GUJARAT TECHNOLOGICAL UNIVERSITY

SUBJECT NAME: ORGANIC CHEMISTRY

SUBJECT CODE: 2133501

B.E. Semester: III (Environmental Science & Technology)

Type of course: Environmental Science & Technology

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 manufacturing process.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		PA (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 (%)
1.	Electronic theory: Types of bonds & bond fission process, resonance effect &hyper conjugation, tautomerism. Reaction intermediates: generation, structure & some reactions such as carbocations, carbanions, free radicals &carbenes, electrophile & nucleophile.	6	15
2.	Stereochemistry: Classification of stereomers, diasteromers, separation of enantiomers, absolute configuration (R/S, E/Z), projection formula, elements of symmetry, stereochemistry of compounds containing two asymmetric carbon atoms. Conformation: conformation around C-C bond in acyclic compounds, structure of cycloalkanes. Geometrical isomerism, Stereoselctive & Stereo specific reactions.	10	20
3.	Friedel – Craft & related reactions, Halogenated compounds, nitroaromatic compounds, aromatic amines, aromatic sulfonic acids, phenols.	6	15
4.	Name reactions in Organic chemistry : Hoffman reaction, Grignard reaction, Diazotization reaction, Hydrogenation reaction, Ozonolysis, Aldol& Cross aldol reaction, Cannizzaro reaction	14	25
5.	Mechanism of organic reactions: Nucleophilic substitution : SN 1 & SN 2, Elimination reaction : E 1 & E 2, Addition reaction : Hydroboration – oxidation reaction, Rearrangment : Pinacol & Benzidine, NGP	14	25

ReferenceBooks:

- Organic Chemistry, J. McMurry, Brroks / Cole, 5th Ed.,1999
- Organic Chemistry ,T. W. Solomons& C. B. Fryhle, John Wiley &Sons.,7th Ed., 2000
- Organic Chemistry , G.Marc Loudon, Oxford University Press ,4th Ed. , 2002
- Organic Chemistry, L. G. Wade Jr., Pearson Education,5th Ed. , 2003
- 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. Stadehofer, Berlin Springer Verlag, 1st Ed., 1988
- Stereochemistry of Carbon Compounds, E. L. Eliel, McGraw – Hill, 1st Ed, 2003.
- Stereochemistry: Conformation & Mechanism, P. S. Kalsi, New Age International (P) Ltd.,6th Ed., 2005
- Stereochemistry & Mechanism through solved problems, P. S. Kalsi, New Age International (P) Ltd.,3rd Ed, 2007
- Organic Chemistry, Morrison & Boyd, Pearson, 7th Ed, 2011
- Name reactions & Reagents in Organic synthesis, B.P.Mundy, M.G.Ellerd and F G Favaloro, John Wiley and Sons, 2005
- 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

Course Outcome: Afterlearningthe coursethe students should be able:

1. To be able to understand the basic of organic chemistry.
2. To carry out synthesis of various chemicals in laboratory.
3. To be able to understand industrial processes based on various reaction mechanisms.
4. To be able to apply this knowledge in future subjects of environmental science & technology.
5. To build a bridge between theoretical and practical concept used in industry.

List of Experiments and OpenEndedProjects:

PRACTICALS (ANYFIVE):

1.	Safety and Overview of an Synthetic Organic Laboratory
2.	Organic Qualitative analysis of Solids
3	Organic Qualitative analysis of Liquids
4.	Crystallization and checking the purity by TLC
5.	Distillation and checking the purity by Boiling point
6.	Organic qualitative analysis of Ternary mixtures
7.	Organic estimation
8.	Two step organic synthesis
9.	Three step organic synthesis
10.	Techniques like TLC, UV etc.

MajorEquipment:

Distillation assembly, TLC chambers, Mechanical stirrers, oil bath, water bath, glasswares.

OpenEndedProject fields:-

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

Some suggested projects are listed below:

- Study of named reactions & their application in industry
- Study of individual reactions & their application in industry
- Literature survey of new techniques

List of Open Source Software/learning website:

1)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 is 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 be sent to achievements@gtu.edu.in.