



**SILVER OAK UNIVERSITY**  
**SILVER OAK COLLEGE OF PHARMACY (067)**

**Programme Name: B.Pharm**

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

**Subject Code: 1180673201**

**Semester: III**

**Prerequisite:**

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.

**Objective:** 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

**Teaching Scheme:**

| Teaching Scheme |   |   |               |        |
|-----------------|---|---|---------------|--------|
| L               | T | P | Contact Hours | Credit |
| 3               | 1 | 4 | 8             | 6      |

**Content:**

| Unit No. | Contents   | Teaching Hours | Weightage % |
|----------|--|----------------|-------------|
| 1        | Benzene and its derivatives<br>A. Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule<br>B. Reactions of benzene - nitration, sulphonation, halogenation reactivity, Friedelcrafts alkylation- reactivity, limitations, Friedelcrafts acylation.<br>C. Substituents, effect of substituents on reactivity and | 10             | 22.22       |

|   |  |    |       |
|---|--|----|-------|
|   | orientation of mono substituted benzene compounds towards electrophilic substitution reaction<br><br>D. Structure and uses of DDT, Saccharin, BHC and Chloramine   |    |       |
| 2 | <ul style="list-style-type: none"> <li>• Phenols* - Acidity of phenols, effect of substituents on acidity, qualitative tests, Structure and uses of phenol, cresols, resorcinol, naphthols</li> <li>• Aromatic Amines* - Basicity of amines, effect of substituents on basicity, and synthetic uses of aryl diazonium salts</li> <li>• Aromatic Acids* –Acidity, effect of substituents on acidity and important reactions of benzoic acid.</li> </ul> | 10 | 22.22 |
| 3 | <p><b>Fats and Oils</b></p> <p>a. Fatty acids – reactions.</p> <p>b. Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils.</p> <p>c. Analytical constants – Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value – significance and principle involved in their determination</p>   | 10 | 22.22 |
| 4 | <p><b>Polynuclear hydrocarbons:</b></p> <p>a. Synthesis, reactions</p> <p>b. Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene, Diphenylmethane, Triphenylmethane and their derivatives</p>  | 08 | 17.77 |
| 5 | <p><b>Cyclo alkanes*</b></p> <p>Stabilities – Baeyer’s strain theory, limitation of Baeyer’s strain theory, Coulson and Moffitt’s modification, Sachse Mohr’s theory (Theory of strainless rings), reactions of cyclopropane and cyclobutane only</p>  | 07 | 15.55 |

**Course Outcome:** After Completion of Syllabus Students will able to

| Sr. No. | CO statement   | Unit No |
|---------|--|---------|
| CO-1    | To know the reaction, preparation of Benzene and its derivatives, Effect of substitution, Structure and uses of compounds. | 1       |
| CO-2    | To integrate the different concept of aromatic amines and acids along with effect of substitution on acidity and basicity. | 2       |
| CO-3    | To understand about Fats and Oils and study different concept of analytical constants.                                     | 3       |
| CO-4    | To have been introduced to a variety of reaction and synthesis of polynuclear compound.                                    | 4       |
| CO-5    | Understanding of concepts and principles of cycloalkanes.  | 5       |

### Teaching & Learning Methodology: -

The various methods or tools follows by the faculties to teach the above subject are:

1. Chalk and board method
2. Experiential learning.
3. Power point presentation and slide show method

### Experiments:

Students will perform following Experiments

1. Experiments involving laboratory techniques
  - Recrystallization
  - Steam distillation
2. Determination of following oil values (including standardization of reagents)
  - Acid value
  - Saponification value
  - Iodine
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

**Books Recommended:**

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

**CO-PO-PSO Matrix:**

| Co. No. | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO-1    | 3   | 1   | 3   | 3   | -   | 2   | 1   | 2   | 2   | 3    | 3    | 2    | 3    |
| CO-2    | 3   | 1   | 3   | 2   | -   | 3   | 2   | 2   | 2   | 3    | 2    | 2    | 3    |
| CO-3    | 3   | 2   | 3   | 2   | 1   | 2   | 2   | 1   | 2   | 3    | 2    | 2    | 3    |
| CO-4    | 3   | 2   | 3   | 2   | -   | 2   | 2   | 2   | 3   | 2    | 2    | 3    | 3    |
| CO-5    | 3   | 1   | 3   | 2   | -   | 2   | -   | 2   | 3   | 2    | 2    | 3    | 2    |