Lesson Plan

Name of College: GCW Lakhan Majra, Rohtak
Academic Session:2024- 25 Semester: Odd
NameofAsstt./Ass.Prof: Anita Amani
Class: B.Sc.1st sem(SEC)
Name of Subject: Chemistry

22nd–27th July	**Analysis of soil: Composition of soil**
28th July	**SUNDAY**
29th-03rd August	Concept of pH and pH measurement of soil
04th August	**SUNDAY**
5th-10th August	Complexometric titrations, Chelation, Chelating agents, use of indicators
11th August	**SUNDAY**
12th-17th August	Estimation of Calcium and Magnesium ions in soil.
18th August	**SUNDAY**
19th-24th August	Analysis of water: Definition of pure water, sources responsible for contaminating water, water sampling methods.
25th August	**SUNDAY**
26th–31st August	water purification methods. Determination dissolved oxygen of a water sample.
1st September	**SUNDAY**
2nd -7th September	A general study including preparation and uses of the Hair dye, soap, shampoo.
08th September	**SUNDAY**
9th-14th September	Preparation and uses of the suntan lotions, face powder, lipsticks, talcum powder, nail enamel.
15th September	**SUNDAY**
16th-21st September	General introduction to pesticides (natural and synthetic), benefits and adverse effects
22nd September	**SUNDAY**
23th-28th September	Changing concepts of pesticides, brief introduction of structure activity relationship
29th September	**SUNDAY**
30th Sep -05th October	Synthesis and technical manufacture and uses of representative pesticides in the Organochlorines (Gammexene,); Organophosphates (Malathion).
06th October	**SUNDAY**
07th-12th October	Basic principle of pH metric, potentiometric and conductometric titrations
13th October	**SUNDAY**
14th-19th October	Applications of conductivity measurements: determination of degree of dissociation
20th October	**SUNDAY**
21st–26th October	Determination of Ka of acids and base, Buffer solution, Buffer action,
27th October	**SUNDAY**
4th –9th November	Henderson – Hazel equation, Buffer mechanism of buffer action.
10th November	**SUNDAY**
11th -16th November	Revision and test
17th November	**SUNDAY**
18th November onwards till Exams.	Test discussion

LESSONPLAN-B.Sc5thSEMESTER
Session:2024-25

Name of teacher-Anita Amani

Subject-Inorganic Chemistry

CLASS	WEEKS	SYLLABUS
B.Sc 5th Semester	22-7-2024to27-7-2024	Metal-ligand Bonding in Transition Metal Complexes Limitations of valence bond theory,
	29-7-2024to3-8-2024	An elementary idea of crystal-field theory, crystal field splitting in octahedral
	5-8-2024to10-8-2024	Crystal field split tetrahedral and square planar complexes,
	12-8-2024to17-8-2024	Factors affecting the crystal-field parameters
	20-8-2024t24-8-2024	Thermodynamic and Kinetic Aspects of Metal Complex
	27-8-2024to31-8-2024	A brief outline of thermodynamic stability of metal complexes and factors affecting the stability,
	2-9-2024to7-9-2024	Substitution reactions of square planar complexes of Pt(II)
	9-9-2024to14-9-2024	Magnetic Properties of Transition Metal Complex Types of magnetic behaviour
	16-9-2024to21-9-2024	Methods of determining magnetic susceptibility ,spin-only formula.
	23-9-2024to28-9-2024	L-S coupling, correlation of s and f values, orbital contribution to magnetic moments ,application of magnetic moment data for 3dmetal complexes.
	30-9-2024to5-10-2024	Electron Spectra of Transition Metal Complexes Types of electronic transitions,
	7-10-2024to12-10-2024	Selection rules ford-d transitions ,spectroscopic ground states, spectrochemical series.
	14-10-2024to19-10-2024	Orgel-energy level diagram ford1 and d9 states,

	21-10-2024to26-10-2024	Discussion of the electronic spectrum of[Ti(H2O)6]3+ complex ion
	4-11-2024to9-11-2024	Revision of Electron Spectra, Doubts
	11-11-2024to20-11-2024	Assignments, Viva, Test, Revision
	23-11-2024to20-12-2024	MDU examination
	21-12-2024to31-12-2024	Winter break

