PITHAPUR RAJAH'S GOVERNMENT COLLEGE(AUTONOMOUS)
KAKINADA - 533 001, EAST GODAVARI, A.P.

Affiliated to Adikavi Nannaya University

NAAC Accredited with "A" Grade (3.17 CGPA)

BOARD OF STUDIES OF CHEMISTRY

B.Sc. Chemistry Under CBCS

Meeting Minutes/Resolutions

Convened on 03 November 2022

DEPARTMENT OF CHEMISTRY
P. R. GOVT. COLLEGE (Autonomous)
Opp. Mc Laurin High School, Raja Ram Mohan Roy Road, Kakinada

www.prgc.ac.in; e-mail: chemistry_dept@prgc.ac.in

	P. R. College (Autonomous), Kakinada	**Program & Semester** I B.Sc. Chemistry (I Semester)			
Course Code	**TITLE OF THE COURSE** Inorganic & Physical chemistry				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites	III A Group Elements, Modern periodic table, Chemical bonding	60	10	30	4+1

Course Objectives:

1. To explain the basic concepts of p-block elements
2. To analyze modern periodic table.
3. To synthesize inorganic molecules
4. To understand physical and chemical properties of elements
5. To understand the various types of structures of molecules.

Course Outcomes:

Course on Completion of the course, the students will be able to	
CO1	Understand the basic concepts of p-block elements.
CO2	Explain the difference between solid, liquid and gases in terms of intermolecular interactions.
CO3	Apply the concepts of gas equations, electrolytes while studying other Chemistry courses.
CO4	Explain the concepts of azeotropic mixtures and missible liquids and steam distillation

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development			**Employability**			**Entrepreneurship**	

SYLLABUS FOR SEMESTER –I

CHEMISTRY PAPER- I

(Inorganic & Physical Chemistry) 60hrs. (4h/w)

INORGANIC CHEMISTRY 24 h

UNIT–I

Chemistry of p-block elements 8h

Group13: Preparation & structure of Diborane, Borazine

Group14: Preparation, classification and uses of silicones

Group 15: Preparation & structures of Phosphonitrilic halides $\{(PNCl_2)_n$ where n=3,4

Group 16: Oxides of Sulphur, (structures only)

Group 17: Pseudo halogens, Structures of Interhalogen compounds.

Additional Input: Oxoacids of Sulphur (structures only)

UNIT-II

1. **Chemistry of d-block elements: 6h**

Characteristics of d-block elements with special reference to electronic configuration, variable valence, magnetic properties, catalytic properties and ability to form complexes. Stability of various oxidation states.

2. **Chemistry of f-block elements: 4h**

Chemistry of lanthanides; electronic structure, oxidation states, Lanthanide contraction, consequences of lanthanide contraction , magnetic properties.

Theories of bonding in metals: 6h

Valence bond theory and Free electron theory, explanation of thermal and electrical conductivity of metals based on these theories, Band theory- formation of bands, explanation of conductors, semiconductors and insulators.

Additional Input: Chemistry of actinides-electronic configuration, oxidation states, actinide contraction, comparison of lanthanides and actinides.

PHYSICALCHEMISTRY **36h**

UNIT-III

Solid state **10h**

Symmetry in crystals. Law of constancy of interfacial angles. The law of rationality of indices. The law of symmetry. Miller indices, Definition of lattice point, space lattice, unit cell. Bravais lattices and crystal systems. X-ray diffraction and crystal structure. Bragg's law. Powder method.

Additional Input: Defects in crystals. Stoichiometric and non-stoichiometric defects.

UNIT-IV

1. **Gaseous state** **6h**

Van der Waal's equation of state. Andrew's isotherms of carbondioxide, continuity of state. Critical phenomena. Relationship between critical constants and vander Waal's constants . Joule-Thomson effect. Inversion temperature.

2. **Liquid state** **4h**

Liquid crystals, mesomorphic state. Differences between liquid crystal and solid/liquid. Classification of liquid crystals into Smectic and Nematic. Application of liquid crystals as LCD devices.

Additional Input: Law of corresponding states.

UNIT-V

1. **Solutions** **6h**

Azeotropes-HCl-H_2O system and ethanol-water system. Partially miscible liquids-phenol-water system. Critical solution temperature(CST), Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law.

2. **Ionic equilibrium** **3h**

Ionic product, common ion effect, solubility and solubility product. Calculations based on solubility product.

3. **Dilute solutions** **7h**

Colligative properties- RLVP, Osmotic pressure, Elevation in boiling point and depression in freezing point. Experimental method for the determination of molar mass of a non-volatile solute using osmotic pressure, abnormal colligative properties. Van't Hoff factor.

Additional Input: Effect of impurity on consulate temperature. Immiscible liquids and steam distillation. Experimental methods for the determination of Elevation in boiling point and depression in freezing point.

Co-curricular activities and Assessment Methods

1. Continuous Evaluation: Monitoring the progress of students learning
2. Class Tests, Worksheets and Quizzes
3. Presentations, Projects and Assignments and Group Discussions: Enhances critical thinking's kills and personality
4. Semester- end Examination: critical indicator of student's learning and teaching methods adopted by teachers throughout the semester.

1. **Textbooks :**
2. Principles of physical chemistry by Prutton and Marron
3. Solid state Chemistry and its applications by Anthony R.West
4. Textbook of physical chemistry by K L Kapoor
5. Textbook of physical chemistry by S G lasstone
6. Advanced physical chemistry by Bahl and Tuli
7. Inorganic Chemistry by J.E. Huheey
8. Basic Inorganic Chemistry by Cotton and Wilkinson
9. A textbook of qualitative inorganic analysis by A.I. Vogel
10. Atkins,P.W. & Paula, J.deAtkin's Physical Chemistry Ed., Oxford University Press 10th Ed (2014).
11. Mortimer, R.G. Physical Chemistry 3rdEd.Elsevier: NOIDA, UP (2009).
12. Barrow, G.M. Physical Chemistry

LABORATORYCOURSE –I **30**hrs (2h/ w)

Practical-I Analysis of SALTMIXTURE

(At the end of Semester-I)

Qualitative inorganic analysis (Minimum of Six mixtures should be analyzed) **50 M**

Course outcomes:

At the end of the course, the student will be able to;

1. Understand the basic concepts of qualitative analysis of inorganic mixture
2. Use glassware, equipment and chemicals and follow experimental procedures in the laboratory
3. Apply the concepts of common ion effect, solubility product and concepts related to qualitative analysis

Analysis of SALT MIXTURE **50M**

Analysis of mixture salt containing two anions and two cations (From two different groups) from the following:

Anions: Carbonate, Sulphate, Chloride, Bromide, Acetate, Nitrate, Borate, Phosphate.

Cations: Lead, Copper, Iron, Aluminium, Zinc, Nickel, Manganese, Calcium, Strontium, Barium, Potassium and Ammonium