SEMESTER-VI

CORE ELECTIVE: THEORY

Programme : Degree in Bachelor of Science	**Year :III**	**Semester-VI**
CourseCode: CHE(N):350		
CourseName: Applied Chemistry		
Credit:3		
Max Marks:70+30=100		

Course Objective and Outcomes:

After completion of this course, the students will be able to understand the chemistry of biomolecules. The new frontiers of chemistry such as nano-chemistry and green chemistry are the part of syllabi of this course which boost the knowledge of the learners in these fields. The learners will also able to understand the basic idea of drug and development. Learners will gain an understanding of molecular spectroscopy.

Syllabus Details

Block-I: Molecules of life

Unit 1: Carbohydrates

Classification and nomenclature. Monosaccharides, mechanism of osozone formation, interconversion of glucose and fructose, chain lengthening and chain shortening of aldose. Configuration of monosaccharides. Erythro and threo diastereomers conversion of glucose, ethers and esters. Determination of ring size of monosaccharides. Cyclic structure of D (+) glucose. Mechanism of mutarotation. General study of disaccharides. General introduction of structure of ribose and deoxyribose.

Unit 2: Amino Acid, Peptide and Proteins

Classification, structure and stereochemistry of amino acids. Acid base behavior, isoelectric point and electrophoresis. Structure and nomenclature determination, end group analysis, selective hydrolysis of peritides and proteins. Level of protein structure. Protein denaturation. Enzymes, Coenzymes, Cofactors and Vitamins.

Unit 3: Lipids

Introduction, Classification and Types of Lipids, important Structural features, Industrial features.

Unit 4: Nuclic acid

Nucleic acids: introduction. Constituents of nucleic acids. Ribonucleosides and Ribonucleotides. The double helical structure of DNA, Genetic code.

Unit 5: Bioinorganic chemistry

Essential and trace elements in biological processes, metalloporphyrins with special references to haemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ion with special references to Ca^{+2}, Nitrogen fixation.

Block-II: Applied Chemistry

Unit 6: Basics of green chemistry

Introduction, role of green chemistry in sustainable development, principles of green chemistry.

Unit 7: Fundamentals of Nanochemistry

Definition, brief history, classification, general approach of nano synthesis, general methods of characterization, general applications

Unit 8: Preliminary idea of Pharmaceuticals

Drug discovery, design and development; concepts of prodrugs and soft drug, structure-activity relationship (SAR); Synthesis of the representative drugs of the following classes: analgesics agents, antipyretic agents (Aspirin, paracetamol); antibacterial and antifungal agents (Sulphonamides); Cardiovascular (sorbitrate).

Block -III: Molecular spectroscopy

Unit 9: Fundamentals of Spectroscopy

Introduction of Spectroscopy, importance of Spectroscopy, The Electromagnetic Radiation. regions of the spectrum, basic features of different spectrometers Difference between Atomic and molecular Spectroscopy, Absorption and Emission spectra, Born- Oppenheimer Approximation

Unit 10: Vibrational Spectroscopy

Infrared spectrum, energy levels of simple harmonic oscillator, selection rules, pure vibrational

spectrum, intensity, determination of force constant and qualitative relation of force constant and bond energies, effect of harmonic motion andisotope on the spectrum, idea of vibrational frequencies of different functional groups.

Unit 11: Rotational Spectroscopy

Diatomic molecules, energy levels of a rigid rotor (semi classical principles), selection rule, rotational spectra of rigid diatomic molecule, determination of bond length, numerical problems.

Unit 12: Raman Spectroscopy

Concept of polarizavility, selection rules, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules

SEMESTER-VI
CORE ELECTIVE: PRACTICAL

Programme : Degree in Bachelor of Science	**Year :III**	**Semester-VI**
CourseCode: CHE(N):350L		
CourseName: Applied Chemistry		
Credit:1		
Max Marks:50		

Course Objective and Outcomes:

Upon completion of this course, the learners will have the knowledge and skills to synthesize the organic compounds using green solvents/methods. Spectroscopic and chromatographic exercise will train them to interpret the spectral data and chromatograms of compounds.

Syllabus Details

Block -1: Experiment

Unit 1: Synthesis and analysis of organic compound

1. Photoreduction of benzophenone to benzopinacol in the presence of sunlight
2. Analysis of organic compunds by spectroscopic techniques.
3. Differentiate between a reducing/ nonreducing sugar.

Unit 2: Separation of mixture by chromatography

1. Separation of mixtures by chromatography: Measure the R_f value in each case (Amino acids, carbohydrates)

2. To synthesise aspirin by acetylation of salicylic acid and compare it with the ingredient of an aspirin tablet by TLC.

Distribution of marks shall be as given below:

1. Synthesis of Organic Compounds : 12
2. Chromatography exercise : 12
3. Spectroscopy Analysis : 11
4. Viva : 05
5. Home assignnment / Internal assessment lab record and attendence : 10