LESSON PLAN (2024-25)

Name of Assistant Professor : Dr. Satish Kumar

Sem. : 1st

Subject : M.Sc. Chemistry

Weeks	Date	Organic Spectroscopy
1st	22 July - 27 July	Introduction, ion production - EI, Cl, FD and FAB, factors affecting fragmentation
2nd	29 July- 03 Aug	Ion analysis, Ion abundance, mass spectral fragmentation of organic compounds, Common functional groups
3rd	05 Aug- 10 Aug	Molecular ion peak, Metastable peak, Nitrogen rule, Molecular weight determination, Molecular formula from isotopic ratio data.
4th	12 Aug - 17 Aug	Isotope profile of halogen compounds, factors affecting reaction pathways,
5th	19 Aug- 24 Aug	Fragmentation pattern - simple cleavage, retro Diels Alder, Hydrogen transfer rearrangement like scrambling, ortho effect
6th	26 Aug- 31 Aug	McLafferty rearrangement, Fragmentation of Hydrocarbons, Alcohols, Phenols, ethers, Aldehydes
7th	02 Sep - 07 Sep	Ketones, esters, carboxylic acids, amines, nitro, amides, nitriles
8th	09 Sep - 14 Sep	Revision of Mass spectrometry
9th	16 sep- 21 sep	Assisgnment and Unit tests
10th	24 sep- 28 sep	Carbon 13 nucleus, chemical shifts and its calculation
11th	30 sep- 05 oct	Proton coupled and decoupled C-13 Spectra. NOE
12th	07 oct - 12 oct	Cross polarisation, probems with intergration
13th	14 oct -19 oct	Molecular relaxation process, off resonance decoupling
14th	21 oct - 26 oct	Distortionless enhancement by polarization transfer,
15th	28 oct -02 nov	Diwali Break
16th	04 nov- 09 nov	Heteronuclear coupling of CARBON to deuterium, flourine and phosphorus
17th	11 nov - 16 nov	IR, NMR, UV and conjoint IR-UV/VIS-NMR - MASS spectrometry problems
18th	18 nov- 23 nov	IR, NMR, UV and conjoint IR-UV/VIS-NMR - MASS spectrometry problems
19th	25 nov - 30 nov	Revision

Name of Assistant Professor : Ravi Kant

Sem. : 1st

Subject		**: Chemistry**
Weeks	Date	Topics
1st	22 July - 27 July	Stereochemistry-I : Introduction to molecular symmetry and chirality
2nd	29 July- 03 Aug	D-L, R-S, E-Z and threo-erythro nomenclature
3rd	05 Aug- 10 Aug	Interconversion of Fischer, Newman and Sawhorse and flying wedge formulae
4th	12 Aug - 17 Aug	Conformational analysis
5th	19 Aug- 24 Aug	eneatiomerism and diastereomerism of simple acyclic, cyclic system (Chair and boat configuration)
6th	26 Aug- 31 Aug	fused and bridged bicyclic systems (decalins) and sugars
7th	02 Sep - 07 Sep	Conformation and reactivity with examples, optical activity in the absence of chiral carbon (biphenyls)
8th	09 Sep - 14 Sep	Allenes, ansa compounds, cyclophanes, hemispiranes and spiranes
9th	16 sep- 21 sep	Stereochemistry of the compounds containing Nitrogen, sulphur and phosphorous
10th	24 sep- 28 sep	Doubt Class and Unit test
11th	30 sep- 05 oct	Stereochemistry-II : Topicity of ligands and faces, their nomenclature and prostereoisomerism
12th	07 oct - 12 oct	Stereogenicity, chirogenicity, pseudoasymmetry and prochiral centre
13th	14 oct -19 oct	Stereospecific and stereoselective reaction, Asymmetric synthesis
14th	21 oct - 26 oct	Asymmetric synthesis : Enantiomeric excess, % enantioselectivity, optical purity.
15th	28 oct -02 nov	Diwali Break
16th	04 nov- 09 nov	Asymmetric synthesis : % diastereomeric excess and % diastereoselectivity
17th	11 nov - 16 nov	Asymmetric synthesis: Basic principle, auxiliary, substrate, reagent and catalyst controlled
18th	18 nov- 23 nov	Submission of Assignments by Students
19th	25 nov - 30 nov	Revision

