

Syllabus and Scheme of Examination

for

**B.Sc. Chemistry (Honours)
& B.Sc. Chemistry**



Fakir Mohan University, Balasore

Under

Choice Based Credit System (CBCS)

(Applicable from the Academic Session 2016-17 onwards)

gandhiji
vishu

Discipline Specific Elective Paper-1

POLYMER CHEMISTRY

Unit-I

Introduction and history of polymeric materials:

Different schemes of classification of polymers, Polymer nomenclature, Molecular forces and chemical-bonding in polymers, Texture of Polymers.

Functionality and its importance:

Criteria for synthetic polymer formation, classification of polymerization processes, Relationships between functionality, extent of reaction and degree of polymerization. Bi-functional systems, Poly-functional systems.

Unit-II

Mechanism & Kinetics of Polymerization:

Polymerization reactions – addition and condensation, mechanism and kinetics of step growth, radical chain growth, ionic chain (both cationic and anionic) and coordination polymerizations, Mechanism and kinetics of copolymerization, polymerization techniques.

Crystallization and crystallinity:

Determination of crystalline melting point and degree of crystallinity, Morphology of crystalline polymers, Factors affecting crystalline melting point.

Unit-III

Molecular weight of polymers and their determination (M_n , M_w , M_v , M_z) by end group analysis, viscometry and osmotic pressure methods. Molecular weight distribution and its significance. Polydispersity index.

Glass transition temperature (T_g) and its determination: WLF equation, Outlines of factors affecting glass transition temperature (T_g).

Unit-IV

Properties of polymers (physical, thermal and mechanical properties)

Preparation, structure, properties and applications of the following polymers: polyolefins (polyethylene, polypropylene), polystyrene, polyvinyl chloride, polyvinyl acetate, polyacrylamide, fluoro polymers (Teflon), polyamides (nylon-6 and nylon 6, 6). Thermosetting polymers - phenol formaldehyde resins (Bakelite, Novalac), polyurethanes, conducting polymers (polyacetylene, polyaniline). Brief outline of biodegradable polymers.