

ALIGARH MUSLIM UNIVERSITY, ALIGARH
FACULTY OF ENGINEERING & TECHNOLOGY
SYLLABUS FOR
M.Sc. (Polymer Science and Technology)

ORGANIC CHEMISTRY:

Structure Bonding, Mechanism of Organic reactions: Types of reagents, Reactive intermediates, stereochemistry of organic compounds, Alkanes, Alkenes, Dienes and Alkynes, Cycloalkanes, Cycloalkenes, Arenes and Aromaticity, Alkyl and Aryl halides, Alcohols, Phenols, Ethers, Epoxides, Aldehydes, Ketones, Carboxylic Acids and derivatives. Carbohydrates, Amino Acids, Peptides, Proteins and Nucleic Acids.

PHYSICAL CHEMISTRY:

Gaseous State, Liquid State, Solid State, Solutions, Chemical Kinetics and Catalysis. Thermodynamics, Chemical Equilibrium, Phase Equilibrium, Electrochemistry, Colloidal and surfactants, adsorption.

INORGANIC CHEMISTRY:

Atomic Structure, Periodic Properties, Chemical Bonding-Covalent Bond, Ionic Solids, Weak Interactions, Diborane, Interhalogen compounds, Acids and Bases. Chemistry of Noble Gases. Coordination Compounds, Valence bond and Crystal field theories, Magnetic and electronic properties of transition metal complexes, Organometallic chemistry, Basics of Bioinorganic chemistry.

BASIC CONCEPTS OF SPECTROSCOPY:

Electromagnetic radiation, region of various spectroscopic techniques. FITR spectroscopy: functional and fingerprint region. UV-visible spectroscopy: Basics of electronic transitions, Beer-Lambert law, Woodward fisher rules. Basic concepts of X-ray diffraction, Bragg's law, crystal systems.

ENVIRONMENTAL CHEMISTRY:

Environmental Segments, Major regions of atmosphere: troposphere, stratosphere, mesosphere, thermosphere. Air Pollutants: Carbon Dioxide and Global Warming, Sulphur Dioxide and Nitrogen Oxides, Acid rain, and particulate matters, CFC and depletion of ozone layer, Photochemical smog. Water pollution, insecticides and pesticides in water, industrial effluents, soil pollution, waste water treatment, nuclear waste and its treatment. An introduction to renewable resources.

POLYMERS:

Definition, Classification of Polymers of Polymers (based origin, thermal response, structure, tacticity etc) Types of Polymerisation Reactions , Preparation, properties and uses of some important thermoplastic and thermosetting polymers: Polythene, PVC, Teflon, Polyamides (Nylon 6,6 and nylon 6), polyester, Bakelite, melamine-formaldehyde resins. Rubber: Natural rubber, vulcanisation of rubber, synthetic rubbers (Neoprene, Buna-N and Buna-S). Molecular mass of Polymers, Biodegradable Polymers, Polymers of Commercial Importance.