MANGALORE UNIVERSITY

DEPARTMENT OF CHEMISTRY

M. SC. ORGANIC CHEMISTRY

OC H 501: Organic Reaction Mechanism

COURSE OUTCOME:

- Students will gain the in-depth knowledge about twenty organic name reactions, their mechanisms and synthetic uses with multiple examples.
- Students will learn about the mechanism and synthetic utility of various kinds of nineteen molecular rearrangement reactions with diverse examples.
- Students will understand the synthetic design with diverse chemical reactions planning of organic synthesis and functionality

UNIT I: **[15 Hours]**

Organic Name Reactions: Reactions, Mechanisms and synthetic uses of the following: Stobbe condensation, Darzen condensation, Gattermann-Koch reaction, Cannizzaro reaction, Duff reaction Chichibabin reaction, Benzoin condensation, Claisen-Schmidt condensation, Claisen reaction, Simon-Smith reaction, Stork Enamine reactions, Sharpless asymmetric epoxidation, Hofmann-Loffler-Freytag reaction, Suzuki coupling, Heck reaction, Woodward and Prevost Hydroxylation, Bucherer reaction, Ullmann reaction. Wittig reaction-Mitsunobu reaction, Stephen reaction.

UNIT- II: **[15 Hours]**

Molecular Rearrangements: Classification and general mechanistic treatment of nucleophilic, electrophilic and free radical rearrangements. Intermolecular and Intramolecular migration, nature of migration and migratory aptitudes. Mechanism of Wagner-Meerwein, Dienone-Phenol, Pinacol-Pinacolone, Demyanov, Benzil-Benzilic acid, Fries, Wolff, Favorskii, Neber, Benzidine, Baeyer-Villiger, Beckmann, Lossen, Curtius, Schmidt, Stevens, Shapiro, Baker-Venkatraman and Amadori rearrangement.

UNIT- III: **[15 Hours]**

Synthetic Design: Carbon skeleton frame work, Classification of carbon-carbon single bond and double bond forming reaction and their use in carbon skeleton ring formation. Ring forming and ring cleaving reactions, use of Thorpe condensation, Carbene insertion reaction, Friedel-Crafts reaction, 1,3-dipolar addition and Ene reaction in ring formation, Oxidative cleavage of rings and Retro Diel's-Alder reactions.

Planning of Organic Synthesis: Selection of starting materials and key intermediates during the synthesis. Synthesis of Cubane and Iswarane. Use of Robinson annulation, Dieckmann cyclisation, Arndt-Eistert synthesis, Diel's- Alder reaction in organic synthesis.

Functionality: Synthesis of 6- and 7- methoxy tetralones, biotin and penicillin-V with special reference to the introduction of functional groups. Stereo chemical consideration and stereo selectivity during organic synthesis.

References:

1. Advanced Organic Chemistry- Part A & B-Francis A Carey and R. J. Sundberg (Plenum)
3. Organic Chemistry, Vol 1-3 Mukherji Singh and Kapoor (Wiley Eastern, New Delhi)
4. Synthetic Organic Chemistry- G.R. Chatwal (Himalaya, Bombay), 1994.
5. Organic Reaction Mechanisms-V.K. Ahluw alia & R.K. Parashar (Narovasa publishing house), 2006
6. Organic Chemistry, Vol I-II, I.L. Finar (Longmann ELBS, London), 1973.
7. Advanced Organic Chemistry: Reaction Mechanisms- Reinhard Bruckner (Academic), 2005.
8. Organic Reactions and their mechanisms-P.S. Kalsi (New Age, New Delhi), 1996.
9. Organic Synthesis- R. E. Ireland (Prentice Hall India), 1969.
10. Art in Organic Synthesis- Anand, Bindra & Ranganath-(Wiley New Delhi), 1970.
11. Modern Methods of Organic Synthesis-N. Carruthers (Cambridge University), 1996.