



*Addition to carbon-carbon multiple bonds:* General mechanism, reactivity, orientation and stereochemical implications of addition reactions involving electrophiles, nucleophiles and free radicals. Addition to cyclopropane ring. Hydrogenation of double and triple bonds, and aromatic rings. Hydroboration, Ene-reaction, Michael reaction and Sharpless asymmetric epoxidation.

*Addition to carbon-hetero multiple bonds:* Overview of mechanisms of addition of nucleophiles to carbonyl compounds. Chemoselectivity, diastereoselectivity and enantioselectivity of addition of hydride donors and organometallic compounds to acyclic and cyclic carbonyl compounds. Mechanism and applications of Wittig, Mannich, Aldol, Cross Aldol, Cannizzaro's, Knoevenagel, Robinson annulation, Claisen, Dieckmann, Benzoin, Perkin, Reformatsky and Stobbe's reactions. Mechanism of conjugate addition to  $\alpha$ ,  $\beta$ -unsaturated carbonyl compounds,

#### **Unit-IV      *Molecular Rearrangements*      (16 Contact hours)**

General mechanistic treatment of nucleophilic, electrophilic and free radical rearrangements. Nature of migration, migratory aptitude and memory effect.

Detailed mechanistic study and application of following rearrangements: a) Rearrangement to electron deficient centers: Wagner-Meerwin, Pinacol-Pinacolone, Demjanov, Benzil-Benzilic Acid, Arndt-Eistert, Payne, Dienone-Phenol, Hofmann, Curtius, Lossen, Schmidt, Beckmann, Baeyer-Villiger, Dakin, Neber. b) Rearrangement to electron rich centres: Stevens, Favorskii.

c) Free Radical Rearrangement: Claisen rearrangement, Photo-Fries Rearrangement.

#### ***Books Recommended:***

1. March's Advanced Organic Chemistry Reactions, Mechanism and Structure, 6th Ed., Smith, M.B. (Wiley-2014)
2. Organic Chemistry 8th Ed. - F. A. Carey and Robert M. Giuliano (McGraw Hill-2012).
3. Reaction Mechanism in Organic Chemistry 3rd Ed., S.M. Mukherjee and S.P. Singh. (Macmillan- 1998).
4. Stereochemistry of Organic Compounds 2nd Ed., D. Nasipuri. (New Age Inter.- 2008)
5. Stereochemistry of Carbon Compounds - E.L.Eliel. (TMH -2007)
6. Stereochemistry of Organic Compounds 7th Ed. - P.S. Kalsi. (New Age Inter.- 2012).
7. Organic Chemistry - 2nd Ed., J. Hornback. (Brooks/Cole- 2006.
8. Organic Chemistry, 5th Ed., John McMurry. (Brooks/Cole-2000).
9. Advanced Organic Chemistry, 5th Ed., F.A Carey & R.J Sundberg (Springer-2007).
10. Organic Chemistry, 2nd Ed., Jonathan Clayden (OUP-2012)
11. Organic Chemistry, 11th Ed., Solomons, T.W.G., (Wiley-2015).
12. Advanced Organic Chemistry, Reaction Mechanisms; Reinhard Bruckner, Academic press, Elsevier.S