Session: 2024-25 **Semester V**

Lesson Plan for UG Classes B.Sc 3rd Year

Assistant Professor: Dr. Naveen **Subject: Physical Chemistry**

Paper Code: CH-502 **Marks: 29+7**

Month	WEEKS	SYLLABUS
July	**4thWeek**	Quantum Mechanic s-Black-body radiation, Plank's radiation law, photoelectric effect
	5th Week	Heat capacity of solids, Compton effect, wave function and its significance of Postulates of quantum mechanics ,.
August	**1st Week**	Quantum mechanical operator, commutation relations, Hamiltonian operator, Hermitian operator, average value of square of Hermitian as a positive quantity,
	2nd Week	Role of operators in quantum mechanics, To show quantum mechanically that position and momentum cannot be predicated simultaneously,
	3rd Week	Determination of wave function & energy of a particle in one dimensional box, Pictorial representation and its significance
	4th Week	Physical Properties and Molecular Structure Optical activity, polarization – (clausius – Mossotti equation). Orientation of dipoles in an electric field, dipole moment,
September	**1st Week**	Measurement of dipole moment-temperature method and refractivity method, dipole moment and
	2nd Week	Structure of molecules, Magnetic permeability, magnetic susceptibility and its determination. Application of magnetic susceptibility, magnetic properties – Para magnetism, diamagnetism and ferromagnetic.
	3rd Week	Spectroscopy-I Introduction: Electromagnetic radiation, regions of spectrum, basic features of spectroscopy, statement of Born Oppenheimer approximation, Degrees of freedom..
	4th Week	Rotational Spectrum Diatomic molecules. Energy levels of rigid rotator (semi-classical principles), selection rules,
October	**1st Week**	Spectral intensity distribution using population distribution (Maxwell-Boltzmann distribution), determination of bond length, qualitative description of non-rigid rotor, isotope effect.
	2nd Week	Vibrational spectrum Infrared spectrum: Energy levels of simple harmonic oscillator,
	3rd Week	Selection rules, pure vibrational spectrum, intensity, determination of force constant and qualitative relation of force constant and bond energies,
	4th Week	Effects of anharmonic motion and isotopic effect on the spectra., idea of vibrational frequencies of different functional groups.
November	**1st Week**	Raman Spectrum: Concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selectin rules, Quantum theory of Raman spectra
	2nd Week	Assignments, Test, Revision
	3rd Week	Test, Revision
	25/11/2024 - 20/12/2024	Theory examination
	21/12/2024- 31/12/2024	Winter break

Session: 2024-25 **Semester V**

Lesson Plan for UG Classes B.Sc 3rd Year

Assistant Professor: Dr. Naveen **Subject: Organic Chemistry**
Paper Code: CH-503 **Marks: 30+8**

MONTH	WEEKS	SYLLABUS
July	4th Week	NMR Spectroscopy-I Principle of nuclear magnetic resonance, the PMR spectrum,number of signals, peak areas,
	5th Week	Equivalent and nonequivalent protons positions of signals and chemical shift, shielding and deshielding of protons,
August	1st Week	Proton counting, splitting of signals and coupling constants, magnetic equivalence of protons
	2nd Week	NMR Spectroscopy-II Discuss ion of PMR spectra of the molecules: ethyl bromide, n-propyl bromide, isopropyl bromide,
	3rd Week	1,1-dibromoethane, 1,1,2-tribromoethane, ethanol, acetaldehyde, ethyl acetate, toluene,
	4th Week	benzaldehyde and acetophenone. Simple problems on PMR spectroscopy for structure determination of organic compounds
September	1st Week	Carbohydrates-I Classification and nomenclature. Monosaccharides, mechanism of osazone formation, interconversion of glucose and fructose, chain lengthening and chain shortening of aldoses.
	2nd Week	Configuration of monosaccharides. Erythro and threo diastereomers. Conversion of glucose in to mannose. Formation of glycosides, ethers and esters
	3rd Week	Determination of ring size of glucose and fructose. Open chain and cyclic structure of D (+)-glucose & D (-) fructose.
	4th Week	Mechanism of mutarotation. Structures of ribose and deoxyribose
October	1st Week	Carbohydrates-II An introduction to disaccharides (maltose, sucrose and lactose) and.
	2nd Week	Polysaccharides (starch and cellulose) without involving structure determination
	3rd Week	Organometallic Compounds, Organmagnesium compounds: the Grignard reagents-formation, structure and chemical reactions.
	4th Week	Organozinc compounds: formation and chemical reactions.
November	1st Week	Organolithium compounds: formation and chemical reactions.
	2nd Week	Assignments, Test, Revision
	3rd Week	Test, Revision
	25/11/2024 – 20/12/2024	Theory examination
	21/12/2024 – 31/12/2024	Winter break

LESSON PLAN

TEACHER: Dr. Heena

DEPARTMENT: Department of Chemistry

SESSION: 2024-2025 **CLASS**: B.Sc. Life Sciences/Physical Sciences **SEMESTER**: I

