B.Tech Biotechnology: Semester-II BAS-201 – Chemistry	
Teaching Scheme	**Examination Scheme**
Lectures: 3 hrs/Week	Class Test -12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
Credits: 4	Attendance – 12 Marks
	End Semester Exam – 70 marks

Course Objective:

1. To give an overview of Chemical sciences and their significance
2. To give basic knowledge of chemistry for understanding nature of biotechnology
3. To have an overview of molecular bonding and chemical interactions

Course Learning Outcomes:

After completing the course, the student shall be able to:

CO1: To define the basic application of chemistry in science and biotechnology,

CO2: To summarize the applied chemistry in biomolecules.

UNIT-I CHEMICAL BONDING
Chemical bonding: Molecular Orbital Theory and its applications to Homo and Hetero diatomic molecules. Hydrogen bonding and its consequences.Band theory of metals and its applications. Liquid crystalline state: Classification and its application. Solid state: Solid state: Unit cell, space lattice, limiting radius ratio (cubic).Braggs equation, Miller indices, mathematical expression for density of unit cell Distinctive allotropes of carbon such as graphite and fullerenes (two dimensional); properties and applications. Liquid state: Properties of liquids, viscosity, surface tension and effect of temperature Gaseous state: Gas laws: Boyle's law, Charles law, Gay lussac law and kinetic theory of gases. Reaction kinetics: Order and molecularity of reaction, integated rate equation for zero first and second order. Theories of reaction rate. Phase rule: Phase rule and its application to one component system (water), eutectic system of metal Bi-Cd and Pb-Ag system Electrochemistry: Electrode potential, electrochemical and concentration cell ,electrochemical theory of corrosion and its prevention ,fuel cell.
UNIT-II CONCEPTS OF ORGANICS
Concepts of organics: Electronic displacement in covalent bonded compound, Stability of reaction intermediates; carbocation, carboanian, free radical,vOptical isomerism of organic compounds. E-Z nomenclature and R-S configuration, Conformation of n butane Nucleophilic substitution reactions. Structural and mechanistics: Reaction mechanism of (i) Aldol Condensation, (ii) Cannizarro Reaction (iii) Hoffmann Rearrangement (iv) Beckmann rearrangement (v) Diels Alder reaction. Polymers: Classification of polymers, polymerization techniques; addition, condensation and co –ordination polymerization. Structure preparation, properties and application of Elastomers, plastomers, polyamides and polyesters .Conducting Polymers: biodegradable polymers.
UNIT-III SPECTROSCOPY

Head
Department of Biotechnology
Invertis University, Bareilly (U.P.)

Dean
Faculty of Science
Invertis University, Bareilly (U.P.)

Registrar
Invertis University
Bareilly

Spectroscopy: Elementary idea and simple application of U.V, IR and NMR spectral techniques. Water: Specifications of domestic water. Analysis of water BOD,COD,TDS,TSM, Water processing: boiler feed water (Calgon process), process water (Zeolite process) potable water, (ion exchange method); Fuel: Classification and analysis of coal (proximate and Ultimate) and their implications, calorific value and its determination (Bomb Calorimeter). Biomass,biogas and bio-fuel. Titrimetric analysis: Types of titrimetric analysis: Acid Base, Redox, Precipitation and Complexometric titrations

Suggested Readings:

- Cotton F.A., Wilkinson G.,Murillo,C.A. and Bochmann "Advanced inorganic chemistry", Wiley,chiester ,1992
- Smith,Michael B./March Jerry, March,s "Advanced organic chemistry": "Reaction , mechanism and structure".,Wilelly and Sons ,2007
- Glaston,Samuel B., "Elements of physical chemistry", ELBS,2005
- Finar,I.L, "Organic Chemistry(vol I&II)" , Addision-Wesley Longman Ltd.
- F.W. Billmeyer, "Text Book of Polymer Science", JonhonWielly&sons
- G.W. Gray and P.A. Winsor, Ellis Harwood series in "Physical Chemistry, Liquid crystals and plastic crystals (vol I)", ,New York
- M.G. Fontana, "Corrosion Engineering", Mc.Graw Hill Publications.

Head
Department of Biotechnology
Invertis University, Bareilly (U.P.)

Dean
Faculty of Science
Invertis University, Bareilly (U.P.)

Registrar
Invertis University
Bareilly