

NIRMA UNIVERSITY
Institute of Pharmacy
(B. Pharm)
(Semester - IV)

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Course Code	BP401T
Course Title	Pharmaceutical Organic Chemistry III - Theory

Scope:

This subject imparts knowledge on stereo-chemical aspects of organic compounds and organic reactions, important named reactions, chemistry of important hetero cyclic compounds. It also emphasizes on medicinal and other uses of organic compounds.

Objective: At the end of the course, the student shall be able to

1. Understand the methods of preparation and properties of organic compounds.
2. Explain the stereo chemical aspects of organic compounds and stereo chemical reactions.
3. Know the medicinal uses and other applications of organic compounds.

Course Learning Outcomes (CLO):

After successful completion of the course, student will be able to -

1. Remember IUPAC rules for nomenclature and medicinal uses of heterocyclic compounds.
2. Understand basic aspects of stereochemistry including configuration and conformation.
3. Explain various reactions of synthetic importance.
4. Describe important chemical reactions and synthesis of heterocyclic rings.
5. Discuss optical & geometrical isomerism.

Syllabus:**Teaching hours: 45 Hours**

Note: To emphasize on definition, types, mechanisms, examples, uses/applications.

UNIT I**10 Hours****Stereo isomerism****Optical isomerism:**

Optical activity, enantiomerism, diastereoisomerism, meso compounds, elements of symmetry, chiral and achiral molecules.

DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers.

Reactions of chiral molecules.

Racemic modification and resolution of racemic mixture.

Asymmetric synthesis: partial and absolute.

UNIT II**10 Hours****Stereo isomerism****Geometrical isomerism:**

Nomenclature of geometrical isomers (Cis Trans, EZ, Syn, Anti systems), methods of determination of configuration of geometrical isomers.
Conformational isomerism in Ethane, n-Butane and Cyclohexane.
Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity.
Stereospecific and stereoselective reactions.

UNIT III

10 Hours

Heterocyclic compounds:

Nomenclature and classification, synthesis, reactions and medicinal uses of following compounds/derivatives: Pyrrole, Furan, and Thiophene
Relative aromaticity and reactivity of Pyrrole, Furan and Thiophene.

UNIT IV

08 Hours

Heterocyclic compounds:

Synthesis, reactions and medicinal uses of following compounds/derivatives: Pyrazole, Imidazole, Oxazole and Thiazole, Pyridine, Quinoline, Isoquinoline, Acridine and Indole.
Basicity of Pyridine.
Synthesis and medicinal uses of Pyrimidine, Purine, Azepines and their derivatives.

UNIT V

07 Hours

Reactions of synthetic importance:

Metal hydride reduction (NaBH_4 and LiAlH_4), Clemmensen reduction, Birch reduction, Wolff Kishner reduction.
Oppenauer-oxidation and Dakin reaction.
Beckmann's rearrangement and Schmidt rearrangement.
Claisen-Schmidt condensation.

Tutorials

Teaching Hours: 15 Hours

Tutorials will be based on above syllabus.

Suggested Readings[^]: (Latest edition)

1. Morrison, R. T., Boyd, R. N. *Organic Chemistry*. Prentice Hall, Inc., USA.
2. Finar, I. L. *Organic Chemistry*, Vol. I & II, ELBS.
3. Gilchrist, T. L. *Heterocyclic chemistry*. New Delhi: Pearson.
4. Bahl, B. S. *Text Book Of Organic Chemistry*. S. Chand And Company Ltd Ram Nagar; New Delhi.
5. Bansal, R. K. *Heterocyclic chemistry*. New Age International.
6. March, J. *Advanced organic chemistry: reactions, mechanisms, and structure*. John Wiley & Sons,.
7. Solomons, T. W., Fryhle, C. B., & Johnson, R. G. *Organic chemistry*. New York: Wiley.
8. Vishnoi, N. K. *Advanced practical organic chemistry*. Vikas Publishing House Pvt. Limited.
9. Gurudeep, C. R., & Gurudeep, C. R. *Reaction Mechanism and Reagents in Organic Chemistry*. Bombay: Himalaya Publishing House.

L= Lecture, T= Tutorial, P= Practical, C= Credit

[^] this is not an exhaustive list