

# GDC Memorial College

Bahal (Bhiwani) - 127028

NAAC Accredited Grade "B" (Second Cycle) and Recognized under  
the Sections 2(f) & 12B of the UGC Act, 1956

Affiliated to Ch. Bansi Lal University, Bhiwani

## Lesson Plan- January to April 2026

Name - Dr. SUMAN DEVI

Department - Chemistry

Class - M.Sc

Subject - Inorganic Chemistry-II

Semester - 2nd

Subject Code - 25PN-CHE-201

### Week-1

#### UNIT-1

27.Jan.26 Magnetic Properties of Transition metal complexes-Elementary theory of magneto-chemistry

28.Jan.26 Dia,para,ferro and antiferro magnetism

29.Jan.26 concept of magnetic susceptibility,methods for determination of magnetic susceptibility

### Week-2

2-Feb-26 Curie and Curie-Weiss law for temperature dependence of magnetic susceptibility

3-Feb-26 Temperature independent paramagnetism

4-Feb-26 Calculation of magnetic moments of metal ions Cr<sup>3+</sup>,Co<sup>3+</sup>,Mn<sup>2+</sup> and Fe<sup>2+</sup>

5-Feb-26 Linde factor, $\mu$  and  $\mu_B$

### Week-3

9-Feb-26 Orbital contribution to the magnetic moment,quenching of magnetic moment by crystal field

10-Feb-26 Application of magneto-chemistry in structure determination

11-Feb-26 Magnetic exchange coupling and spin state crossover in coordination compounds

12-Feb-26 Unit Test

### Week-4

#### UNIT-2

16-Feb-26 Spectroscopic ground states,spin orbit coupling in free metal ions for 3d series

17-Feb-26 Ground state terms for transition metals/ions

18-Feb-26 Racah parameter and nephelauxetic effect

19-Feb-26 Orgel diagrams d1-d10 and Tanabe-Sugano diagrams for transition metal complexes(d1&10)

### Week-5

23-Feb-26 Elementary concept of Dq,B and beta parameters

24-Feb-26 Effect of Jahn Teller distortion on electronic spectra of 3d-series metal complexes

25-Feb-26 Charge transfer spectra

26-Feb-26 Electronic spectra of molecular addition compounds of iodine

### Week-6

#### UNIT-3

2-Mar-26 Metal pi complexes-18-electron rule,counting methods and ligand contribution

5-Mar-26 haptoligands with hapticity-2-8

### Week-7

9-Mar-26 Unit test

10-Mar-26 Metal carbonyls-structure and bonding,vibrational spectra of metal carbonyls for bonding

11-Mar-26 structural elucidation,Low nuclearity carbonyl clusters(LNCC)

12-Mar-26 High nuclearity carbonyl clusters(HNCC)having interstitial atoms

### Week-8

16-Mar-26 Electron counting schemes for High nuclearity clusters,polyhedral skeletal electron pair

17-Mar-26	approach/Mingo's rules,important chemical reactions of metal carbonyls
18-Mar-26	Do
19-Mar-26	Preparation,structure,bonding and important reactions of metal nitrosyls
<b>Week-9</b>	
23-Mar-26	Dinitrogen and dioxygen complexes,tertiary phosphine as a ligand
24-Mar-26	<b>UNIT-4</b> STYX code,borane anions
25-Mar-26	Introduction,nomenclature,synthesis and properties of some important members( $B_2H_6$ ,
<b>Week-10</b>	
30-Mar-26	$B_4H_{10}$ , $B_5H_9$ , $B_5H_{11}$ and $B_{10}H_{14}$ ,bonding in boranes
31-Mar-26	Carboranes-Introduction,general methods of preparations and important properties
1-Apr-26	Polyhedral skeletal electron pair theory
2-Apr-26	Metalloboranes and metallocarboranes-Introduction and general methods of preparation
<b>Week-11</b>	
6-Apr-26	properties,isolobal analogy
7-Apr-26	Unit Test
8-Apr-26	Metal carbonyls and halide clusters
9-Apr-26	Introduction,structure and bonding of compounds having M-M bonds
<b>Week-12</b>	
13-Apr-26	Do
14-Apr-26	Calculation of M-M bonds
15-Apr-26	Revision
16-Apr-26	Unit test
<b>Week-13</b>	
20-Apr-26	Problem discussion
21-Apr-26	Problem discussion
22-Apr-26	Revision
23-Apr-26	Revision
<b>Week-14</b>	
27-Apr-26	Revision
28-Apr-26	Revision
29-Apr-26	Revision
30-Apr-26	Revision
	<b>Signature of Faculty</b>

