GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE PROCESSING (28)

ORGANIC CHEMISTRY

SUBJECT CODE: 2132805

B.E. SEMESTER III

Type of course: Textile Processing Engineering.

Prerequisite: Zeal to learn the subject.

Rationale: It is the basic subject for Textile Processing.

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	2	5	70	20	10	20	10	20	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1.	**Structure & Properties**: Fundamental concepts of Atomic theory, Electronic configuration of different elements, Formation of Atomic and Molecular orbitals (using Quantum No, Lewis, Pauli's Aufbau, Hund's Principle) Dipole moment, Polarity of bonds, Electronegativity, Different types of Bonds, Soulbility (Chemistry of Protic and Aprotic Solutes and Solvents)	6	15%
2.	**Reactivity of Molecules and Mechanisms:** Electronic displacements, Concepts of Conjugation, Electron delocalization and resonance. Nature of reactions (polar and non-polar reactions). Factors affecting electron availability in a molecule. Homolytic & Heterolytic fission, Types of organic reaction, Factor which affect reactions – Electromeric, Inductive, and Mesomeric effect, Some important mechanisms like Electrophilic Substitution and Addition, Nucleophilic Substitution and Addition reactions. Some known reactions like, Diazotisation, Azo coupling reaction, Cummene, Sandmeyer,	6	15%
3.	**Isomerisms:** Defination, Sturctural & Stereo isomerism, Optical activity, Plane Polarised light, Specific rotation, Polarimeter, Enantiomerism, Chirality, Optical resolution.	4	10%
4.	**Chemistry of Functional Groups:** Study the general properties and uses of, C - X bonded compounds - Alkyl halides & Aryl halides C - O bonded compounds - Alcohols & Phenols C = O bonded compounds - Aldehydes, Ketones, Esters, Carboxylic Acids, Amides C - N bonded compounds - Nitro and Cyano.	9	20%

5.	**Chemistry of Polynuclear Hydrocarbons and Heterocyclic compounds:** Aromaticity & Huckel Rule Naphthalene, Anthracene and some important derivatives of both. Five & Six member Heterocyclic compounds: Preparation, Properties & reactions of Pyrrole, Furan, Thiophene, Pyridine and Quinoline.	6	15%
6.	**Chemistry of some Common Textile intermediates and Auxillaries:** Acetic acid, Citric acid, Sulphanilic acid, Oxalic acid, Formic acid, Formaldhyde, Acetone, Phenol, Aniline, Toluene, Anthracene, H & J acid, DMF, DMDHU, Glycerine and Urea.	7	15%
7.	**Principles of Laboratory Practices**: Introduction to process of separation, purification & identification. Principles of common Analytical Instruments.	3	10%

Reference Books:

1. A Text Book Of Organic Chemistry by P. L. Soni, Sultan Chand & Sons, New Delhi.
2. A Text Book of Organic Chemistry by Arun Bahl and B.S. Bahl, Sultan Chand & Sons, New Delhi
3. A Textbook of Organic Chemistry by Raj K Bansal, New Age International, New Delhi
4. Organic Chemistry by Solomons, John Willey & Sons, USA.
5. Organic Chemistry, I. L. Finar Vol. I & II ELBS & Longmans, Green – UK
6. Organic Chemistry By Morrison and Boyd, Pearson Education, Singapore.
7. A Textbook of Organic Chemistry By Francis A Carey, Springer –USA
8. Organic Reaction and their Mechanism By P S Kalsi, New Age International, New Delhi
9. Atomic Structure and the Chemical Bond By Manas Chanda, Tata Mcgrawhill
10. Heterocyclic Chemistry By Bansal B K, New Age International, New Delhi
11. Laboratory Techniques in Organic Chemistry By Ahluwalia V K, I K International, New Delhi
12. Vogel's textbook of Qualitative Organic Analysis, by Arthur I Vogel, Revised by Jefferey et al. Publisher: Addison Wessley Longmann Ltd, England

Course Outcome:

After learning the course the students should be able:

1. To build a basic knowledge of the Fundamental structure of Organic molecules.
2. To analyze scientific concepts and think critically.
3. Can understand and explain the reactions in Organic molecules.
4. Can correlate the same as per their utility in field of processing.

List Of Practicals: (Minimum 10 to be performed.)

1. Qualitative analysis of different Organic molecules.
2. Preparations of some important Organic derivatives.
3. Purification and measurements of melting and boiling points of Organic molecules.

Open Ended Problems/Design Oriented Problems: Apart from above experiments a group of students has to undertake one open ended problem/design problem. Few examples of the same are given below.

1. Students with respect to any sort of preparation of some synthetic organic molecules.

2. Formation of any of synthetic dyes or color which can be applicable to fabric.

3. In continuation to the same any sort of auxiliaries (organic or inorganic) should also be considered

Major Equipments:

1. Magnetic Stirrer, Hot plates.
2. Laboratory Oven.
3. Melting Point Instrument.

List of Open Source Software/learning website: http://nptel.iitm.ac.in, World Wide Web, Google Search Engine etc.

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.