and Company, New York; 2012. ISBN-13: 978-1-4292-7704-4.
- Unit Process in Organic Synthesis By P H Groggins, Tata Mc Graw Hill, New Delhi.

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Examine scientific concepts and think critically targeting research	20
CO-2	Review the fundamentals of organic chemistry with illustrative problems	10
CO-3	Identify unit processes based on various chemical products	20
CO-4	Understand applicability of organic compounds in industrial processes	15
CO-5	Judge the fate of organic compounds in environment	20
CO-6	Develop a greener approach for organic reactions	15