GOVT. COLLEGE (AUTONOMOUS), RAJAHMUNDRY
DEPARTMENT OF CHEMISTRY

SYLLABUS FOR B.Sc. FIRST YEARSEMESTER II
FROM 2018-19 ONWARDS

GENERAL& PHYSICAL CHEMISTRY

Course Code: CHE102

GENERAL CHEMISTRY **30 hrs (2h / w)**

UNIT-IV

1. **Surface chemistry** 8 h

Definition of colloids. Solids in liquids(sols), preparation, purification, properties - kinetic, optical, electrical. Stability of colloids, Hardy-Schulze law, protective colloid.

Liquids in liquids (emulsions) preparation, properties, uses. Liquids in solids (gels) preparation, uses.

Adsorption: Physical adsorption, chemisorption. Freundlisch, Langmuir adsorption isotherms. Applications of adsorption.

Additional input: Factors effecting Adsorption.

2. **Chemical Bonding** 7h

Valence bond theory, hybridization, VB theory as applied to XeF_2, ClF_3, IF_7 Ni $(CO)_4$, Molecular orbital theory - LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules (N_2, O_2, CO and NO).

Additional input: MO diagram of HCl.

UNIT-V

Stereochemistry of carbon compounds 15 h

Molecular representations- Wedge, Fischer, Newman and Saw-Horse formulae. Optical isomerism: Optical activity- wave nature of light, plane polarised light, optical rotation and specific rotation. Chiral molecules- definition and criteria (Symmetry elements)- Definition of enantiomers and diastereomers – Explanation of optical isomerism with examples Glyceraldehyde, Lactic acid, Alanine, Tartaric acid, 2,3-dibromopentane. D,L and R,S configuration methods and E,Z- configuration with examples.

Additional input: Separation technique of d(+) and l(-) compounds.

PHYSICAL CHEMISTRY

Unit- III: Gaseous State& Solutions

Gaseous State8hrs

Deviation of real gases from ideal behavior, van der Waal's equation of state, P-V Isotherms

of of carbon dioxide. Critical phenomena. The van der Waal's equation and the critical state (Relationship between critical constants and vander Waal's constants). The law of corresponding stales and reduced equation of states. Joule-Thomson effect. Liquefaction of gases: i) Linde's method and ii) Claude's method.

Additional input: C_p/C_vratio, Numerical problems

Solutions 8 hrs

Solutions of liquids in liquids - Raoult's law- ideal solutions, non-ideal solutions. Vapour pressure - composition curves for ideal and non-ideal solutions. Vapour pressure -composition and temperature- composition curves of completely miscible binary solutions (Azeotropes-HCl-H_2O, ethanol-water systems) - fractional distillation. Partially miscible liquids-phenol-water, tri methyl amine-water, nicotine-water systems. Effect of impurity on consulate temperature. steam distillation. Nernst distribution law and its applications. Solutions of gases in liquids- Henry's law.

Additional input:Types of Solutions

Unit - IV: Surface Chemistry Solid State Chemistry

Surface Chemistry 6hrs

Definition of colloids. Solids in liquids (sols), preparation, properties-kinetic, optical,electrical. Stability of colloids, Hardy-Schulze law, protective colloid. Liquids in liquids(emulsions) preparation, properties, uses. Liquids in solids (gels) preparation, uses. Adsorption: Physical adsoption, chemisorption. Freundlich, Langmuir adsorption isotherms. Applications of adsorption .

Additional input: Factors effecting adsorption.

Solid State Chemistry8 hrs

Types of Solids-symmetry in crystal systems-space lattice and unit cell- Bravias Lattices-crystal systems -law of rational indices-Miller indices-interplanar spacings in a crystal system-X-ray diffraction- Bragg's equation; Quasi crystals.Defects in crystals-point and line defects; Schottky and Frenkel defects.

Additional input: Color centers.