Summary of Lesson Plans of College Faculty

Name of College: Dr. B. R. A. Govt. College Kaithal

Academic Session 2021-2022 Semester: Even

Name of Asstt./Ass. Prof : Dr. Indu Ravish

Class: B.Sc. Ist year (2^{nd} sem) Organic Chemistry

Subject Lesson Plan: From April 2022-July2022

Date	Topics
April	Alkenes-Introduction
	Structure and isomerism of alkene
	Nomenclature and relative stability of alkenes
	Dehydrohalogenation of alkylhalide
	Dehydration of alcohals
	Saytzeff rule
	Homann elimination
	Physical Properties
	Mechanism involved in hydrogenation
	Electrophilic addition reaction
	free radical additions
May	Markownikoff rule
	Hydroboration-oxidation reaction
	Oxymercuration-reduction reaction
	Ozonolysis reaction, Hydration reaction
	Hydroxylation and oxidation with $KMnO_4$
	Nomenclature of benzene derivatives, Huckle rule, aromatic ions, annulenes upto 10 carbon
	Aromatic, anti-aromatic and non-aromatic compounds
	General pattern of electrophilic substituition mechanism, Mechanism of nitration, halogenation
	Mechanism of sulphonation and friedal –craft reaction
	Energy profile diagram
	Activating, deactivating substituents and orientation
June	Nomenclature and classification of dienes, structure of butadienes
	Chemical reactions and Diels-Alder reaction
	Nomenclature, structure and bonding in alkynes
	Methods of formation, Chemical reactions of alkynes
	Mechanism of electrophilic, nucleophilic addition reactions
	Acidity of alkynes, hydroboration-oxidation of alkynes
	Alkyl and Aryl Halides- Nomenclature and classes of alkyl halides, Methods of formation
	Chemical reactions.
	Mechanisms and stereochemistry of nucleophilic substitution

	reactions of alkyl halides
	S_N2 and S_N1 reactions with energy profile diagrams.
July	Methods of formation and reactions of aryl halides
	The elimination-addition Reaction, Relative reactivities of alkyl halides *v/s* allyl, vinyl and aryl halides
	Mechanisms of nucleophilic aromatic substitution reactions
	Test
	Revision
	Revision
	Test
	Revision
	Revision

Lesson Plan

Name of Assistant Professor: Dr. Indu Ravish

Class and Section:B.Sc II Semester IVth

Lesson Plan: April 2022- July2022

Subject: Chemistry

April	Week 1 Lanthanides: Electronic structure
	Week 2 Lanthanides: oxidation states
	Week 3 Lanthanides: magnetic properties
	Week 4 Lanthanides: complex formation Lanthanides: colour
	Assignments
	Week 5 Ionic radii and lanthanide contraction, occurrence,
May	Week 6 Separation of lanthanides, Lanthanide compounds. Test
	Week 7 Actinides: General characteristics of actinides
	Week 8 Chemistry of separation of Np, Pu and Am from uranium,
	Week 9 Comparison of properties of Lanthanides and actinides with transition elements. Assignment and Test

June	Week 10 Theory of Qualitative and Quantitative Analysis Chemistry of analysis of various groups of basic and acidic radicals
	Week 11 Chemistry of identification of acid radicals in typical combination.
	Week 12 Chemistry of identification of acid radicals in typical combination.
July	Week 13 Chemistry of interference of acid radicals including their removal in the analysis of basic radicals.
	Week 14 Chemistry of interference of acid radicals including their removal in the analysis of basic radicals.
	Week 15 Common ion effect, Solubility product.
	Week 16 Theory of precipitation, Coprecipitation, Post precipitation, Assignment

Lesson Plan **Name of the Assistant/Associate: Dr. Indu Ravish** **Class and Section: B. Sc. III Semester VI** **lesson Plan: April 2022-July2022** **Subject: Chemistry**	
April	Week 1 Acids and Bases: Arrhenius, Bronsted-lowry, Lux-flood levelling solvents
	Week 2 Solvent system and Lewis concept of acids and bases, relative strength of acids and bases
	Week 3 hard and soft acids and bases(HSAB), Applications of HSAB principle. Assigment and test
	Week 4 Organometallic chemistry: Definition, classification and nomenclature of organometallic compounds,
	Week 5 preparation, properties and bonding of alkyls of Li, Al, Hg and Sn,

