



# GUJARAT TECHNOLOGICAL UNIVERSITY

**Bachelor of Engineering**

**Subject Code: 3143610**

**Semester – IV**

**Subject Name: Organic Chemistry for Technologists**

**Type of course:** Chemical Technology

**Prerequisite:** Needs basic knowledge of 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 manufacturing process.

### 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)		
3	0	4	5	70	30	30	20	150

### Content:

Sr. No.	Content	Total Hrs
1	<b>Electronic theory:</b> Types of bonds & bond fission process, resonance effect & hyperconjugation, tautomerism. Reaction intermediates: generation, structure & some reactions such as carbocations, carbanions, free radicals & carbenes, electrophile & nucleophile	07
2	<b>IUPAC nomenclature</b> of different Organic polyfunctional compounds	04
3	<b>Only preparation and chemical reaction of following compounds:</b> Halogenated compounds, nitro aromatic compounds, aromatic amines, aromatic sulfonic acids, phenols.	05
4	<b>Name reactions in Organic chemistry :</b>  Hoffman reaction, Grignard reaction, Diazotization reaction, Hydrogenation reaction, Ozonolysis, Aldol & Cross aldol reaction, Cannizzaro reaction	06



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5	<b>Study of individual reaction with mechanism :</b>  1. Arndt Eister synthesis 2. Baeyer Villiger reaction 3. Baker- Venkatraman reaction 4. Reformatsky reaction 5. Curtius rearrangement 6. Favorskii rearrangement	06
6	<b>Study of individual reaction with mechanism :</b>  1. Pinner reaction 2. Benzilic acid rearrangement 3. Witting reaction 4. Diels-Alder reaction 5. Birch reduction 6. Mannich reaction.	06

**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	15	15	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:**

**Course Outcomes:**

Sr. No.	CO statement	Marks % weightage
CO-1	To state various chemical compounds using IUPAC nomenclature.	10
CO-2	To construct a bridge between theoretical and practical concept used in industry	20



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CO-3	To apply the knowledge of Halogenated compounds, nitroaromatic compounds, aromatic amines, aromatic sulfonic acids, phenols in future subjects of chemical technology.	15
CO-4	To discriminate the relative stability of aromatic compounds and demonstrates their reaction mechanism.	15
CO-5	To choose reaction conditions favoring one path over another, thereby giving maximum amounts of desired products and minimum amounts of undesired products	20
CO-6	To design synthesis of various chemicals in laboratory.	20

### List of Experiments: (Any ten experiments to be done)

1	Safety and Overview of an Synthetic Organic Laboratory
2	Organic Qualitative analysis of Solids (Binary mixture)
3	Organic Qualitative analysis of Liquids (Binary mixture)
4	one step organic synthesis
5	Two step organic synthesis
6	Techniques like TLC, UV etc
7	Organic estimation of Glucine
8	Crystallization and checking the purity by TLC
9	Distillation and checking the purity by Boiling point
10	Organic Estimation of Formaldehyde

### Reference Books:



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1. Organic Chemistry, J. McMurry, Brooks / Cole, 5th Ed., 1999
2. Organic Chemistry, T. W. Solomons & C. B. Fryhle, John Wiley & Sons., 7th Ed., 2000
3. Organic Chemistry, G. Marc Loudon, Oxford University Press, 4th Ed., 2002
4. Organic Chemistry, L. G. Wade Jr., Pearson Education, 5th Ed., 2003
5. Organic Chemistry, Volumes I & II, I L Finar, ELBS & Longman Ltd., 5th Ed., 1996
6. Industrial Aromatic Chemistry: Raw materials, processes, products, H. G. Franck & J. W. Stadehofer, Berlin Springer Verlag, 1st Ed., 1988
7. Stereochemistry of Carbon Compounds, E. L. Eliel, McGraw – Hill, 1st Ed, 2003.
8. Stereochemistry: Conformation & Mechanism, P. S. Kalsi, New Age International (P) Ltd., 6th Ed., 2005
9. Stereochemistry & Mechanism through solved problems, P. S. Kalsi, New Age International (P) Ltd., 3rd Ed, 2007
10. Organic Chemistry, Morrison & Boyd, Pearson, 7th Ed, 2011
11. Name reactions & Reagents in Organic synthesis, B.P.Mundy, M.G.Ellerd and F G Favaloro, John Wiley and Sons, 2005
12. Organic Building Blocks of the Chemical Industry, H HSzmant, John Wiley and Sons, 1989
13. Organic chemistry : Bahl and Bahl
14. Fundamentals of Organic chemistry : Puri & Sharma

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

1. NPTEL
2. MIT Open course lecture available on Internet etc
3. Delnet