

## Teaching Plan 2024

### B.Sc. Chemistry (Physical Science) NEP, IV Sem

**Subject:** Discipline Specific Course -10 (DSC- 10): Carbohydrates, Lipids and Heterocyclic Compounds

**Teacher:** Dr. KANIKA SOLANKI

#### BSC. (PHYSICAL SCIENCES)- CHEMISTRY COMPONENT SEMESTER - IV

DISCIPLINE SPECIFIC CORE COURSE CHEM-DSC -10: Chemistry- IV: Chemistry of Carboxylic Acids & their Derivatives, Amines and Heterocycles

#### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Chemistry of Carboxylic Acids & their Derivatives, Amines and Heterocycles DSC-10: Chemistry- IV	04	02	-	02	Class 12th with Physics, Chemistry, Mathematics	

#### Learning Objectives

The Learning Objectives of this course are as follows:

- To make students learn about the chemistry of carboxylic acids and their derivatives (aliphatic and aromatic)
- To give basic understanding of amines (aliphatic & aromatic), diazonium salts
- To provide basic understanding of heterocyclic systems.

#### Learning outcomes

By studying this course, students will be able to:

- Understand reactions of carboxylic acids, esters, amides, amines and diazonium salts
- Understand the concept of protection and deprotection.
- Use the synthetic chemistry learnt in this course to do functional group transformations.
- Gain theoretical understanding of chemistry of heterocyclic compounds.

#### Syllabus

**Unit 1: Carboxylic Acids and their Derivatives (aliphatic and aromatic) (13 Lectures)**

Preparation: Oxidation reactions of alcohols, aldehydes and ketones, Acidic and alkaline

hydrolysis of esters; Reactions: Hell-Volhard Zelinsky reaction,

Carboxylic acid derivatives (aliphatic): Preparation: Acid chlorides, anhydrides, esters and amides from acids and their interconversion, Claisen condensation. Reactions: Relative reactivities of acid derivatives towards nucleophiles, Reformatsky reaction, Perkin condensation.

Active methylene compounds: Keto-enol tautomerism. Preparation and synthetic applications of ethyl acetoacetate

## Unit 2: Amines (aliphatic & aromatic) and Diazonium Salts

(Hours:10)

Amines

Preparation: from alkyl halides, Gabriel's Phthalimide synthesis, Hoffmann bromamide reaction. Reactions: Hoffmann vs Saytzeff elimination, carbylamine test, Hinsberg test, reaction with  $\text{HNO}_2$ , Schotten-Baumann reaction. Electrophilic substitution (case aniline): nitration, bromination, sulphonation; basicity of amines.

Diazonium salt

Preparation: from aromatic amines; Reactions: conversion to benzene, phenol and dyes.

## Unit 3: Heterocyclic Compounds

(Hours: 7)

Introduction, classification, structure, nomenclature and uses. Preparation and properties of the following heterocyclic compounds with reference to electrophilic and nucleophilic substitution: furan, pyrrole, thiophene, and pyridine.

Week	Dates From – To	Topic
1.	22/01/2024 - 27/01/2024	Amines Preparation: from alkyl halides, Gabriel's Phthalimide synthesis,
2.	29/01/2024- 03/02/2024	Hoffmann bromamide reaction. Reactions: Hoffmann vs Saytzeff elimination,
3.	05/02/2024- 10/02/2024	Carbylamine test, Hinsberg test, reaction with $\text{HNO}_2$ ,
4.	12/02/2024- 17/02/2024	Schotten-Baumann reaction, basicity of amines.
5.	19/02/2024 - 24/02/2024	Electrophilic substitution (case aniline): nitration, bromination, sulphonation
6.	26/02/2024- 02/03/2024	Diazonium salt Preparation: from aromatic amines;
7.	04/03/2024- 09/03/2024	Reactions: conversion to benzene, phenol and dyes
8.	11/03/2024- 16/03/2024	Heterocyclic Compounds: Introduction, classification, structure
9.	18/03/2024 - 23/03/2024	Nomenclature and uses of Heterocyclic compounds
10.	01/04/2024 - 06/04/2024	Preparations, Chemical and Physical Properties of furan and pyrrole

11.	08/04/2024- 13/04/2024	Preparations, Chemical and Physical Properties of thiophene, and pyridine
12.	15/04/2024- 20/04/2024	Electrophilic and nucleophilic substitution: furan and pyrrole,
13.	22/04/2024- 27/04/2024	Electrophilic and nucleophilic substitution: thiophene, and pyridine
14.	29/04/2024 - 04/05/2024	Reactions of furan, pyrrole, thiophene, and pyridine.
15.	06/05/2024- 11/05/2024	Tests / Assignments