

# Syllabus

## PANJAB UNIVERSITY, CHANDIGARH

### B.Sc. Semester-IV

### ORGANIC CHEMISTRY

**Note :** (i) Question paper will consist of NINE questions comprising TWO questions from each unit and ONE compulsory question of short answer type covering the whole syllabus.

(ii) The students are required to attempt FIVE questions in all, ONE question from each unit and the compulsory question.

(iii) Compulsory question carries SIX marks and remaining all questions carry FOUR marks each.

#### UNIT-I

(8 Hrs.)

##### Carboxylic Acid Derivatives

Structure and nomenclature of acid chlorides, esters, amides and acid anhydrides. Relative stability and reactivity of acyl derivatives.

Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution.

Preparation of carboxylic acid derivatives, chemical reactions, Mechanisms of esterification and hydrolysis (acidic and basic).

#### UNIT-II

(8 Hrs.)

##### Ethers, Epoxides, Fats, Oils and Detergents

Nomenclature of ethers and methods of their formation, physical properties, Chemical reactions-cleavage and auto-oxidation, Ziesel's Method.

Synthesis of epoxides acid and base catalysed ring opening of epoxides, orientation of epoxide ring opening, Reactions of Grignard and organolithium reagents with epoxide.

Natural fats, edible and industrial oils of vegetable origin, common fatty acids, glycerides, hydrogenation of unsaturated oils. Saponification value, iodine value, acid value. Soaps, synthetic detergents, alkyl and aryl sulphonates.

#### UNIT-III

(7 Hrs.)

##### Organic Compounds of Nitrogen

Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanism of nucleophilic substitution in nitroarenes and their reactions in acidic, neutral and alkaline media, Picric acid.

Structure and nomenclature of amines, physical properties. Stereochemistry of amines. Separation of a mixture of primary, secondary and tertiary amines. Structural features effecting the basicity of amines. Amine salts as phase-transfer catalysts. Preparation of alkyl and aryl amines (reduction of nitro compounds and nitriles), reductive amination of aldehydic and ketonic compounds, Gabriel-phthalimide reaction, Hoffmann bromamide reaction.

## UNIT-IV

(7 Hrs.)

### Heterocyclic Compounds :

Introduction : Molecular orbital picture and aromatic character of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole.

Introduction to condensed-five and six-membered heterocyclics. Preparation and reactions of indole, quinoline and isoquinoline with special reference to Fischer indole Synthesis, Skraup synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of indole, quinoline and isoquinoline.