

Semester	<b>1</b>
Course	<b>MAJOR</b>
Paper Code	<b>C1CH230121T</b>
Paper Title	Inorganic Chemistry 1
No. of Credits	<b>THEORY: 4</b>
Theory / Practical / Composite	THEORY
Minimum No. of preparatory hours per week a student has to devote	04
Number of Modules	04
Syllabus	<p>Theory</p> <p><b>Module 1: Extra nuclear Structure of atom</b> 12 Lectures  Atomic spectrum of hydrogen atom. Wave mechanics: de Broglie equation, Heisenberg's Uncertainty Principle and its significance, Schrödinger's wave equation, significance of <math>\psi</math> and <math>\psi^2</math>. Quantum numbers and their significance. Radial and angular wave functions for hydrogen atom. Radial and angular distribution curves. Shapes of s, p, d and f orbitals. Pauli's Exclusion Principle, Hund's rules, Exchange energy, Aufbau principle and its limitations, Ground state Term symbols of atoms and ions for atomic number upto 30.</p> <p><b>Module 2: Periodic Properties</b> 12 Lectures  Modern IUPAC Periodic table, Effective nuclear charge, screening effects and penetration, Slater's rules, atomic radii, ionic radii (Pauling's univalent), covalent radii, scandide contraction, lanthanide contraction. Ionization potential, electron affinity and electronegativity (Pauling's, Mulliken's and Allred-Rochow's scales) and factors influencing these properties, group electronegativities. Group trends and periodic trends in these properties in respect of s-, p- and d-block elements. Secondary periodicity, Relativistic Effect, Inert pair effect.</p> <p><b>Module 3: Covalent Bonding-I</b> 12 Lectures  VSEPR Theory to predict the structure and stereochemistry of simple molecules; Idea of stereo chemically active and inactive lone pair, concept of hybridization, Bent's Rule and applications; Pseudo-rotation, Resonance and its applications, Dipole moment, VBT (Hitler &amp; London)</p> <p><b>Module 4: Coordination Chemistry: Basics and Isomerism</b>  12 Lectures  Werner's theory and allied conceptions in coordination complexes, Classification and types of ligands, chelates, chelate effect and macrocyclic effect; Coordination numbers, IUPAC nomenclature of coordination complexes (up to two metal centers), Isomerism in</p>

	coordination compounds, constitutional and stereo isomerism, Geometrical and optical isomerism in square planar, tetrahedral and octahedral complexes
Learning Outcomes	<p><b>Theory:</b></p> <ol style="list-style-type: none"> <li>1. To have basic knowledge about the wave mechanical model of an atom, the concept of Atomic Orbital and ground state terms.</li> <li>2. To develop the idea of periodic table and periodic properties</li> <li>3. To be acquainted with the several theories of bonding in accordance with the Valence Bond Theory</li> <li>4. To realize the nature of ligands and the coordination complexes, their IUPAC names and isomeric forms</li> </ol>
Reading/Reference Lists	<p>Theory:</p> <ol style="list-style-type: none"> <li>1. Douglas, B.E. and McDaniel, D.H. Concepts &amp; Models of Inorganic Chemistry Oxford, 1970.</li> <li>2. Atkin, P. Shriver &amp; Atkins' Inorganic Chemistry, 5th Ed., Oxford University Press.</li> <li>3. Cotton, F.A., Wilkinson, G. and Gaus, P.L., Basic Inorganic Chemistry 3rd Ed.; Wiley India.</li> <li>4. Sharpe, A.G., Inorganic Chemistry, 4th Indian Reprint (Pearson Education).</li> <li>5. Huheey, J. E.; Keiter, E.A. &amp; Keiter, R.L. Inorganic Chemistry, Principles of Structure and Reactivity 4th Ed., Harper Collins 1993, Pearson.</li> <li>6. Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press.</li> <li>7. Winter, M. J., The Orbitron, <a href="http://winter.group.shef.ac.uk/orbitron/">http://winter.group.shef.ac.uk/orbitron/</a>. An illustrated gallery of atomic and molecular orbitals.</li> <li>8. Burgess, J., Ions in solution: basic principles of chemical interactions. Ellis Horwood.</li> <li>9. Pfennig, B. W., Principles of Inorganic Chemistry. John Wiley &amp; Sons.</li> <li>10. Housecraft, C. E.; Sharpe, A. G., Inorganic Chemistry, 5th Edition, Pearson.</li> <li>11. Wulfsberg, G., Inorganic Chemistry, Viva Books Private Limited.</li> </ol>
Evaluation	<p>Theory: 100  Internal: 30 (CIA: 20; Other form of Assessment: 5; Attendance: 5)  Semester Exam: 70</p>
Paper Structure for Theory Semester Exam	Answer SEVEN out of NINE Questions of 10 marks each.