DEPARTMENT OF CHEMISTRY

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES) DHANBAD

1st B. Tech. Monsoon Semester – Academic year 2019-2020
Lecture Plan for Chemistry UNIT –III (CYI 101) (1-0-0)

Sl. No	Sub topics	Learning Objectives	Number of Lectures*
1	Crystal Field Theory; d-orbital splitting in Octahedral and tetrahedral ligand field; Jahn-Teller distortion;	Develop understanding about the effect of ligand field on d-orbital energy	2 L
2	Factors influencing magnitude of crystal field splitting; Spectrochemical Series, CFSE, Limitations and Consequence of CFT, Introduction to LFT	Understand the origin of colour, electronic and magnetic properties of compounds	2 L
3	FT-IR spectroscopy vibration modes, Hooke's Law,	Understand the reason behind origin of Infrared spectra	1 L
4	UV-Visible spectroscopy Instrumentation: Source, Dispersion devices, sample area, detectors; types of electronic transitions, selection rules, ground state term symbol, chromophores; effect of conjugation, substituent effects	Understand the reason behind origin of electronic spectra. Able to predict electronic transitions in molecules. Identify electronic transitions	3 L
5	18 and 16 electron rule, M-M bonding,	Understand the origin of 18 electron rule and predict the stability of metal complexes.	1 L
6	bonding modes of CO, activation of metal carbonyls, Catalysis by organometallic compounds: hydroformylation, Ziegler-Natta catalysis,	Develop ability to reason the choice of enzymes and catalysts used in Industry	2 L
5	Miller indices; Miller Indices for Planes,	Understand identification of planes in crystal lattice	1 L
6	Interplanar spacing; defects; semiconducting and superconducting materials.	Understand the role of defects in defining the properties of solids	2 L
Total Hours			**= 14 L**

Books for reference:

1. **Shriver Atkin's Inorganic Chemistry by** P. Atkins, T. Overton, J. Rourke, M. Weller, M. Armstrong, 5th Edn, Oxford University Press, 2009
2. **Inorganic Chemistry** by C.E. Housecroft, A. G. Sharpe, 4th Edn, Pearson Education, 2017
3. **Introduction to Spectroscopy by** PAVIA, LAMPMAN, KRIZ, VYVYAN, Cengage Learning India Private Limited; 5 edition.

-Rohith P. John, Assoc. Prof.

C. Haldar, Asstt. Prof.

*Each lecture is of 50 minutes duration