

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS),

VISAKHAPATNAM

VIII SEMESTER B.SC HONOURS CHEMISTRY TIME:4hrs/week

CODE CH8202(3)

REVISED SYLLABUS UNDER CBCS 2020-21

MARKS: 100

**ORGANIC CHEMISTRY: MODERN ORGANIC SYNTHESIS AND
NATURAL PRODUCTS**

Course Objective: To introduce students to advanced concepts pertaining to modern organic synthesis and natural products

Course Outcomes:

- Understanding of various types of reaction intermediates and the bonding present in
- Various organic compounds.
- Understand how to protect various functional groups in organic synthesis and can apply the same to novel molecules useful for research also.
- Students understand the mode of addition reactions involving addition by electrophile and nucleophiles over unsaturated bonds between carbons.
- Students understand the mechanisms of studied named reactions and their applications in organic synthesis.
- Learn about the importance of flavones, flavonoids and hormones.

Syllabus

UNIT - I : Reactive intermediates, Reactive Species and Protecting groups-12 hours

Reactive intermediates: Generation, Structure, Stability, Detection and Reactivity of Carbocations, Carbanions, Free radicals, Carbenes, Nitrenes and Arynes.

Reactive Species: Generation and reactivity of Electrophiles, Nucleophiles, Dienophiles, Ylids, Enophiles.

Protecting groups: Protection of carbonyl, Hydroxyl, carboxylic and Amine groups

UNIT-II Addition Reactions

12 Hours

(A) Addition to Carbon – Carbon Multiple Bonds: Mechanistic and stereochemical aspects of addition reactions involving electrophiles, nucleophiles and free radicals, region and chemo selectivity, orientation and reactivity, Hydrogenation of double and triple bonds, hydrogenation of aromatic rings, Hydroboration.

(B) Addition to Carbon-Hetero Multiple Bonds: Steric course of addition reactions to C=O and C=N, Knoevenagel, Claisen- Schmidt, Claisen, Dieckman, Benzoin and Stobbe condensations, Tollen's reaction, Prins reaction: Wittig, Grignard, Mannich, and Michael reaction.

UNIT-III Molecular Rearrangements

12 Hours

Types of molecular rearrangements, migratory aptitude;

- a) Rearrangements to electron deficient carbon: Wagner-Meerwein, Tiffeneau–Demjanov, Dienone–Phenol, Arndt-Eistert synthesis;
- b) Rearrangements to electron deficient nitrogen: Beckmann, Hofmann, Schmidt and Lossen re-arrangements;
- c) Rearrangements to electron deficient oxygen: Baeyer-villiger and Dakin re-arrangements; Benzil-Benzilic acid and Favorskii rearrangements.

UNIT–IV: Steroids

12Hours

Occurrence, nomenclature, basic skeleton, Diels hydro carbon and its stereochemistry. Isolation, structure determination and synthesis of androsterone, testosterone, oestrone and progesterone.

UNIT–V: Flavonoids and Isoflavonoids:

12 Hours

Occurrence, nomenclature and general methods of structure determination, Isolation, structure elucidation and synthesis of Kaempferol, Quercetin, Cyanidin, Genestein, Butein and Daidzein. Biosynthesis of flavonoids and Isoflavonoids.

III. Co-Curricular Activities

1. Training of students by related industrial experts.
2. Assignments, Seminars and Quiz (on related topics), collection of relevant videos and material.
3. Visits of industries, firms, research organizations etc.

4. Invited lectures and presentations on related topics by field/industrial experts

IV. List of Reference Books:

1. Advanced Organic Chemistry: Reactions Mechanisms and Structure by Jerry March, Mc. Graw Hill and Kogakush.
2. Organic Chemistry Vol.I(SixthEd.) and Vol.II(FifthEd.) by ILFinar ELBS.
3. Organic Chemistry (fifth Ed.,) by Morrison and Boyd, PHI, India.
4. 4.OrganicChemistry(fifthedition)byFrancisA.CareyTataMcGrawHillpublishing Company Limited, New Delhi.
5. Chemistry of natural products by S.V. Bhat, B.A. Nagasampangi
6. Organic Chemistry Vol.I (Sixth Edn.) and Vol. II (Fifth Ed.,) by ILfinar ELBS.
7. Organic Chemistry (fifth Edn.,) by Morrison and Boyd, PHI, India.
8. 3.OrganicChemistry(fifthedition)byFrancisA.CareyTataMcGrawHillpublishing Company Limited, New Delhi.
9. Reaction Mechanism in Organic Chemistry by Mukherjee Sirigh, NTerniitarr, Indiar
10. A guide book to mechanism in Organic Chemistry by Peter Sykes, ELBS.
11. Chemistry of Natural products by R.S.Kalsi Kalyani Publishers.1983.