Name of Assistant Professor	**: Dr. Anuj**	
Class	**: M.Sc. Chemistry**	
Sem.	**: 1st**	
Subject	**: Physical Chemistry**	
Month	Week	**Topic**
	Week 1	**Unit III :- Chemical Dynamics** Brief description of integrated rate laws of zero and first order

Sept	Week 2	Brief description of integrated rate laws of second order and graphical representation
	Week 3	Lindemann Hinshewood treatment for unimolecular gas; rate law for opposing reaction
	Week 4	Rate law for opposing reactions; parallel reaction
Oct	Week 1	Rate law for consecutive reactions
	Week 2	Chain reactions
	Week 3	Chain reactions, chain length, apparent activation energy
	Week 4	**Diwali Vacation**
Nov	Week 1	**UNIT-IV** Ion - Ion Interactions: The Debye-Huckel theory of ion- ion interactions, ionic cloud, Poisson's equation, excess charge density, Linearization of Boltzmann equation
	Week 2	Linearized Poison Boltzmann equation and its solution, excess charge density and potential as a function of distance from central ion, Debye Huckel reciprocal length ionic cloud and its contribution to the total potential
		Debye-Huckel limiting law of activity coefficients, its physical significance and its limitations, ion-size effect on potential, ion-size parameter and the theoretical mean - activity coefficient in the case of ionic clouds with finite - sized ions.
	Week 4	Debye - Huckel -Onsager treatment for aqueous and non aqueous solutions and its limitations. Debye-Falkenhagen effect, Wein effect.

LESSON PLAN (2024-25)

Name of Assistant Professor : Anil kumar

Class : M.Sc.

Sem. : 1st

Subject : Chemistry

Weeks	Date	Topics
1st	22 July - 27 July	NMR:- introduction , nuclear spin stattes , nuclear magenetic moments, resosnace,population denesities.
2nd	29 July- 03 Aug	chemical shift and shielding meachinism, chemical equivalence , integral and integarion,, chemical environments and chemical shift,local diamagentic ,shielding.

3rd	05 Aug- 10 Aug	magnetic anisotropy , spin -spin splitting , pascal triangle , comparision of spectra at low and high fields strength , spin spin coupling,role of maganetic equalennce,
4th	12 Aug - 17 Aug	concept of non equilaqnce with in a group,measuring coupling constants from first order and second order spectra,coupling in aromatic and hetroaromatic system ,
5th	19 Aug- 24 Aug	spectra of homotopic ,enantiotopic and diasteriotopic system,NMR absorption of organic compounds :- alakane, alakene, aromatic compounds,alkyne,alkylhalides, alcohols,
6th	26 Aug- 31 Aug	ethers amines , nitrile aldehyded , ketones, esters, carboxlic acid, amide, nitroalkanees. Discussion on simplication tec- deteruium excahnge ,
7th	02 Sep - 07 Sep	chemical shifts regents, chiral resolving agents, spin decoupling methodes, double resonance and NOE spectra.
8th	09 Sep - 14 Sep	Revision and Doubt sessions. Unit Test For Assessment
9th	16 sep- 21 sep	carbon NMR:- carbon 13 nucleus, chemical shift, and its calculation, proton coupled and decoupled car-13, nuclear overhauser , enhancement , cross, polarization,
10th	24 sep- 28 sep	problem with integation , molecular relaxation process , off resonance , decoupling , distorionless enhancement by polarization transfer,
11th	30 sep- 05 oct	hetro nuclear coupling of carbon to deuterium , flourine and P
12th	07 oct - 12 oct	IR soectra:- principal , units of frequency, wavelength and wavenumber ,
13th	14 oct -19 oct	molecular vib, factor influncing vibrational freq
14th	21 oct - 26 oct	instrumentation:- dispersive and interferometric ,
15th	28 oct -02 nov	Diwali Break
16th	04 nov- 09 nov	sample techique, application of IR, identity by fingerprinting and functional groups
17th	11 nov - 16 nov	quantative Ir analysis , attenuated total reflectance and m,ultiple internal reflectance
18th	18 nov- 23 nov	Submission of Assignments by Students
19th	25 nov - 30 nov	Revision

