

Course Title: DSC: General Inorganic Chemistry, <i>w.e.f. the session 2025-26 and onwards</i>	
Class: Pt.-IV / Semester-VII	Course code: BCH-C701
Lectures: 60	Credits: 04
M.M.: 70	Exam. Hrs.: 3:00

NOTE: The question paper shall consist of Two sections (Sec.-A and Sec.-B). Sec.-A shall contain 10 short answer (about 150 words) type questions of SIX marks each and student shall be required to attempt any five questions. Sec.-B shall contain 08 descriptive type questions of TEN marks each and student shall be required to attempt any four questions. Both sections shall have questions from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Couse contents

COORDINATION CHEMISTRY: Distortion in Complexes, Molecular orbital theory (M.O.T.) as applied to octahedral complexes, π - bonding in octahedral complexes, inert and labile complexes based on various theories, ligand substitution reaction in octahedral and square planar complexes, electron transfer reaction in coordination compounds. **(15 Lectures)**

ELECTRONIC SPECTRA OF COMPLEXES: Term symbols S,P,D,F, in a cubic field; splitting of term for d configuration; spectra of Transition metal complexes, selection rules and intensities of the transitions, nature of Electronic transitions in complexes, Orgel energy level diagram, Tanabe-Sugano diagram. Calculation of Dq , B' and β for Cr III and Ni II complexes. Structural Evidence from Electronic spectra, charge-transfer spectra. **(15 Lectures)**

MAGNETOCHEMISTRY: Contribution of magnetic properties, Effect of the ligand field on spin-orbit coupling, measurement of magnetic properties, methods of magnetic susceptibility determination, temperature dependence of magnetism, application of magnetic data (Ref. book: Drago)

MOLECULAR SYMMETRY: Symmetry elements, Symmetry operations and point groups, Character Tables (C_{2v}) and applications. **(10 Lectures)**

BIOINORGANIC CHEMISTRY: General introduction to Bio-inorganic Chemistry; occurrence of Inorganic elements in organisms, classification of metallo bio-molecules; Biologically important features and functions of inorganic elements, Biologically important ligands for metal ions, co-ordination by proteins and Enzymatic catalysis.

Role of metal ions and non-metals in Biological systems Na, K, Ca, Mg, Zn, Cl, Si, As, F, I, Se (Giving suitable examples) Biomineralisation. **(10 Lectures)**

OXYGEN CARRIERS: Hemoglobin; non-porphyrin and porphyrin oxygen carriers, synthetic oxygen carriers. Recent trends in Nitrogen fixation, photosynthesis PS- 1 & PS - 11, superoxide Dismutase. **(10 Lectures)**

Suggested Readings:

1. Inorganic Chemistry by: James E. Huheey
2. Text Book of Inorganic chemistry by: Cotton and Wilkinson 5th Edition
3. Physical Methods in Inorganic Chemistry by: R.S.Drago
4. Selected Topics in Inorganic Chemistry by: Malik, Tuli & Madan
5. Bioinorganic and Supramolecular Chemistry by: A.K.Bhagi, G.R.Chatwal

Course Objectives

In this course, students should be able to:

1. To understand the Coordination chemistry and various electronic spectra of complexes
2. To studies in detail about the Knowledge of Magneto chemistry.
3. To understand the aspects of the Molecular symmetry.
4. To studies on Basic concepts of Bio-inorganic chemistry and Oxygen Carriers

Course Outcomes (COs)

On successful completion of the course with industrial chemicals and environment, the student will be able to:

CO:1 Helped students in attaining basic concepts with a balanced knowledge of coordination Chemistry.

CO:2 Created awareness about electronic spectra of coordination compound for better industrial employment.

CO:3 Developed interest among students for chemistry and its application in various measurements and monitoring techniques of Magneto chemistry.

CO:4 Upgrade students' knowledge about basic concepts of molecular symmetry and its applications.

CO:5 Developed and enhanced knowledge about the introduction to Bio-inorganic Chemistry and skills for its Enzymatic catalysis system in human life.

CO:6 Created awareness about the role of metal ions and non-metals in Biological systems.

CO:7 Created the skill in students in Haemoglobin; non-porphyrin and porphyrin oxygen carriers, synthetic oxygen carriers.

CO:8 Created chemical knowledge in Vedic chemistry with nitrogen fixation and photosynthesis

Mapping of course Outcomes (COs) with program outcomes (POs)

Course Outcomes/Program outcomes	1	2	3	4	5	6	7	8
CO:1		X			X			X
CO:2				X				X
CO:3	X		X					
CO:4				X				X
CO:5	X			X				X
CO:6	X		X		X			
CO:7			X				X	
CO:8						X		

Note: put 'X' in relevant column of the mapping