	Government College (Autonomous) Rajahmundry	Program & Semester I B.Sc. CHEMISTRY (H) SEMESTER - II			
Course Code Major-3	TITLE OF THE COURSE Course -3: GENERAL & INORGANIC CHEMISTRY				
Teaching	Hours Allocated: 45 (Theory) (3 hrs. / Wk.)	L	T	P	C
Pre-requisites:	Basic knowledge about inorganic chemistry and elements	3	-	-	3




Course Objectives:

1. Gain knowledge about on atomic structure and Periodic table
2. Gain knowledge about different types of chemical bonds and their applications
3. Get knowledge on different theories of acids and bases and their applications

Course Outcomes:

On Completion of the course, the students will be able to-		Cognitive Domain
CO1	1. Understand the structure of atom and the arrangement of elements in the periodic table.	Understanding
CO2	2. Understand the nature and properties of ionic compounds.	Understanding
CO3	3. Explain the existence of special types of compounds through weak chemical forces.	Application
CO4	4. Define acids and bases and predict the nature of salts.	Application

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

Unit - I: Atomic Structure and Periodic table

9 h

Electronic configuration: Bohr theory, dual nature of electrons, Heisenberg uncertainty principle, the Schrodinger equation, significance of wave functions, Pauli's exclusion principle, Hund's rule, sequence of energy levels (Aufbau principle).

Periodicity: Periodic law and arrangement of elements in the periodic table (Groups and Periods)

General properties of atoms: size of atoms and ions-atomic radii, ionic radii, covalent radii; trend in ionic radii, ionization potential, electron affinity; electro negativity - Pauling, Mulliken-Jaffe, Allred-Rochow definitions; oxidation states and variable valency; isoelectronic relationship; inert-pair effect;

UNIT - II: Ionic bond

9 h

Properties of ionic compounds, factors favoring the formation of ionic compounds, ionization potential, electron affinity, and electronegativity. Lattice energy: definition, factors affecting lattice energy, Born-Haber cycle-enthalpy of formation of ionic compound and stability. Stability of ionic compounds in terms of ΔH_f and U_o . Solubility and thermal stability of ionic compounds. Covalent character in ionic compounds-polarization and Fajan's rules and its applications.

UNIT - III: The Covalent Bond

9 h

Valence Bond theory-arrangement of electrons in molecules, hybridization of atomic orbitals and geometry of molecules- BeCl_2 , BF_3 , CH_4 , PCl_5 , SF_6 , effect of bonding and nonbonding electrons on the structure of molecules, effect of electronegativity,

Isoelectronic principle, illustration of structures by VESPR model: NH_3 , H_2O , SF_4 , ICl_4^- , ICl_2^- , XeF_4 , XeF_6

Molecular orbital theory -LCAO method, construction of M.O. diagrams for homonuclear and hetero-nuclear diatomic molecules (N_2 , O_2 , CO and NO)

UNIT - IV: Metallic and Weak Bonds

9 h

The Metallic bond: metallic properties, free electron theory, Valence Bond Theory, band theory of metals. Explanation of conductors, semiconductors and insulators.

Weak bonds: hydrogen bonding-intra- and intermolecular hydrogen bonding, influence on the physical properties of molecules, comparison of hydrogen bond strength and properties of hydrogen bonded N, O and F compounds; associated molecules-ethanol and acetic acid; Vander Waals forces, ion dipole-dipole interactions.

UNIT - V: Acids and Bases 9 h

Theories of acids and bases: Arrhenius theory, Bronsted-Lowry theory, Lewis theory, the solvent system,

Non aqueous solvents: classification-protonic and aprotic solvents, liquid ammonia as solvent-solutions of alkali and alkaline earth metals in ammonia.

Types of chemical reactions: acid-base, oxidation-reduction, calculation of oxidation number. Definition of pH, pKa, pKb. Types of salts, Salt hydrolysis. Pearson's concept, HSAB principle & its importance, bonding in Hard-Hard and Soft-Soft combinations

List of Reference Books:

1. J. D. Lee, Concise Inorganic Chemistry, 5th ed., Blackwell Science, London, 1996.
2. B. R. Puri, L. R. Sharma, K. C. Kalia, Principles of Inorganic Chemistry, Shoban Lal Nagin Chand and Co., 1996.
3. D. F. Shriver and P. W. Atkins, Inorganic Chemistry, 3 rd ed., W. H. Freeman and Co, London,

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-': No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	2	3	3	2	2	3	3	3
CO2	2	3	3	3	3	2	1	2	2	3	2	2	3
CO3	3	3	3	2	2	1	1	2	3	1	2	3	3
CO4	2	1	2	1	3	2	3	1	2	3	2	3	2
Av g.	2.5	2.25	2.75	2.0	2.5	1.75	2.0	2.0	2.25	2.25	2.25	2.75	2.75