ORGANIC CHEMISTRY
(Chemical Engineering)

Course Code: 15BC1107

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Course Outcomes:

At the end of the course the student shall be able to

CO 1 understand the basic principles of organic chemistry

CO 2 understand the mechanisms and applications of some named reaction

CO 3 Use methods of preparation and synthetic applications of active methylene compounds

CO 4 know the principles of therapeutic activity of various heterocyclic's used as drugs and synthesis of dyes

CO 5 understand the basic concepts of stereo chemistry in the synthesis of biologically active compounds

UNIT-I **(8 Lectures)**

ELECTRON DISPLACEMENT EFFECTS:

Inductive effect-applications, Inductomeric effect, Mesomeric (or) Resonance effect-applications, Electromeric effect, hyper conjugation-applications

UNIT–II **(10 Lectures)**

MECHANISM AND APPLICATIONS OF THE FOLLOWING NAMED REACTIONS

i. Friedel-Crafts reaction

ii. Riemer-Timer reaction

iii. Aldol condensation,

iv. Benzoin condensation

v. Perkins's reaction

vi. Pinacol-Pinacalone rearrangement

vii. Beckmann rearrangement

UNIT–III (12 Lectures)

ACTIVE METHYLENE COMPOUNDS:

Preparation of Malonic ester, isomerism- Acid hydrolysis of Malonic ester. Synthetic uses malonic ester with reference to synthesis of mono carboxylic acids(n-butyric acid isobutyric acid, and isovaleric acid), dicarboxylic acids (succinic acid, á,-methylsuccinic acid and adipic acid), á,â-unsaturated acid (crotonic acid), amino acid(glycine), ketocarboxylic acid (acetoacetic acid) ketones (ethylmethylketone), alicyclic acids(cyclopropanecarboxylic acid) and heterocyclics (Barbituric acid).

Preparation of Acetoacetic ester, isomerism-tautomerism, and Ketonic and Acid hydrolysis. Synthetic uses of acetoacetic ester with reference to synthesis of mono carboxylic acids (n-butyric acid isobutyric acid and á,-methyl n-butyric acid andâ-methyl n-butyric acid), dicarboxylic acids(succinic and adipic acids), á,â- unsaturated acid(crotonic acid), amino acid(glycine), ketones (3-methyl-2-pentanone), 1,3 & 1,4diketones(acetylacetone and acetonylacetone) and alicyclic acids (acetycyclohexane) and heterocyclics (4-methyluracil).

UNIT–IV: (10 Lectures)

HETEROCYCLIC COMPOUNDS:

Nomenclature, preparation, structure, properties and uses of Furan, Pyrrole, Thiophene, Pyridine, Quinoline, Isoquinoline

DYES:

Definition of dye, Classification based on chemical structure and method of application.Witt's theory of color and chemical constitution. Synthesis and uses of the following dyes- Cong red, Bismark brown, Malachite green, Rosaniline and Fluorescein.

UNIT–V (10 Lectures)

STEREO CHEMISTRY:

CONFIGURATIONAL ISOMERISM:

Optical isomerism, Conditions for an optically active compound-elements of symmetry, Optical activity of Lactic acid and Tartaric acid. Diastereomerism, Relative and Absolute configuration- Sequence rules, Geometrical isomerism-E & Z system of nomenclature.

CONFORMATIONAL ISOMERISM:

Conformations of ethane, n-butane and 1,2-dihaloethane.Bayer's strain theory-limitations, Sachey and Mohr theory, conformations of cyclohexane

TEXT BOOKS:

1. Arun Bahl & B.S. Bahl, *"Advanced Organic Chemistry"*, Rev. Edition, *S.Chand & Company* Ltd, New Delhi, 2012
2. T. Morrison and Robert.N. Boyd, *"Organic Chemistry"*, 6th Edition

REFERENCE BOOKS:

1. I.L Finar Volume I & Volume II, 6th Edition, Pearson Education Publishers, New Delhi
2. Peter Skyes, *"Reaction mechanism"*, 6th Edition, Orient Longman Ltd. New Delhi
3. O.P.Agrawal, *"Reaction and Reagents"*, Rev. Edition, Goel Publishing house, Meerut, India
4. Gaurikar and others, *"Polymer science"* New Age International Ltd, New Delhi
5. O.P.Agrawal, *Synthetic Organic Chemistry*, 14th Edition, Goel Publishing House, Meerut, India
6. P.Bahadur & N.V.Sastry, Narosa, "Principles of Polymer Science", Publishing house, New Delhi
7. Paula Yurkanis Bruice, *"Organic chemistry"*, 3rd Edition, Pearson Publishers