# FACULTY OF SCIENCE

**M.Sc Chemistry (SEM-I)**

In Effect from Academic Year 2016-17

**Course Objective:** To impart knowledge and training in chemistry at advanced level, make aware with recent analytical technique, use of reagents and reactions in laboratory, synthesis and study of materials, the exploration of their properties and development of ways to use them in real life.

| SUBJECT CODE: 1SC2030102 | TITLE OF PAPER: ORGANIC CHEMISTRY |
|---|---|
| COURSE TYPE: CORE COURSE | |

| Teaching scheme (hours) per week | | Credit | | | Theory Marks | | Practical Marks | | Total |
|---|---|---|---|---|---|---|---|---|---|
| Theory | Practical | Theory | Practical | Total | Uni. Assessment | Cont. Assessment | Uni. Assessment | Cont. Assessment | |
| 4 | 2 | 4 | 2 | 6 | 60 | 40 | 30 | 20 | 150 |

| UNIT | DISCRIPTION IN DETAIL | WEIGHTAGE | Hrs |
|---|---|---|---|
| I | **Stereochemistry**<br>Concept of Chirality, Chirality and Symmetry, Elements of Chirality including Chiral centre, Chiral axis, Chiral plane and Helicity, CIP Nomenclature,Molecules with more than one Chiral centre, Total number of Stereoisomer in such molecules, Enantiomeric and Diastereomeric Relationship, Chirogenicity and Stereogenecity, Pseudochirality, Topicity and Prostereoisomerism, Determination of Topic relationship between Homomorphic ligands in Intact Molecules, Sawhorse, Newman and Fischer Projections, Interconversion of Projections,Optical activity in the absence of chiral carbon(biphenyls, allenes and spiranes) chirality deu to helical shape, Optical Purity, Determination of Mechanisms using Various Methods. | 25% | 12 |
| II | **Aromaticity**<br>Aromaticity, aromatic character, Frost circle diagram for cyclobutadiene, benzene and others. Resonance and chemical stabilization-aromatic character based on NMR criteria, Huckels rule, energy level of π moleculer orbitals, Huckelsmoleculer orbital(HMO) method, MO of simple organic systems such as ethene, allyl and butadiene Aromaticity in benzenoid and non-benzenoid compounds and charged rings, annulenes, fulvenes, azulenes, antiaromaticity and homoaromaticity. | 25% | 12 |

| | | | |
|---|---|---|---|
| **III** | **Pericyclic reaction**<br>Molecular orbital symmetry, Frontier orbital of ethylene, 1,3-butadiene, 1,3,5-hexatriene and allylsystem.Classifiction of pericyclicreactions. Woodwards-Hoffmann correlation diagrams. FMO and PMO approach. Electrocyclic reactions-conrotatory and disrotatory motions, 4n, 4n+2 and allyl systems. Cycloadditionantrafacial and suprafacial addition, 4n, 4n+2 systems, 2+2 addition of ketenes, 1,3 dipolar cycloadditions and cheleotropic reactions.<br>Sigmatropic rearrangement – suprafacial and antra facial shifts of H sigmatropic shifts involving carbon mpieties, 3,3 and 5,5- sigmatropic rearrangements. Claisen, cope and azacope rearrangement. Fluxional tautomerism. Ene reaction. | **25%** | **12** |
| **IV** | **Reactive Intermediate**<br>Carbocation (classical and non-classical): stability, structure, generation and fate.<br>Carbanions: stability, structure, generation and fate.<br>Carbenes: stability and structure, the generation and fate Free radicals: stability, structure, generation and fate, NBS Bezynes: stability, structure, generation and fate. Nitrene: stability, structure, generation, reactions. | **25%** | **12** |

**Learning Outcomes**

- Students can understand the atomic and molecular basis of organic chemistry.
- They can know the impact of organic chemistry on the fields of medicine, pharmacy and its impact on the global economy.
- They can understand the fundamental principles of molecular structure and shape as they relate to organic molecules and their properties.
- They can identify organic molecules by functional group: alkane, alkene, alkyne, halo alkane, alcohol, thiol, ether, sulfide, amine, aldehyde, ketone, carboxylic acid and carboxylic acid derivatives.

## Practicals
## M.Sc. Semester-I

**Organic Chemistry**

Organic preparation with IR, TLC and crystallization (Included TLC and IR of starting material and for finish product) (Minimum10)
Organic Estimation. (Any-4)

**LIST OF BOOKS:**

1. Organic Reactions, Stereochemistry and Mechanism: P.S. Kalsi (New Age.)
2. Principles of Organic Synthesis: R.O.C Norman & J.M. Coxon (ELBS)
3. Mechanism in Organic Chemistry: Peter Sykes (Orient Longman)
4. Modern Methods of Organic Synthesis: W. Carruthers (Cambridge)
5. Organic Reaction Mechanism: V.K.Ahluwalia and R.K.Parashar( Narosa )
6. Advanced organic chemistry part-A F.A.Carey and R.G.Sundbreg
7. Stereochemistry of carbon compounds by E.L.Eliel
8. Stereochemistry of organic compounds by Nasipuri
9. Advanced Organic chemistry reacton mechanism and structure by Jerry March
10. Organic chemistry by J. Clayden, Oxford University Press
11. Reaction Mechanism in Organic chemistry by S.M.Mechanism and S.P.Singh
12. Pericyclic reaction by Jagdambasingh
13. Principles of organic synthesis R O C Norman and J.M. Coxon. Blackie academic and Professional
14. A Guide book to Mechanism in organic chemistry, Peter Sykes Longman
15. Organic chemistry by R.T. Morrison and R.N. Boyd, Prentice-Hall.
16. Reaction and mechanism in organic chemistry by P.S. Kalsi, New Age Internation