May	Week 6 concept of hapticity of organic ligand, Structure and bonding in metal-ethylenic complexes,
	Week 7 Structure of Ferrocene, classification in metal carbonyls, preparation, properties and bonding in mononuclear carbonyls. Assignment and test
	Week 8 Bio inorganic chemistry: Metal ions present in biological system
	Week 9 classification on the basis of action (essential, non essential, trace, toxic),
June	Week 10 Metalloporphyrins with special reference to haemoglobin and myoglobin.
	Week 11 Biological role of Na_{+}, K_{+}, Ca_{+2}, Mg ions
	Week 12 Cooperative effect, Bohr effect
July	Week 13 Silicones and Phosphazenes: Nomenclature, classification, prepration and uses of silicones
	Week 14 Prepration and uses of elastomers,polysiloxane copolymers
	Week 15 Prepration and uses of polyphosphazenes
	Week 16 bonding in triphosphazene, test and assignment

Lesson Plan

Name of the Assistant Professor: Dr Poonam

Class and Section: B. Sc. I Semester 2

Subject: Chemistry lesson Plan

April
Week 1 Hydrogen Bonding – Definition, types, effects of hydrogen bonding on properties of substances, application.
Week 2 Brief discussion of various types of Van der Waals forces.

Week 3 Metallic Bond and semiconductors, Band theories of metallic bond (conductors, semiconductors, insulators).
Week 4 Metallic Bond and semiconductors- Introduction, types and applications.
May Week 1 Comparative study of the elements including diagonal relationship, Anomalous behaviour of Lithium and Beryllium compared to other elements in the same group, salient features of hydrides, oxides (methods of preparation excluded).
Week 2, Salient features of halides. hydroxides (methods of preparation excluded), behaviour of solution in liquid NH3
Week 3 Chemistry of Noble Gases; Oxygen family (16th group)
Week 4 General physical properties, low chemical reactivity, chemistry of xenon, structure and bonding in fluorides
June Week 1 Chemistry of Noble Gases; Oxygen family (16th group)
Week 2 Bonding in oxides and oxyfluorides of xenon. Oxy acids of sulphur – structure and acidic strength, Hydrogen Peroxide – properties and uses.
Week 3 p-Block elements: Electronic configuration, atomic and ionic size, metallic character, melting point, ionization, Boron family
Week 4 Diborane: Preparation, properties and structure (as an example of electron deficient compound and multicenter bonding).
July Week 1 Carbon family and Nitrogen family-Catenation, Carbides, fluoro carbons, silicates (structural aspects).
Week 2 Structure of oxides of nitrogen and phosphorus, Oxyacids : Structure and relative acid strength of oxy acids of nitrogen and phosphorus
Week 3 Halogen family
Week 4 Test

Summary of Lesson Plans

Name of College: Dr. B.R.A. Govt College Kaithal

Academic Session 2021-2022 Semester: Even

Name of Assist. Prof : Dr Poonam

Class: B.Sc. IInd year (4^{th} sem) Organic Chemistry

Date	Topics
April	Infrared (IR) absorption spectroscopy-Molecular vibrations, Hooke 's law
	selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region
	characteristic absorptions of various functional groups
	interpretation of IR spectra of simple organic compounds
	Applicat ions of IR spectroscopy in structure elucidation of simple Organic compounds.
	Test of IR spectra
	Diazonium Salts-Mechanism of diazotisation,
	structure of benzene diazoniumchloride
May	Replacement of diazo group by Br, I, NO_2 and CN groups
	Replacement of diazo group by H, OH, F, Cl, reduction of diazonium salts to hyrazines,
	Coupling reaction and its synthetic application.
	Test of diazonium salts
	Nomenclature and structure of carbonyl groups
	Synthesis of aldehyde and ketone
	Benzoin, Aldol, Perkin reaction
	Knoevenagel, witting, Mannich reaction
June	Baeyer-Villiger oxidation, Cannizaro, MPV reaction
	Clemmensen, Wolff-Kishner, $LiAlH_4$ and $NaBH_4$ reaction
	Test of aldehyde and ketones
	Structure and nomenclature of amines, physical properties
	Separation of primary, secondary and tertiary amines, Structural features
July	Preparation of alkyl and aryl amines
	Gabriel-phthalimide and Hoffmann broamide reaction
	Electrophilic aromatic substitution in aryl amines
	Reactions of amines
	Test of amines
	Test of diazonium salt
	Revision
	Test of IR spectroscopy

	Revision

Summary of Lesson Plans

Name of College: Dr. B.R.A. Govt College Kaithal

Name of Assist. Prof : Dr poonam

Class: B.Sc. IInd year (6^{th} sem) Organic Chemistry

Subject Lesson Plan: April 2022-July 2022

Date	Topics
April	Organic synthesis via enolates: acidity of α-hydrogen
	Alkylation of diethyl malonate
	Alkylation of ethyl acetoaetate
	Synthesis of ethyl acetoaetate
	Keto-enol tautomerism of ethyl acetoaetate
	Heterocyclic compounds: molecular orbital picture and aromatic character
	Method of synthesis of pyrrole
	Method of synthesis of furan
	Method of synthesis of thiophene
	Electrophilic substitution reaction of pyrrole
May	Electrophilic substitution reaction of thiophene
	Electrophilic substitution reaction of furan
	Nucleophilic substitution reaction of pyridine derivative
	Basicity of pyridine. Piperidine and pyrrole
	Introduction to condensed five and six membered heterocycle compounds
	Preparation of indole
	Preparation of quinoline
	Preparation of iso-quinoline
	Electrophilic substitution reactions of quinoline