# GDC Memorial College

Bahal (Bhiwani)-127028

NAAC Accredited Grade "B" (Second Cycle) and Recognized under  
the Sections 2(f) & 12B of the UGC Act, 1956

Affiliated to Ch. Bansi Lal University, Bhiwani

## Lesson Plan- January to April, 2026

Name - Dr. Anita

Department - Chemistry

Class - M.Sc Chemistry

Subject - Physical Chemistry

Semester - 2nd

Subject Code - 25PN-CHE-202

Week-1	UNIT-I Statistical Mechanics:
27-01-26	Introduction to Physical Chemistry
28-01-26	Information of statistics
29-01-26	Distribution and probability
Week-2	
02-02-26	Introduction, microstates and macrostates
03-02-26	Thermodynamic probability & most probable distribution for Maxwell Boltzmann stat.
04-02-26	partition function and its significance
05-02-26	Fermi dirac statistics
Week-3	
09-02-26	Bose-Einstein & Fermi Dirac statistics
10-02-26	identification of the constant $\alpha$ and $\beta$
11-02-26	Application of Bose-Einstein statistics for a photon gas
12-02-26	Application of Femi-dirac statistics, Partition function
Week-4	UNIT-II STATISTICAL THERMODYNAMICS
16-02-26	Transistional, rotational, nuclear partition function
17-02-26	sakur and tetrode equation
18-02-26	relation between molar and molecular partition function
19-02-26	multiplication theorem of partition function
Week-5	
23-02-26	Thermodynamic properties in terms of partition function.
24-02-26	Heterogeneous equilibrium
25-02-26	Phase rule, Clausius- Clapeyron Equation
26-02-26	do
Week-6	
02-03-26	Phase diagram for one component system (H <sub>2</sub> O & S)
03-03-26	holiday
04-03-26	holiday
05-03-26	relation between molar and molecular partition function

<b>Week-7</b>	
09-03-26	Question Answer
10-03-26	Take problems from student
11-03-26	Take problems from student
12-03-26	Class Test
<b>Week-8</b>	<b>UNIT-III CHEMICAL DYNAMICS</b>
16-03-26	Effect of temperature on reaction rates
17-03-26	Arrhenius equation
18-03-26	Collision theory of reaction rates
19-03-26	do
<b>Week-9</b>	thermodynamic formulation of activated complex theory
23-03-26	correlation between various theories of reaction rates.
24-03-26	Collision theory
25-03-26	do
<b>Week-10</b>	
30-03-26	Enzymatic reaction: Michaelis – Menton treatment
31-03-26	Michaelis's constant for enzyme – substrate binding by Lineweaver – Burk
01-04-26	plot
02-04-26	Concept of inhibition
<b>Week-11</b>	
06-04-26	Revision
07-04-26	Take problems from student
08-04-26	Take problems from student
09-04-26	<b>UNIT-IV Photochemistry</b>
<b>Week-12</b>	
13-04-26	Laws of photochemistry:
14-04-26	Grothus-Draper law, Stark-Einstein law of photochemical equivalence
15-04-26	Lambert-Beer's law
16-04-26	do
<b>Week-13</b>	
20-04-26	quantum yield, quantum efficiency
21-04-26	reasons for high and low quantum yields, singlet and triplet state
22-04-26	Jablonskii diagram, photophysical processes (radiative and non-radiative)
23-04-26	do
<b>Week-14</b>	
27-04-26	fluorescence, phosphorescence and chemiluminescence
28-04-26	do
29-04-26	Kinetics of photophysical processes and relaxation time,
30-04-26	Kinetics of quenching: Stern Volmer equation
<b>Week-15</b>	
	Revision

# GDC Memorial College

Bahal (Bhiwani) - 127028

NAAC Accredited Grade "B" (Second Cycle) and Recognized under  
the Sections 2(f) & 12B of the UGC Act, 1956

