

**Lesson Plan**

<b>Name of the Faculty:</b>	<b>Dr. Vikas Bhardwaj</b>
<b>Discipline:</b>	<b>B.Tech. (CSE, IT, ELC, MME)</b>
<b>Semester:</b>	<b>1<sup>st</sup> &amp; 2<sup>nd</sup></b>
<b>Subject &amp; Code:</b>	<b>Engineering Chemistry (B24-BSC-104)</b>
<b>Work Load (Lecture) per week (In hours):</b>	<b>Lecture-3</b>

<b>UNIT 1: ATOMIC AND MOLECULAR STRUCTURE</b>		
<b>S. No.</b>	<b>Lecture</b>	<b>Topics</b>
1.	L1.	Molecular orbitals of diatomic molecules
2.	L2.	Equations for atomic and molecular orbitals.
3.	L3.	Energy level diagrams of diatomic molecules (O <sub>2</sub> , N <sub>2</sub> , CO, NO)
4.	L4.	Energy level diagrams of diatomic molecules (CN, HCl, HF), Pi-molecular orbitals of butadiene
5.	L5.	Concept of aromaticity
6.	L6.	Crystal field theory & the energy level diagrams for transition metal ions
7.	L7.	Energy level diagrams of [Co(NH <sub>3</sub> ) <sub>6</sub> ], [Ni(CO) <sub>4</sub> ], [PtCl <sub>2</sub> (NH <sub>3</sub> ) <sub>2</sub> ]
8.	L8.	Magnetic properties of metal complexes
9.	L9.	Band structure of solids
10.	L10.	The role of doping on band structures.
		<b>REVISION/HOME ASSIGNMENT</b>
<b>UNIT II: SPECTROSCOPIC TECHNIQUES AND APPLICATIONS</b>		
11.	L11.	Principles of spectroscopy & selection rules
12.	L12.	Electronic spectroscopy(basic concept).
13.	L13.	Fluorescence and its applications in medicine
14.	L14.	Vibrational spectroscopy and its applications in medicine
15.	L15.	Nuclear magnetic resonance & Magnetic Resonance Imaging
16.	L16.	Surface Characterization Techniques, Diffraction & Scattering

		<b>REVISION/HOME ASSIGNMENT</b>
<b>UNIT 1II: THERMODYNAMICS</b>		
17.	L17.	Thermodynamic functions: energy, entropy and free energy
18.	L18.	Estimations of entropy
19.	L19.	Estimations of free energies
20.	L20.	Free energy and emf, Criteria for feasibility of a process
21.	L21.	Chemical potential
22.	L22.	Clausius-Clapeyron equation and applications
23.	L23.	Numerical problems
<b>UNIT 1II: PHASE EQUILIBRIA</b>		
24.	L24.	Phase rule and derivation of phase rule equation
25.	L25.	Terms involved in phase rule (phase, component, degree of freedom)
26.	L26.	One Component system (Water system)
27.	L27.	Two Component system (Pb-Ag system)
28.	L28.	Applications of phase equilibria
		<b>REVISION/HOME ASSIGNMENT</b>
<b>UNIT IV: CORROSION AND ITS PREVENTION</b>		
29.	L29.	Introduction, Galvanic Cell
30.	L30.	Types of Galvanic Cell (Chemical & Concentration Cell)
31.	L31.	Cell potentials, Nernst equation and its applications
32.	L32.	Types of corrosion (Dry and Wet Corrosion)
33.	L33.	Electrochemical Theory of corrosion
34.	L34.	Bimetallic corrosion, Pitting corrosion, Differential Aeration corrosion, Water-line corrosion
35.	L35.	Stress corrosion, Factors affecting corrosion rate
36.	L36.	Preventive measures of corrosion (design of material, anodic & cathodic protection and protective covering)