

**Subject name:** Pharmaceutical Organic Chemistry-II

**Subject code:** 13PH0301

**Scope:** This subject deals with general methods of preparation and reactions of some organic compounds. Reactivity of organic compounds are also studied here. The syllabus emphasizes on mechanisms and orientation of reactions. Chemistry of fats and oils are also included in the syllabus.

**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. Prepare organic compounds

**Theory:**

Sr.	Topics	Hrs.
1.	<b>Benzene and its derivatives:</b> <ul style="list-style-type: none"> <li>Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule.</li> <li>Reactions of benzene - nitration, sulphonation, halogenation - reactivity, Friedelcrafts alkylation - reactivity, limitations, Friedelcrafts acylation.</li> <li>Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction.</li> <li>Structure and uses of DDT, Saccharin, BHC and Chloramine.</li> </ul>	10
2.	<b>Phenols:</b> Acidity of phenols, effect of substituents on acidity, qualitative tests, Structure and uses of phenol, cresols, resorcinol, naphthols. <b>Aromatic Amines:</b> Basicity of amines, effect of substituents on basicity, and synthetic uses of aryl diazonium salts. <b>Aromatic Acids:</b> Acidity, effect of substituents on acidity and important reactions of benzoic acid.	10
3.	<b>Fats and Oils:</b> <ul style="list-style-type: none"> <li>Fatty acids - reactions.</li> <li>Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils.</li> <li>Analytical constants - Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value - significance and principle involved in their determination.</li> </ul>	10
4.	<b>Polynuclear hydrocarbons:</b> <ul style="list-style-type: none"> <li>Synthesis, reactions.</li> <li>Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene, Diphenylmethane, Triphenylmethane and their derivatives.</li> </ul>	8
5.	<b>Cyclo alkanes:</b> Stabilities - Baeyer's strain theory, limitation of Baeyer's strain theory, Coulson and Moffitt's modification, Sachse Mohr's theory (Theory of strain less rings), reactions of cyclopropane and cyclobutane only.	7

**Practical:**

1. Experiments involving laboratory techniques:
  - Recrystallization
  - Steam distillation
  
2. Determination of following oil values (including standardization of reagents):
  - Acid value
  - Saponification value
  - Iodine value
  
3. Preparation of compounds:
  - Benzanilide/ Phenyl benzoate/ Acetanilide from Aniline/ Phenol/ Aniline by acylation reaction.
  - 2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/ Acetanilide by halogenation (Bromination) reaction.
  - 5-Nitro salicylic acid/ Meta di nitro benzene from Salicylic acid/ Nitro benzene by nitration reaction.
  - Benzoic acid from Benzyl chloride by oxidation reaction.
  - Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction.
  - 1-Phenyl azo-2-naphthol from Aniline by diazotization and coupling reactions.
  - Benzil from Benzoin by oxidation reaction.
  - Dibenzal acetone from Benzaldehyde by Claisen Schmidt reaction.
  - Cinnamic acid from Benzaldehyde by Perkin reaction.
  - P-Iodo benzoic acid from P-amino benzoic acid.

**Recommended books (Latest editions):**

1. Organic Chemistry by Morrison and Boyd.
2. Organic Chemistry by I.L. Finar, Volume-I.
3. Textbook of Organic Chemistry by B. S. Bahl & Arun Bahl.
4. Organic Chemistry by P. L. Soni.
5. Practical Organic Chemistry by Mann and Saunders.
6. Vogel's textbook of Practical Organic Chemistry.
7. Advanced Practical organic chemistry by N. K. Vishnoi.
8. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.