WEEK	TOPICS TO BE COVERED
WEEK 1 **22/07/2024 – 27/07/2024**	Electronic displacements and its applications
WEEK 2 **29/07/2024 – 03/08/2024**	Reaction intermediates
WEEK 3 **05/08/2024 – 10/08/2024**	Aromaticity
WEEK 4 **12/08/2024 – 17/08/2024**	Isomerism
WEEK 5 **19/08/2024 – 24/08/2024**	Optical Isomerism, optical activity, symmetry elements, chirality
WEEK 6 **26/08/2024 – 31/08/2024**	Enantiomers, stereogenic centre, two stereocentres, diastereomers
WEEK 7 **02/09/2024 – 07/09/2024**	Threo-erythro diastereomers, meso compounds, resolution, inversion, retention, racemization
WEEK 8 **09/09/2024 – 14/09/2024**	Relative and absolute configurations, sequence rules, R and S nomenclature.
WEEK 9 **16/09/2024 – 21/09/2024**	Maxwell velocity and energy distribution, RMS, average, most probable velocity calculation.
WEEK 10 **23/09/2024 – 28/09/2024**	Collision diameter, number, frequency and mean free path. Real gas deviation, van der Waals equation of states
WEEK 11 **30/09/2024 – 05/10/2024**	Boyle's temperature, compression factor, behaviour of real gases.
WEEK 12 **07/10/2024 – 12/10/2024**	Critical temperature, pressure, volume determination. PV isotherms of real gases
WEEK 13 **14/10/2024 – 19/10/2024**	Continuity of states, van der Waal isotherms, relations of critical and van der Waal constants
WEEK 14 **21/10/2024 – 26/10/2024**	Compressibility factor, law of corresponding states.
WEEK 15 **28/10/2024 – 02/11/2024**	Diwali break
WEEK 16 **04/11/2024 – 09/11/2024**	Revision and tests
WEEK 17 **11/11/2024 – 16/11/2024**	Revision and tests
WEEK 18 **18/11/2024 – 23/11/2024**	Revision and tests
25/11/2024 – 20/12/2024	Theory examination
21/12/2024 – 31/12/2024	Winter break

LESSON PLAN

TEACHER: Dr. Heena

DEPARTMENT: Department of Chemistry

SESSION: 2024-2025 **CLASS**: B.Sc. **SEMESTER**: III **Paper**: CH-301,302

WEEK	TOPICS TO BE COVERED
WEEK 1 22/07/2024 – 27/07/2024	Thermodynamic terms, system types, extensive-intensive properties
WEEK 2 29/07/2024 – 03/08/2024	State and path functions, thermodynamic process, concept of heat and work, zeroth law of thermodynamics
WEEK 3 05/08/2024 – 10/08/2024	First law of thermodynamics, internal energy, enthalpy, heat capacity, heat capacities at constant volume and pressure
WEEK 4 12/08/2024 – 17/08/2024	Relation between C_p and C_v, Joule's law, Joule's coefficient, inversion temperature
WEEK 5 19/08/2024 – 24/08/2024	W, q, dU, dH calculation for ideal gas under isothermal, adiabatic conditions for reversible process.Enthalpy Temp. dependance
WEEK 6 26/08/2024 – 31/08/2024	Kirchoff's equation, bond energies and applications.
WEEK 7 02/09/2024 – 07/09/2024	Equilibrium constant, G, chemical potential, law of eq. derivation
WEEK 8 09/09/2024 – 14/09/2024	K dependance on temperature, reaction isochore, isotherm, Le-Chatelier's principle and applications
WEEK 9 16/09/2024 – 21/09/2024	Clausius Clapeyron equation and applications, Distribution law derivation, modifications of law
WEEK 10 23/09/2024 – 28/09/2024	Applications of distribution law, Werner's coordination theory, EAN concept.
WEEK 11 30/09/2024 – 05/10/2024	Chelates, Nomenclature, Isomerism,VBT of transition metal complexes
WEEK 12 07/10/2024 – 12/10/2024	Physical properties of a solvent
WEEK 13 14/10/2024 – 19/10/2024	Types of solvent and characteristics
WEEK 14 21/10/2024 – 26/10/2024	Reactions in liquid ammonia and sulphur dioxide
WEEK 15 28/10/2024 – 02/11/2024	Diwali break
WEEK 16 04/11/2024 – 09/11/2024	Revision and tests
WEEK 17 11/11/2024 – 16/11/2024	Revision and tests
WEEK 18 18/11/2024 – 23/11/2024	Revision and tests
25/11/2024 – 20/12/2024	Theory examination
21/12/2024 – 31/12/2024	Winter break