LESSON PLAN (2024-25)

Name of Assistant Professor : Usha

Subject : Chemistry

Lecture Time : 09:00 to 10:00AM

Weeks	Date	Topics
1st	08-Aug	Unit :3 - CFT and its limitations
2nd	14-Aug	Crystal field effects: d- orbital splitting in Oh, Sq. planar complexes

3rd	21-22 aug	d- orbital splitting in sq. pyramidal and trigonal bipyramidal complexes
4th	28-29 aug	JT distortion
5th	04-05 sept	MOT of sigma bonding
6th	11-12sept	MOT for pi - bonding
7th	18-19 sept	MOT for pi- bonding
8th	25-26 sept	Unit : 2 - Inert and labile complexes
9th	03-Oct	Kinetic applications of VBT and CFT
10th	09-10 oct	Class Test ans assignment submission
11th	16-17oct	kinetics of Oh substitution
12th	23-24 oct	acid hydrolysis and base hydrolysis
13th	27oct- 03 nov	**Diwali Holidays**
14th	06-07 nov	conjugate base mechanism , anation reaction
15th	13-14nov	racemization of tris chelate complexes
16th	20-21 nov	reaction without metal ligand bond cleavage

LESSON PLAN 2nd Semester

Name of Assistant Professor : Dr. Satish Kumar

Subject : Organic Chemistry II

Weeks	Date	Topics
1	13 Jan- 18 Jan	Arenium ion mechanism, orientation and reactivity, Energy profile diagram
2	20 Jan - 25 Jan	The ortho/para ratio, ipso attack, oreintattion in other ring system, Diazonium coupling
3	27 Jan - 01 Feb	Gattermann Koch Reaction, Vilsmeiert Haack reaction, Riemer Tiemann reaction, Fries rearrangement
4	03 Feb - 08 Feb	Aromatic nucleophilic substitution, Benzyne and SRN1 Mechanism, effect of substrate structure
5	10 Feb - 15 Feb	leaving group and attacking nucleophile, Thevon Richter and smiles reaarangement.
6	17 Feb - 22 Feb	E1 and E2 and E1CB mechanism, Orientation effect in eleimination effect
7	24 Feb - 28 Feb	Reactivity and effect of substrate structure, attacking base, leaving group and the medium
8	03 March -08 March	Saytzeff and Hoffmann rules, Streochemistry of E2 reaction. And eclipsing effect in E2 Elimination
9	10 March - 15 March	**Holi Break**
10	17 March-22 March	**Submission of Assignment by students** **Unit Test for Assessment**

11	24 March- 29 March	Mechanistic and streochemical aspects of addition reaction involving electrophile, Nucleophile and free radical
12	31 March - 05 April	Regio and chemioselectivity orientation and reactivity.
13	07 April -12 April	Hydrogenation of double and triple bonds
14	14 April - 20 April	Hydrogenation of aromatic rings
15	21 April - 27 April	Hydroboration, Michael reaction, sharpless assymetric epoxidation.