June	Electrophilic substitution reactions of iso-quinoline
	Classification of amino acids, acid-base behaviour
	Test of heterocyclic compounds
	Isoelectric point and electrophoresis, Preparation of amino acids
	Structure, nomenclature, classification of proteins and peptides, peptide structure determination
	End group analysis, selective hydrolysis, lassical peptide, solid phase peptide synthesis
July	Structure of peptide and proteins
	Addition, free radical, ionic, Zieglar-Natta polymerization
	Vinyl polymers, condensation polymerization, polyester, polyamides
	Phenol-formaldehydes resins, natural and synthetic rubber
	Test of polymers
	Revision
	Test of amino acid
	Revision
	Revision

Lesson Plan

Name of the Assistant Professor: Ms. Seema Rani
Class and Section: B. Sc. I (N.M. & Medical) Second Semester
Subject: Chemistry lesson Plan: Even Semester 2021-2022

April,2022	Rate of reaction, rate equation and its types, factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst
	factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst, Order of a reaction, integrated rate expression for zero order, first order
	Order of a reaction, integrated rate expression for second and third order reactions, Half life period of a reactions
	Effect of temperature on the rate of reaction – Arrhenius equation, Theories of reaction rate – Simple collision theory for unimolecular collision
May,2022	Theories of reaction rate – Simple collision theory for unimolecular

	collision
	Transition state theory of bimolecular reactions Assignments exercise related to the topic covered.
	Electrolytic conduction, factors affecting electrolytic conduction, specific conductance, molar conductance, equivalent conductance and relation among them, their variation with concentration,.
June,2022	Arrhenius theory of ionization, Ostwald's Dilution Law, Applications of conductivity measurements: determination of degree of dissociation
	Determination of Ka of acids determination of solubility product of sparingly soluble salts, conductometric titrations. Concepts of pH and pKa
	Buffer solution, Buffer action, Henderson – Hazel equation, Buffer mechanism of buffer action
July,2022	Revision & Tests

Lesson Plan

Name of the Assistant Professor: Ms. Seema Rani
Class and Section: B. Sc. II (N.M. & Medical) 4th Semester
Subject: Chemistry lesson Plan: Even Semester 2021-2022

April,2022	Second law of thermodynamics, Carnot's cycle s and its efficiency, Carnot' s theorm, Thermodynamics scale of temperature
	Concept of entropy– entropy as a state function, Entropy as a function of V & T, entropy as a function of P & T, entropy change in physical change.
	Entropy as a criteria of spontaneity and equilibrium, Third law of thermodynamics
	Nernst heat theorem, statement of concept of residual entropy Evaluation of absolute entropy from heat capacity data,
May,2022	Gibbs function (G) and Helmholtz function (A) as thermodynamic

	quantities
	G as criteria for thermodynamic equilibrium and spontaneity, Variation of G with P, V and T.
	Electrolytic and Galvanic cells, reversible & irreversible cells, conventional representation of electrochemical cells
	Calculation of thermodynamic quantit ies of cell reaction (▲G, ▲H & K). Types of reversible electrodes – metal- metal ion, gas electrode, metal –insoluble salt- anion and redox electrodes
June,2022	derivation of cell EMF and single electrode potential, Standard Hydrogen electrode, reference electrodes, standard electrode potential, sign conventions
	Concentration cells with and without transference, liquid junction potential and its measurement
	Applications of EMF measurement in solubility product, potentiometric titrations using glass electrode. More stress on numerical problems
July,2022	Revision & Tests

Lesson Plan

Name of the Assistant Professor: Ms. Seema Rani
Class and Section: B. Sc. III (N.M. & Medical) 6th Semester
Subject: Chemistry lesson Plan: Even Semester 2021-2022

April,2022	Need for statistical thermodynamics, thermodynamic probability, Maxwell- Boltzmann distribution
	Born–oppenheimer approximation, partition function and its significance, factorization of partition function
	Interation of radiation with matter, thermal and photophysical process, laws of photochemistry
May,2022	Jablonski diagram, quantum Yield, photosensitized reactions
	Ideal and non-ideal solutions, Raoults law

	Colligative properties
	Applications in calculating molar mass of normal, dissociated and associated solutes in solution
June,2022	Phase, component and Degree of freedom, Derivation of Gibbs Phase Rule, One component system Water
	Two component system, desilverisation of lead
July,2022	Revision & Tests