First year of Five Years integrated M. Sc. (Physics / Chemistry / Mathematics)

M. Sc - I, Semester – II	**L**	**T**	**P**	**C**
MC 102: Chemistry – II	**3**	**1**	**2**	**5**

- **SURFACE CHEMISTRY** **(05 Hours)**
  Types of adsorption, adsorption isotherms-Freundlich and Langmuir; Colloids and colloids state, application of colloids, surfactants, micelles, critical micelle concentration, Basics of surface characterization by X-Ray and DLS.
- **POLYMERS** **(04 Hours)**
  Methods of polymerization, Characterization by TGA, DTA, Molecular weight and its determination, amorphous and crystalline polymers, biopolymers, structure-property relation in polymers.
- **CARBOHYDRATES** **(04 Hours)**
  Introduction, Basic structural features and types of carbohydrates, Reactions and conversions, role in biological systems.
- **METALLURGY** **(03 Hours)**
  Basic principles and applications; purification of elements and metals, metallurgical aspects of corrosion and its control.
- **INORGANIC CHEMISTRY** **(08 Hours)**
  Transition metal ions and complexes; coordination chemistry, magneto chemistry, organometallic compounds, catalysis, some relevant uses of transition elements, role of metal ions in biological process; trends in properties of s-and p-block elements, silicones; silicates; zeolites; alkoxides, sol-gel process, O_2 activation; N_2 fixation
- **ORGANIC MOLECULES** **(08 Hours)**
  Structure, properties and mechanism of organic reactions: Relationship between shapes and properties of organic molecules. Electrophiles and nucleophiles, reactive intermediates-free radical, carbonium ion and carbanion, carbine, arynes. Types of organic reactions- Stepwise, ionic and free radical mechanisms, single step concerted mechanism, addition, substitution, elimination and rearrangement, emphasizing mechanisms, basic features of pericyclic reactions. Linear free energy relationships, Hammett equation.
- **STEREOCHEMISTRY OF ORGANIC COMPOUNDS** **(08 Hours)**
  Conformations of alkanes and cycloalkanes; configurations, Enantiomers, molecular chirality, diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomers, retention and racemization. Relative and absolute configuration, sequence rules, D and L systems of nomenclature and R and S systems of nomenclature. Geometric isomerism **–** determination of configuration of geometric isomers E and Z systems of nomenclature, geometric isomers of oximes and alicylic compounds. Linear and cyclic conjugation, benzene, aromaticity, properties of conjugated systems.
- **NEW DEVELOPMENTS IN CHEMICAL SCIENCES** **(02 Hours)**
  Environmentally benign chemistry, nanochemistry, smart materials, and their applications. Interface of chemical sciences with other disciplines, particularly in technology and medical sciences and engineering.

(Total Contact Time (Theory) : 42 Hours)

BOOKS RECOMMENDED:

1. **Chawla S**..,*Text Book of Engg. Chemistry*, Dhanpat Rai & Co. Pvt. Ltd., Delhi, 2003.
2. **Adamson A. W**., *Physical Chemistry of Surfaces*, 3rd Edn., John Wiley, 1976.
3. **Morrison R. T. and Boyd R.N.,** *Organic Chemistry', 6th Edn*., Prentice Hall, 1992.
4. **Solomons T. W. G.,** *Fundamentals of Organic Chemistry, 5th Edn*., John Wiley, 1992.
5. **Streitwieser, Jr. A. and Heathcock C. H**., *Introduction to organic chemistry* 2nd Edn, MacMillan, New York , 1998