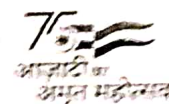




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Courses to be offered Courses for Course Basket for Interdisciplinary Courses 2021. Department of Chemistry and Chemical Science

FIRST SEMESTER (2021-2023) NEP Pattern				
Course Code	Name of the Course	Credit	Semester	Faculty
CCS 5101	Organic Stereochemistry and Spectroscopy	2	B.Sc. 1 <sup>st</sup>	SB/MK

CCS 5101: Organic Stereochemistry and Spectroscopy

Credit: 2

Teaching hours: 60

#### UNIT-I

**Stereochemistry and Conformational Analysis:** Stereochemistry and stereoisomerism, stereochemical nomenclature & terminology, Chirality, the chiral centre, 2-D representations (Fischer projections), Optical activity, Plane-polarized light, the polarimeter, Specific rotation, Specification of configuration: R and S, Sequence rules, Diastereomers, Meso structures, Specification of configuration: More than one chiral center, Generation of a chiral center. Threo- and erythro- isomers, methods of resolution and optical purity. Conformational analysis- Conformation of cycloalkanes, Equatorial and axial bond in cyclohexane, Conformation of cycloalkanes, Equatorial and axial bond in cyclohexane, Stereoisomerism of cyclic compounds: *cis*- and *trans*- isomers.

#### UNIT-II

**UV Spectroscopy:** General principles, Introduction to absorption and emission spectroscopy. Types of electronic transitions,  $\lambda_{max}$ , Chromophores and Auxochromes, Bathochromic and Hypsochromic shifts, Intensity of absorption; Application of Woodward Rules for calculation of  $\lambda_{max}$  for the following systems:  $\alpha, \beta$  unsaturated aldehydes, ketones, carboxylic acids and esters;

Conjugated dienes: alicyclic, homoannular and heteroannular; Extended conjugated systems (aldehydes, ketones and dienes); distinction between *cis* and *trans* isomers.

### UNIT-III

**IR Spectroscopy:** Fundamental and non-fundamental molecular vibrations; IR absorption positions of O, N and S containing functional groups; Effect of H-bonding, conjugation, resonance and ring size on IR absorptions; Fingerprint region and its significance; application in functional group analysis.

### UNIT-IV

**NMR Spectroscopy:** Basic principles of Proton Magnetic Resonance, chemical shift and factors influencing it; Spin – Spin coupling and coupling constant; Anisotropic effects in alkene, alkyne, aldehydes and aromatics, Interpretation of NMR spectra of simple compounds.

### Reference books

1. Organic spectroscopy Principles and Applications, Second Edition, Jag Mohan., Narosa Publishing House.
2. Elementary Organic spectroscopy, Principles and chemical Applications, Y.R. Sharma, S. Chand.
3. Advanced Organic Chemistry, Jagdamba singh, L.D.S Yadav