

# LJ UNIVERSITY

## LJ INSTITUTE OF PHARMACY

### SEMESTER: III

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

**Subject Code: BP302TT**

**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.

**Objectives:** Upon completion of this course the student should 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

**Teaching scheme and examination scheme:**

| Teaching Scheme |          |           |       | Evaluation Scheme |          |           |          |
|-----------------|----------|-----------|-------|-------------------|----------|-----------|----------|
| Theory          | Tutorial | Practical | Total | Theory            |          | Practical |          |
|                 |          |           |       | External          | Internal | External  | Internal |
| 3               | 1        | -         | 4     | 75                | 25       | -         | -        |

| Sr. No. | Course Contents                                                                                                                                                                                                                                                                                                                                                                                                                  | Hours |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1.      | <b>Stereo isomerism</b><br>Optical isomerism –<br>Optical activity, enantiomerism, diastereoisomerism, meso compounds Elements of symmetry, chiral and achiral molecules<br>DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers<br>Reactions of chiral molecules<br>Racemic modification and resolution of racemic mixture.<br>Asymmetric synthesis: partial and absolute | 08    |
| 2.      | Geometrical isomerism<br>Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems) Methods of determination of configuration of geometrical isomers.<br>Conformational isomerism in Ethane, n-Butane and Cyclohexane.<br>Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity.<br>Stereospecific and stereoselective reactions                                                | 07    |
| 3.      | <b>Heterocyclic compounds:</b><br>Nomenclature and classification<br>Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrrole, Furan, and Thiophene, Pyridine and its basicity<br>Relative aromaticity and reactivity of Pyrrole, Furan and Thiophene                                                                                                                                                  | 10    |
| 4.      | Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrazole, Imidazole, Oxazole and Thiazole.<br>Pyridine, Quinoline, Isoquinoline and Indole. Basicity of pyridine Synthesis and medicinal uses of Pyrimidine, azepines and their Derivatives, Hantzsch pyridine                                                                                                                                        | 8     |

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                     |    |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|                    | synthesis, Paal Knorr synthesis, Fischer-indole synthesis, Skraup synthesis                                                                                                                                                                                                                                                                                                                                                         |    |
| 5.                 | <b>Reactions of synthetic importance</b><br>Metal hydride reduction ( $\text{NaBH}_4$ and $\text{LiAlH}_4$ ), Clemmensen reduction, Birch reduction, Wolff Kishner reduction. Oppenauer-oxidation and Dakin reaction.<br>Beckmanns rearrangement and Schmidt rearrangement. Michael addition, Mannich reaction, Baeyer villiger oxidation, Pinacol pinacolone rearrangement, Vilsmeier Haack reaction, Claisen-Schmidt condensation | 12 |
| <b>Total Hours</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                     | 45 |

### Recommended Books:

1. Organic chemistry by I.L. Finar, Volume-I & II.
2. A text book of organic chemistry – Arun Bahl, B.S. Bahl
3. Heterocyclic Chemistry by Raj K. Bansal
4. Organic Chemistry by Morrison and Boyd
5. Heterocyclic Chemistry by T.L. Gilchrist