LESSON PLAN

Name of Assistant Professor : Usha
Subject : Chemistry
Lecture Timing : 09:00 to 10:00AM

Weeks	Date	Topics
1st(Unit-2)	15-16 jan	Electronic arrangements of microstates, calculation of number of microstates
2nd	22-23 jan	spectroscopic term symbol, determination of ground state term symbol- Hunds rule
3rd	29-30jan	correlation and spin orbital coupling in free ions of 1st transition series
4th	05-06 feb	Orgel and T-S diagram
5th	13-Feb	Calculation of CFSC, Racah parameter and nephelaunxetic ratio
6th	19-20 feb	Structural evidence of electronic spectrum, spectrochemical series and nephelauxetic series
7th	27-Feb	charge transfer spectra, anomalous magnetic moment
8th	05-06 march	magnetic exchange coupling and cross over, Unit Test and assignment submission
9th	09-16 march	Holi Break
10th(4th)	19-20 march	Structure and bonding in metal carbonyl clusters
11th	26-27 march	corundum, pervoskite, limenite, calcite
12th	02-03 april	higher boranes , carboranes and metalloboranes
13th	09-10 april	metalloc arboranes and halide clusters, normal and inverse spinels
14th	23-24 april	fluorite, antifluorite,rutile, antirutile, crystobalite
15th	30-Apr	layer lattices: CdI2, BiI3, ReO3, M2O3,

LESSON PLAN

Name of Assistant Professor : Sandeep
Subject : Chemistry
Sem. : 2

Weeks	Date	Topics

1st	20 Jan- 25 Jan	Thermodynamics: Third law of thermodynamics, Nernst he at theorem, concept of absolute entropy.
2nd	27 Jan - 01 Feb	Heterogeneous equilibrium, Phase rule,
3rd	03 Feb - 08 Feb	Clausius- Clapeyron Equation,
4th	10 Feb - 15 Feb	Phase diagram for one component
5th	17 Feb - 22 Feb	system (H>0 & S), two completely miscible components,
6th	24 Feb - 28 Feb	two components system with congruent and incongruent melting point,
7th	03 March -08 Marc	Calculation of eutectic point
8th	10 March - 15March	**Holi Break**
9th	17 March-22 March	**Submission of Assignment by students** **Unit Test for Assessment**
10th	24 March- 29 March	Chemical Dynamics: Effect of temperature on reaction rates , Arrhenius equation,
11th	31 March - 05 April	**collision theory of reaction rates**
12th	17 March-22 March	**thermodynamic formulation of activated compellex theory**
13th	07 April -12 April	correlation between various theories of reaction rate
14th	14 April - 19 April	Enzymatic reaction: Michaelis - Menton treatment, evaluation of Michaelis's constant for e nzyme - substrate
15th	21 April - 26 April	binding by Lineweaver - Burk plot, Concept of inhibition

LESSON PLAN

Name of Assistant Professor : Ravi Kant

Subject : Organic Chemistry II

Weeks	Date	Topics
1	13 Jan- 18 Jan	Reactivity of carbonyl compounds towards additio. Addition of grignard reagent
2	20 Jan - 25 Jan	Organozinc and organolithium reagents to carbonyl and unsaturated carbonyl compounds
3	27 Jan - 01 Feb	Witting reaction, Mechanism of metal hydride reduction of saturated and unsaturated carbonyl compounds
4	03 Feb - 08 Feb	Acids, esters and nitriles. Mechanism of condensation reactions involving enolates like Aldol, Knoevengal
5	10 Feb - 15 Feb	Claisen, Mannich, Robinson, Reformatsky, Benzoin
6	17 Feb - 22 Feb	Perkin and stobbe reactions. Hydrolysis of esters and amides

7	24 Feb - 28 Feb	Classification and general mechanistic treatment of nucleophilic, free radical reaarangement
8	03 March -08 March	Classification and general mechanistic treatment of Electrophilic rearrangement. Wagner Meerwein reaction
9	10 March - 15 March	**Holi Break**
10	17 March-22 March	**Submission of Assignment by students** **Unit Test for Assessment**
11	24 March- 29 March	Pinacol Pinacolone, Benzil - benzilic acid,
12	31 March - 05 April	Favorskii, Steven and Wittig reaction
13	07 April -12 April	Neber, Wolf, Hoffmann
14	14 April - 20 April	Curtius, Lossen, Schmidt and Bayer -Villiger Reaction
15	21 April - 27 April	Revision