Affiliated to Ch. Bansi Lal University, Bhiwani

## Lesson Plan- January to April 2026

<b>Name- Mr.Krishan</b>		<b>Department-Chemistry</b>
<b>Class- M.Sc (Chemistry)</b>		<b>Subject-Organic Chemistry-II</b>
<b>Semester- 2nd</b>		<b>Subject Code- 25PN-CHE-203</b>
<b>Week-1</b>	<b>UNIT-1</b>	
27-Jan-26	Learning objective and outcome	
28-Jan-26	The arenium ion mechanism, orientation and reactivity,	
29-Jan-26	energy profile diagrams. The ortho/para ratio, ipso attack,	
<b>Week-2</b>		
2-Feb-26	orientation in other ring systems.	
3-Feb-26	Diazonium coupling,	
4-Feb-26	Gattermann-Koch reaction, Vilsmeier-Haack reaction,	
5-Feb-26	Reimer-Tiemann reaction, Fries rearrangement	
<b>Week-3</b>		
9-Feb-26	The ArSN1, ArSN2, Ben ne and SRNI mechanisms.	
10-Feb-26	do	
11-Feb-26	Reactivity — effect of substrate structure, leaving group and attacking nucleophile.	
12-Feb-26	do	
<b>Week-4</b>		
16-Feb-26	do	
17-Feb-26	Thevon Richter and Smiles rearrangements.	
18-Feb-26	do	
19-Feb-26	WRITTEN TEST	
<b>Week-5</b>	<b>UNIT-2</b>	
23-Feb-26	The E1, E2 and E1cB mechanisms. Orientation Effects in Elimination Reactions,	
24-Feb-26	Reactivity —effects of substrate structures, attacking base,	
25-Feb-26	the leaving group and the medium. Saytzeff and Hoffman rules,	
26-Feb-26	Stereochemistry ofE2 elimination reactions and eclipsing effects in E2 eliminations.	
<b>Week-6</b>		
2-Mar-26	Mechanistic and stereochemical aspects of addition reactions involving electrophiles,	
3-Mar-26	biotransformation of non-metallic inorganic compounds	
<b>Week-7</b>		
9-Mar-26	nucleophiles and free radicals, regio— and chemoselectivity,	
10-Mar-26	orientation and reactivity.	
11-Mar-26	Hydrogenation ofdouble and triple bonds,	
12-Mar-26	hydrogenation of aromatic rings.	
<b>Week-8</b>		
16-Mar-26	Hydroboration. Michael reaction.	
17-Mar-26	do	
18-Mar-26	Sharpless asymmetric epoxidation.	

19-Mar-26	do
<b>Week-9</b>	<b>UNIT-3</b>
23-Mar-26	Reactivity of carbonyl compounds towards addition. Addition of Grignard reagents,
24-Mar-26	Organozinc and organolithium reagents to carbonyl and $\alpha$ ,
25-Mar-26	$\beta$ -unsaturated carbonyl compounds,
26-Mar-26	Wittig reaction. Mechanism of metal hydride reduction ( $\text{LiAlH}_4$ and $\text{NaBH}_4$ ) of
<b>Week-10</b>	
30-Mar-26	saturated and unsaturated carbonyl
31-Mar-26	esters and nitriles. Mechanism of condensation reactions
1-Apr-26	enolates — Aldol, Knoevenagel, Claisen,
2-Apr-26	Copper Enzymes — Superoxide dismutase,
<b>Week-11</b>	
6-Apr-26	Claisen, Mannich, Robinson, Reformatsky,
7-Apr-26	do
8-Apr-26	Benzoin, Perkin and Stobbe reactions. Hydrolysis of esters and amides.
9-Apr-26	Class test
<b>Week-12</b>	<b>UNIT-4</b>
13-Apr-26	Classification and general mechanistic treatment of nucleophilic,
14-Apr-26	do
15-Apr-26	Classification and general mechanistic treatment of nucleophilic
16-Apr-26	do
<b>Week-13</b>	
20-Apr-26	free radical and electrophilic rearrangement,
21-Apr-26	Wagner-Meerwein, Pinacol-pinacolone,
22-Apr-26	do
23-Apr-26	Benzil-benzilic acid, Favorskii, Steven,
<b>Week-14</b>	
27-Apr-26	Wittig, Neber, Wolff, Beckmann,
28-Apr-26	do
29-Apr-26	Hoffmann, Curtius, Lossen, Schmidt, Bayer-Villiger.
30-Apr-26	Class Test
Signature of Faculty	

