**Name of the Teacher: Dr Jai Pal B. Sc. III Year (Vth Semester)**

**Paper-XV (CH-301) Inorganic Chemistry(Theory & Practical)**

**Lesson Plan**

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| **S No** | **Period** | **Topics to be Covered** | **Academic Activity to be Organized** |
|  | **17-31 July 2017** | **Theory:**  **Section – A**  **Metal- Ligand Bonding in Transition Metal complexes**   1. Limitations of valence bond theory, an elementary idea of crystal field theory, 2. Crystal field splitting in octahedral, tetrahedral and square planer complexes, 3. Factors affecting the crystal field parameters   **Practicals:**  **Synthesis of organic compounds:**  (a) To prepare salicylic acid from Aspirin.  (b)To prepare p-bromoaniline from p- bromoacetanilide. | **Class Tests, Group Discussions & Experiment Presentations** |
|  | **01-31 Aug 2017** | **Theory:**  **Thermodynamics and Kinetic Aspects of metal complexes**   1. A brief outline of thermodynamic stability of metal complexes. 2. Factors affecting the stability, Irving William Series, substitution reactions of square planer complexes of Pt[II], Trans effect.   **Practicals:**  **Synthesis of organic compounds:**  (a) To prepare m-nitroaniline from m-dinitrobenzene.  (b) To prepare S-Benzyl-iso-thiouronium chloride from Thiourea. |
|  | **01-30 Sept 2017** | **Magnetic properties of Transition metal complexes**  Types of magnetic materials, magnetic susceptibility, method of determining  magnetic susceptibility, spin only formula, L-S coupling, correlation of μs and μeff  values, orbital contribution to magnetic moments, application of magnetic moment  data for 3d metal complexes.  **Practicals:Thin Layer Chromatography**  Separation, Identification and Rf determination of a mixture of coloured organic compounds using common organic solvents. |
|  | **01-31 Oct 2017** | **Electronic spectra of Transition metal complexes**  Selection rules for d-d transition, spectroscopic ground states, spectrochemical  series  **Practicals:**  To determine the strength of the given acid solution (mono acid only) conductometrically.  2. To determine the solubility and solubility product of a sparingly soluble electrolyte conductometrically. |
|  | **01-13 Nov 2017** | Orgel energy level diagram for d-1 and d-9 states, discussion of electronic spectrum of [Ti(H2O)6]+3 complex ion.  **Practicals:**  To determine the strength of given Ferrous ammonium sulphate solution potentiometrically. |

**Topics of Assignments/ Class Tests to be given to the Students:**

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| **Assignment 1** | Limitations of valence bond theory, an elementary idea of crystal field theory and Crystal field splitting in octahedral |
| **Assignment 2** | Types of magnetic materials, magnetic susceptibility, method of determining magnetic susceptibility, spin only formula, L-S coupling, |
| **Class Test** | **Metal- Ligand Bonding in Transition Metal complexes** |

**Name of the Teacher: Dr Jai Pal** Class: **B. Sc- II year (Semester-III)**

**Paper- Chemistry Practical**

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| **S No** | **Period** | **Topics to be Covered** | **Academic Activity to be Organized** |
|  | **17-31 July 2017** | **Practicals:**  **Preparations:** Preparation of Cuprous chloride, tetra ammine cupric sulphate | **Group Discussions & Experiment Presentations** |
|  | **01-31 Aug 2017** | **Practicals:**  **Preparations:** Preparation of chrome alum, potassium trioxalatochromate (III) and Nickel Hexammine chloride  **Colorimetry:**  To verify Beer - Lambert law for KMnO4 /K2Cr2O7 and determine the concentration of the given KMnO4 /K2Cr2O7 solution. |
|  | **01-30 Sept 2017** | **Practicals:**  **Gravimetric Analysis:**  Quantitative estimations of, Cu2+ as copper thiocyanate, Ni2+ as Ni-dimethylglyoxime |
|  | **01-31 Oct 2017** | **Practicals:**  1. To determine the CST of phenol-water system.  2. To determine the solubility of benzoic acid at various temperatures and to determine the ΔH of the dissolution process.  3. To determine the enthalpy of neutralisation of a strong base/strong acid and determine the enthalpy of ionisation of the weak acid/weak base.  4. To determine the enthalpy of solution of solid calcium chloride. |
|  | **01-13 Nov 2017** | **Practicals:**  1. To determine the enthalpy of neutralisation of a weak acid/weak base and determine the enthalpy of ionisation of the weak acid/weak base.  2. To determine the enthalpy of solution of solid calcium chloride. |

**Name of the Teacher: Dr Jai Pal** **B. Sc. Ist Year (Ist Semester)**

**Paper-I (CH-101) Inorganic Chemistry (Theory)**

**Lesson Plan**

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| **S No** | **Period** | **Topics to be Covered** | **Academic Activity to be Organized** |
|  | **17-31 July 2017** | **Atomic Structure**  Idea of de Broglie matter waves, Heinsenberg’s uncertainty principle, atomic orbitals, quantum numbers, radial and angular wave functions. | **Group Discussions:**  **Electronic Configurations of atoms and ions**  **Aufbau and Exclusion Principals**  **Numerical Problems related to Born Haber Cycle.**  **Shape of simple molecules and Hybridisation** |
|  | **01-31 Aug 2017** | i)Orthogonal wave functions, significance of Ψ and Ψ2, probability distribution curves, shapes of s, p, d, f orbitals, Aufbau and Pauli exclusion principles, Hund’s  multiplicity rules, Electronic configuration of elements, effective nuclear charge, Slater’s rules.  **ii) Periodic table and atomic properties**  Classification of periodic table into s, p, d, f blocks, atomic and ionic radii,  ionisation energy |
|  | **01-30 Sept 2017** | Electron affinity and electronegativity definition, methods of determination or evaluation, trend in periodic table (in s and p-block elements)  **Covalent Bond**  Various type of hybridisation and  shapes of simple inorganic molecules and ions.  valence shell electron pair repulsion (VSEPR) theory to NH3, H3O+, SF4, ClF3, H2O, SnCl2, ClO3-1 .  MOT of (N2, O2) heteronuclear (CO and NO) diatomic molecules and ions, bond energy, bond angle, bond length and dipole moments, percentage ionic character from dipole moment and electronegativity difference. |
|  | **01-31 Oct 2017** | **Ionic Solids**  Ionic structures (NaCl, CsCl, ZnS (Zinc blende), CaF2) size effects, radius ratio rule and its limitations, Madelung constant, Stoichiometric and Non stoichiometric defects in crystals |
|  | **01-13 Nov 2017** | Lattice energy (mathematical derivation excluded) and Born- Haber cycle, Solvation energy and its relation with solubility of Ionic solids, Polarizing power and Polarisability of ions, Fajan’s rule. |

**Topics of Assignments/ Class Tests to be given to the Students:**

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| **Assignment 1** | Quantum numbers, radial and angular wave functions. |
| **Assignment 2** | Electron affinity and electronegativity definition, methods of  determination or evaluation, trend in periodic table (in s and p-block elements) |
| **Class Test** | Orthogonal wave functions, significance of Ψ and Ψ2, probability distribution curves, shapes of s, p, d, f orbitals |