17BSC302T					Chemistry –III					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
4	0	0	4	4	25	50	25	--	--	100

COURSE OBJECTIVES

- **D**etermine the structure and its features of inorganic compounds by hybridisation and VSEPR.
- Comprehend the chemistry of D block elements.
- Understand the colour, magnetism of the inorganic complexes.
- Know the chemistry of lanthanide metal.

UNIT 1 CHEMICAL BOND **16 Hrs.**

The Lewis theory, Sidgwick-Powell theory, Valence Shell Electron Pair Repulsion (VSEPR) Theory, effect of lone pair, effect of eletronegativity, isoelectronic principle, some example using VSEPR Theory, valence bond theory (VBT), hybridization involving s and p orbitals (sp, sp^2, sp^3), Molecular orbital method, examples of molecular orbital treatment for homo nuclear diatomic molecules H_2^+, H_2, He_2^+,He_2, Li_2, Be_2, B_2, C_2, N_2,O_2, O_2^-, O_2^{-2} and F_2.

UNIT 2 CHEMISTRY OF D-BLOCK ELEMENTS **16 Hrs.**

Introduction, position of d-block elements in the periodic table, electronic configurations and definition, classifications of d-block elements in 3d, 4d, 5d and 6d series, physicochemical properties: atomic radii, Ionic radii, metallic character and related properties, atomic volumes and densities, melting and boiling points, Ionization energies, standard reduction potential values, variable oxidation states, colour of transition metal complex ions, magnetic properties of transition metal ions and their complexes, tendency of transition metals to form complex compounds.

UNIT 3 VBT AND CFT OF INORGANIC COMPLEXES **12 Hrs.**

Valence bond theory of complexes, principle and its application to determine structure and magnetic properties of complexes, limitation of VB theory, postulate of CFT, d-orbital splitting of octahedral and tetrahedral complexes in strong and weak field, effect and application of crystal field splitting, magnetic properties of high and low spin complexes, thermodynamic properties of crystal field splitting.

UNIT 4 LANTHANIDES **12 Hrs.**

Electron configuration, oxidation states, magnetic properties, color and absorption spectra of lanthanide ions, lanthanide contraction, separation and purification of lanthanides**:** Ion-exchange and solvent extraction methods.

56 Hrs.

COURSE OUTCOMES

On completion of the course, students will be able to
CO1-Explain the behaviour of the homo nuclear diatomic molecules by molecular orbital theory.
CO2-Determine the structure of the inorganic molecule.
CO3-Analyze the periodic trend of the D block elements.
CO4-Apply the CFT concept to split the d orbital in different crystal field.
CO5-Evaluate the stability trend of the inorganic complexes in several crystal field.
CO6-Understand the physical properties such separation, magnetism, colour of the lanthanides.

TEXT/REFERENCE BOOKS

1. Inorganic Chemistry, FA Cotton, G Wilkinson, John Wiley and Sons, New York.
2. Concise Inorganic Chemistry, 5th Edition, J D Lee,
3. Advanced Inorganic Chemistry Volume I, Satyaprakash, G D Tuli, S K Basu, R D Madan.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100 **Exam Duration:3 Hrs**

Part A/Question: 10 questions of 2 marks each with internal choice	20 Marks
Part B/Question: 8 questions of 10 marks each with internal choice.	80 Marks