

(B. Pharm)
(Semester - II)

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Course Code	BP202T
Course Title	Pharmaceutical Organic Chemistry I - Theory

Scope:

This subject deals with classification and nomenclature of simple organic compounds, structural isomerism, intermediates forming in reactions, important physical properties, reactions and methods of preparation of these compounds. The syllabus also emphasizes on mechanisms and orientation of reactions.

Objectives:

Upon completion of the course, the student shall be able to -

1. Write the structure, name and the type of isomerism of the organic compound.
2. Write the reaction, name the reaction and orientation of reactions.
3. Account for reactivity/stability of compounds.
4. Identify/confirm the identification of organic compound.

Course Learning Outcomes (CLO):

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

1. Remember IUPAC rules for nomenclature of organic compounds.
2. Understand basic concepts of organic chemistry.
3. Discuss concept of reactivity for the possible chemical reactions.
4. Draw reaction, reaction mechanism and explain orientation of reactions.
5. Identify unknown organic compound.

Syllabus:**Teaching hours: 45 Hours**

General methods of preparation and reactions of compounds superscripted with asterisk (*) to be explained.

To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences.

UNIT I**07 Hours****Classification, nomenclature and isomerism:**

Classification of Organic Compounds

Common and IUPAC systems of nomenclature of organic compounds

(up to 10 Carbons open chain and carbocyclic compounds) Structural isomerisms in organic compounds

UNIT II**10 Hours****Alkanes*, Alkenes*, Alkynes* and Conjugated dienes*:**

SP³ hybridization in alkanes, Halogenation of alkanes, uses of paraffins

Stabilities of alkenes, SP² hybridization in alkenes

E1 and E2 reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeff's orientation and evidences. E1 versus E2 reactions, Factors affecting E1 and E2 reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation.

Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement

UNIT III

10 Hours

Alkyl halides*:

S_N1 and S_N2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations

S_N1 versus S_N2 reactions, Factors affecting S_N1 and S_N2 reactions

Structure and uses of ethyl chloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform

Alcohols*:

Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, Isopropyl alcohol, Chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol

UNIT IV

10 Hours

Carbonyl compounds* (Aldehydes and ketones):

Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation, qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde.

UNIT V

08 Hours

Carboxylic acids*:

Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids, amide and ester

Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid. Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid

Aliphatic amines*:

Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine

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, ELBS.
3. Bahl, B. S. *Text Book Of Organic Chemistry {For B. Sc. Students}*. S. Chand And Company Ltd Ram Nagar; New Delhi.
4. March, J. *Advanced organic chemistry: reactions, mechanisms, and structure*. John Wiley & Sons,.

5. Soni, P. L. *Fundamental organic chemistry*. New Delhi: S. Chand.
6. Mann, F. G., & Saunders, B. C. *Practical organic chemistry*. London: Longman.
7. Solomons, T. W., Fryhle, C. B., & Johnson, R. G. *Organic chemistry*. New York: Wiley.
8. Ahluwalia, V. K. *Organic Reaction Mechanism*. New Delhi: Ane Books India.
9. Mann, F. G. *Practical organic chemistry*. Pearson Education India.
10. Vishnoi, N. K. *Advanced practical organic chemistry*. Vikas Publishing House Pvt. Limited.
11. Pavia, D. L. *Introduction to organic laboratory techniques: a small scale approach*. Cengage Learning.
12. Gurudeep, C. R., & Gurudeep, C. R. *Reaction Mechanism and Reagents in Organic Chemistry*. Bombay: Himalaya Publishing House.
13. Furniss, B. S. *Vogel's textbook of practical organic chemistry*. Pearson Education India.

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

^this is not an exhaustive list