# GDC Memorial College

Bahal (Bhiwani)-127028

NAAC Accredited Grade "B" (Second Cycle) and Recognized under  
the Sections 2(f) & 12B of the UGC Act, 1956  
Affiliated to Ch. Bansi Lal University, Bhiwani

## Lesson Plan- January to April, 2026

Name - Dr. Anita Department - Chemistry

Class - M.Sc Chemistry Subject - Spectroscopy

Semester - 2nd Subject Code - 25PN-CHE-204

Week-2	UNIT-1
28-01-26	UV Spectroscopy Introduction
29-01-26	Ultraviolet (UV) absorption spectroscopy-absorption laws (Beer-Lambert law)
30-01-26	Molar absorptivity, presentation and analysis of UV spectra
31-01-26	Types of electronic transitions and effect of conjugation,
Week-3	
04-02-26	Concept of chromophore and auxochrome
05-02-26	Bathochm, hypochromic, hyperchromic and hypsochromic shifts
06-02-26	UV spectra of conjugated enes and enones.
07-02-26	Application of UV-VIS
Week-4	
11-02-26	Introduction to IR Spectroscopy
12-02-26	Infra Red (IR) absorption spectroscopy- molecular vibrations
13-02-26	Hook's Law, selection rules in IR Measurement of IR spectrum, fingerprint region
14-02-26	Measurement of IR spectrum, fingerprint region and interpretation
Week-5	
18-02-26	Absorptions of various functional groups
19-02-26	Applications of IR Spectroscopy
20-02-26	Intensity and position of IR bands
21-02-26	IR Spectroscopy of carboxylic group, aldehydes, ethers, nitriles
Week-6	
25-02-26	IR Spectroscopy of aldehydes
26-02-26	IR Spectroscopy of ketones and ethers
27-02-26	IR Spectroscopy of amines and nitriles
28-02-26	Explanation of PMR spectrum, number of signals, peak areas etc.
Week-8	UNIT-II
04-03-26	NMR Spectroscopy-I General introduction
05-03-26	Explanation of proton counting in NMR
06-03-26	Magnetic equivalence of protons.

07-03-26	Principle of nuclear magnetic resonance
<b>Week-9</b>	
11-03-26	Explanation of PMR spectrum, number of signals, peak areas etc.
12-03-26	Equivalent and non-equivalent protons,
13-03-26	Positions of signals and chemical shift,
14-03-26	Shielding and deshielding of protons,
<b>Week-10</b>	
18-03-26	NMR absorptions of organic compounds
19-03-26	alkanes, alkenes, aromatic compounds
20-03-26	alkynes, alkyl halides, alcohol, ethers, amines
<b>Week-11</b>	
25-03-26	nitriles, aldehydes, ketones, esters, carboxylic acids
26-03-26	amides, nitroalkanes
27-03-26	Discussion on simplification techniques - deuterium exchange
28-03-26	spin decoupling methods, double resonance and NOE difference spectra.
<b>Week-12</b>	<b>UNIT-3</b>
01-04-26	Mass Spectrometry: Introduction
02-04-26	ion production - EI, CI, FD and FAB
03-04-26	factor affecting fragmentation
04-04-26	on analysis, ion abundance. Mass spectral fragmentation of organic compounds
<b>Week-13</b>	
08-04-26	common functional groups, molecular ion peak, metastable peak
09-04-26	Nitrogen rule, molecular weight determination molecular formula from isotopic ratio data
10-04-26	isotope profile of halogen compounds, factors affecting reaction pathways
11-04-26	pattern-simple cleavage, retro-Diels Alder
<b>Week-14</b>	
15-04-26	Hydrogen transfer rearrangement like scrambling, ortho effect
16-04-26	McLafferty rearrangement, fragmentation patterns of hydrocarbons
17-04-26	alcohols, phenols, ethers, aldehydes, ketones
18-04-26	esters, carboxylic acids, amines, nitro, amides
<b>Week-15</b>	<b>UNIT-4</b>
22-04-26	Heteronuclear Coupling: General considerations,
23-04-26	chemical shift and its calculation,
24-04-26	proton-coupled and decoupled carbon-13 spectra
25-04-26	heteronuclear coupling of carbon to deuterium, fluorine and phosphorus.
<b>Week-16</b>	
29-04-26	nuclear Overhauser enhancement & cross-polarization
30-04-26	problems within integration, molecular relaxation process
	Revision