Session 2024-25 Semester I (Odd)

Lesson Plan for Arts/ Physical Sciences/ Life Sciences/ Commerce

Name of Program:UG Multi/ Interdisciplinary Program in Chemistry

Name of Course: Discipline Specific Course/ Major Course (DSC)

Nomenclature of Course: General Chemistry-I

Course Code: 24CHES401DS01

Credits (L+T+P): 2:0:0 **Marks: 35+15=50**

MONTH	WEEK	SYLLABUS
July	4th week	Atomic Structure and Periodicity of Elements
	5th week	Bohr's atomic model and its applications
August	1st week	quantum numbers, their application and rules of electronic configuration,
	2nd week	effective nuclear charge,
	3rd week	shielding or screening effect, slater rules,
	4th week	variation of effective nuclear charge in periodic table.
	5th week	Periodic trends in atomic radii,
September	1st week	ionic radii and its calculation,
	2nd week	covalent radii, electronegativity,
	3rd week	electron gain enthalpy,.
	4th week	ionization enthalpy and factors affecting ionization energy
	5th week	. Pauling, Mullikan and Allred Rachow scales
October	1st week	Ionic Solids: Ionic bond and its characteristics and factors affecting, types of Bravais lattice, voids
	2nd week	, packing in solids, determination of radius ratio of all voids, radius ratio rule and its limitations.
	3rd week	Packing of ions in crystals, calculation of density and crystal structures of ionic solids (NaCl, CsCl, ZnS, CaF2, Na2O),
	4th week	defect structures in crystal. Born-Landé equation with derivation, expression for lattice energy,
November	2nd week	Madelung constant, Born-Haber cycle and its application with examples, solvation energy.
	3rd week	Semiconductors, types of semiconductors, valence bond and band theories (alloys excluded).
	4th week	Test and Revision

Session 2024-25 Semester III (Odd)

Lesson Plan for Arts/ Physical Sciences/ Life Sciences/ Commerce

Name of Program:UG Multi/ Interdisciplinary Program in Chemistry

Name of Course: Discipline Specific Course/ Major Course (DSC)

Nomenclature of Course: Organic Chemistry-3

MONTH	WEEK	SYLLABUS
July	4th week	1.Alcohols Monohydric alcohols nomenclature, methods of formation by reduction of aldehydes, ketones, carboxylic acids and esters.
	5th week	Hydrogen bonding. Acidic nature. Reactions of alcohols. Dihydric alcohols — nomenclature, methods of formation,
August	1st week	chemical reactions of vicinal glycols, oxidative cleavage [Pb(OAc)4 and HIO4] and pinacol-pinacolone rearrangement.
	2nd week	2. Epoxides Synthesis of epoxides.
	3rd week	Acid and base-catalyzed ring opening of epoxides,
	4th week	orientation of epoxide ring opening,
	5th week	reactions of Grignard and organolithium reagents with epoxides Test and Revision
September	1st week	Phenols Nomenclature, structure and bonding. Preparation of phenols, physical properties and acidic character.
	2nd week	Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion.
	3rd week	Reactions of phenols — electrophilic aromatic substitution, Mechanisms of Fries rearrangement,
	4th week	Claisen rearrangement, Reimer-Tiemann reaction, Kolbe's reaction and Schotten and Baumann reactions
	5th week	Test and Revision
October	1st week	Ultraviole t (UV) absorption spectroscopy Absorption laws (Beer-Lambert law),
	2nd week	molar absorptivity, presentation and analysis of UV spectra, types of electronic transitions, effect of conjugation
	3rd week	. Concept of chromophore and auxochrome. Bathochromic, hypsochromic, hyperchromic and hypochromic shifts. UV spectra of conjugated enes and enones,
	4th week	Woodward- Fieser rules, calculation of max of simple conjugated dienes

		and , -unsaturated ketones. Applications o f UV Spectroscopy in structure elucidation of simple organic compounds
November	2nd week	Carboxylic Acids & Acid Derivatives Nomenclatu re of Carboxylic acids, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength
	3rd week	. Preparation of carboxylic acids. Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Reduction of carboxylic acids. Mechanism of decarboxylation. Structure , nomenclature and preparation of acid chlorides, esters, amides and acid anhydrides.
	4th week	Relative stability o f acyl derivatives. Phys ical properties, interconvers ion of acid derivatives by nucleophilic acyl substitution. Mechanisms of es ter ifica tion and hydrolysis (acidic and basic) Test and Revision