

Programme: M. Sc. Part-I (Chemistry)

Course Code: ICO-401

Title of the Course: Topics in Inorganic Chemistry & Environmental Chemistry

Number of Credits: 03

Effective from AY: 2018-19

Prerequisites for the course:	Student should have studied the courses in chemistry at F.Y. B.Sc., S.Y.B.Sc. and T.Y.B.Sc. levels and / or CHIC-401 course so as to have basic knowledge of Inorganic / environmental chemistry.	No. of lectures
Course Objectives:	<ol style="list-style-type: none">1. To provide fundamental aspects of transition & inner transition metals & their compounds.2. To provide knowledge of main group elements of the periodic table & their compounds3. To introduce various global phenomenon's of atmosphere & environment, follow directive of the Supreme Court in 1993 to introduced environmental education at all levels, have a fair knowledge on the various global activities to justify permissible or adverse, so that future generation are not adversely affected.	
Course Outcomes:	<ol style="list-style-type: none">1. Students should be in position to understand fundamentals / usefulness of transition & inner transition metals.2. Students should be in position to understand chemistry main group elements.3. Students shall be aware of the maintenance of healthy living atmosphere on the globe.	
Content:	<p style="text-align: center;">SECTION-I</p> <p>1. Chemistry of transition & inner transition elements</p> <p>1.1 Transition elements: IUPAC definition of transition elements, occurrence, physical & chemical properties, noble character, metal oxides & oxido complexes, examples of metal-metal bonded clusters.</p> <p>1.2 Inner transition elements: Lanthanides, occurrence, properties, oxidation states, electronic structure, colour and spectra, magnetic properties, lanthanide contraction, compounds of lanthanides. Actinoid chemistry, general trends.</p> <p>2. Main group elements and their compounds</p> <p>2.1 Boron group: Compounds of boron:- borazine and boron nitride, synthesis, properties, structure & bonding. Borates: classification, structures & examples.</p> <p>2.2 Carbon group: Allotropes of carbon including C₆₀, intercalation compounds of graphite, carbides. Compounds of silicon: silicates, zeolites & silicones.</p> <p>2.3 Nitrogen group:- Introduction: oxides & oxyacids of nitrogen. 2.4 Oxygen group: oxyacids & oxohalides of S, S₄N₄ ring compounds: synthesis, properties, structure & bonding.</p>	<p>9 hr</p> <p>9 hr</p>

	<p style="text-align: center;">SECTION-II</p> <p>1. Atmosphere Structure and properties of the atmosphere, composition of atmosphere and vertical temperature behaviour, lapse rate and temperature inversion.</p> <p>2. Air Pollution Classification of air pollutants and photochemical reactions in the atmosphere Common air pollutants (e.g. CO, NO_x, SO₂, hydrocarbons and particulates) (a) sources (b) physiological and environmental effect (c) monitoring, d) various remedial & technological measures to curb pollution. Air quality standards.</p> <p>3. Water pollution Importance of buffer & buffer index in waste water treatments. Chemical, physical & biological characteristics of water pollution, specific & non-specific characterization of water. DO, BOD, COD, and chlorine demand, typical water treatment & waste water treatment (Municipal).</p> <p>4. Treatment of Industrial wastes Electroplating industry, fertilizer industry and pharmaceuticals industries.</p> <p>5. Biogeochemical cycles: Carbon and Nitrogen cycles nature</p>	<p>2 hr</p> <p>7 hr</p> <p>5 hr</p> <p>2 hr</p> <p>2 hr</p>
Pedagogy:	Mainly lectures / tutorials. Seminars / assignments / presentations / self-study or a combination of some of these could also be used to some extent.	
Text books / reference books	<ol style="list-style-type: none"> 1. P.W. Atkins, T. Overton, J. Rourke, M. Weller, & F. Armstrong, <i>Shriver & Atkins Inorganic Chemistry</i>, Oxford publications, 2009, 5th Ed. 2. J. E. Huheey, E. A. Keiter, R. L. Keiter & O. K. Medhi, <i>Inorganic Chemistry: Principles of Structure & Reactivity</i>, Pearson, 2011, 4th Ed. 3. F. A. Cotton, G. Wilkinson & P. L. Gaus, <i>Basic Inorganic Chemistry</i>, Wiley, 2008 (reprint), 3rd Ed. 4. N.N. Greenwood and A. Earnshaw, <i>Chemistry of the Elements</i>, Pergamon Press, Exetr, Great Britain. 1984. 5. J.D. Lee, <i>Concise Inorganic Chemistry</i>, Wiley, 2008, 5th Ed. 6. A.V. Salker, <i>Environmental Chemistry: Pollution and Remedial Perspective</i>, Narosa Publication, 2017. 7. A.K. De, <i>Environmental Chemistry</i>, New Age, 2006. 8. A.C. Stern, R.W. Boubel, <i>Fundamentals of Air Pollution</i>, D. Bruce turner & D.L.Fox, Academic Press, 1984. 9. R.A. Horne, <i>Chemistry of Our Environment</i>”, John Wiley, N.Y. (1978). 10. C.N. Sawyer & P.J. Macarty, <i>Chemistry for Environmental Engineering</i>, Mc Graw Hill, 1978. 12. L.L. Ciaccio, <i>Water and Water Pollution Hand Book</i>”, Marcel Dekker, 1973. 13. J.C. Lamb, <i>Water Quality and its Control</i>, John Wiley & Sons, N.Y., 1985. 	