Gujarat Technological University
M. Pharm. Syllabus
Semester I
910101 : Subject of Specialization Paper – I
Advanced Organic Chemistry – I

Theory
(Four hours per week, 6 Credits)

Course Content: **Hours**

1. Chemical Bonding and Structure: **06**
Chemical Bonding, Bond Energies, Orbital Theory, Orbital Hybridization, Resonance, Electronegativity, Polarity, Hyperconjugation.

2. Chemical Reactivity and Molecular Structure **06**
Kinetics, Stearic, Inductive and electrostatic effect on reactivity, Acids and Bases.

3. Various Reaction Mechanisms

a. **Substitution Reaction:** Nucleophilic substitution reaction in aliphatic systems, SN1, SN2 reactions, Hydride transfer reaction, Cram's rule, Participation of neighbouring group in nucleophilic substitution reaction and rearrangements.

   Aromaticity, electrophilic and nucleophilic substitution in aromatic systems, Reactivity, orientation in electrophilic substitution. **12**

b. **Elimination Reaction:** Beta Elimination reactions, E1, E2 and E1cb mechanisms, Hoffman and saytzeff's rule for elimination. **06**

c. **Addition Reaction:** Electrophilic and Nucleophilic additions, Stereochemiistry involved, Markonikov's rule. **03**

d. **Rearrangement Reactions:** Transannular rearrangement, Pinacol rearrangements, Beckman rearrangement, Hofmann rearrangement. **05**

e. **Free Radical Reaction:** Formation, Detection, Reactions, Homolysis and free radical displacements, addition and rearrangements of free radicals. **04**

4. Reactions of carboxylic acids and esters
BAC2, AAc2, BAL2, BAL1, AAL1, Claisen condensation, decarboxylation, carbanions, enolisation, keto-enol equilibria **08**

5. Y-lides: Introduction, generation and reactions involving phosphorus, sulphur and nitrogen y-lides. **05**

6. Photochemistry: Theory, energy transfer, characteristics of photoreactions, typical photochemical reactions **05**

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Practical

(Four hours per week, 6 Credits)

Laboratory examination including oral and practical examination in general course illustrative of theory section in the syllabus.

Reference Books:

1. Advanced Organic Chemistry – Reaction, Mechanism and Structure – J. March, John Wiley & Sons, New York.
2. Advanced Organic Chemistry Part – A & B – F. A. Carey & R. J. Sundberg, Kluwer Academic / Plenum Publishers, New York.
3. Organic Chemistry, Clayden, Greeves, Waren and Wothers, Oxford University Press, New York.
4. Organic Chemistry, G. Marc Loudon, Oxford University Press., New York.
5. Organic Synthesis, Collective Volumes, Ed. W. E. Noland, John Wiley & Sons, New York.
6. Strategic Application of named reaction in organic synthesis by Laszlo Kurti & Barbara Czako, Elsevier Academic Press.
7. Vogel's textbook of practical organic chemistry, Pearson Education Ltd.
8. "Experimental Organic Chemistry" L. M. Harwood, L. J. Moody, J. M. Percy, Blackwell Science.
9. Techniques and Experiment of Organic Chemistry, Addison Ault, University Science Books.
10. Introduction to Organic Laboratory Techniques, A Microscale Approach, Donald L. Pavia, Gary M. Lampman, George S. Kriz, Harcourt College Pub.