Rita Sharma (Associate Professor) Lesson plan of Organic Chemistry B.Sc – Non-Medical, Medical and BioTech 4th semester, (2020-2021)	
WEEKS	**CHAPTER**
1.	IR SPECTROSCOPY :- Molecular Vibrations, Hook's law, selection rules Intensit and position of IR bands, measurement of IR spectrum, Finger print region
2.	Characteristic absorption of various functional groups and interpretation of IR spectra of simple organic compounds. Application of IR spectroscopy in structure elucidation of simple organic compounds
3.	Aldehydes and ketones:- Nomenclature and structure of carbonyl group synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, advantage of oxidation of alcohols with chromium trioxide(sarett reagent) PCC and pyridine dichromate
4.	Physical properties of aldehydes and ketones, comparison of reactivities of aldehydes and ketones. Mechanism of benzoin condensation , aldol condensation &perkin condensation
5.	Mechanism of knoevenagel condensation, condensation with ammonia and its derivatives , wittig reaction
6.	Mannich reaction, oxidation of aldehydes, Baeyer villiger oxidation of ketones, cannizzaro reaction, MPV reaction, clemmenson, wolfkishner, LiAlH4, NaBH4 reduction
7.	Assignment and test of aldehydes and ketones
8.	Diazonium salt :- Nomenclature, preparation of Diazonium salt, Physical and chemical Properties, synthetic applications of diazonium salt
9.	Nitrocompounds :- preparations of nitro compounds, physical properties of nitro compounds, reactions of nitro alkanes and nitroarenes
10.	Amines:- Structure of amines, nomenclature of amines, preparation of amines, ,
11.	separation of primary secondary and tertiary amines, chemical properties of amines, distinction of primary secondary and tertiary amines,
12.	basicity of amines, effect of substituents on the basicity of amines
13.	Revision of Amines, nitro compounds and diazonium salt
14.	Practice of numericals of IR
15.	Test and assignment of amines nitrocompounds and diazonium salt

Dr. Shish Ram Yadav (Associate Professor) Lesson plan of Organic Chemistry B.Sc–Non-Medical, Non-Medical and BioTech 2nd semester, 2020-2021

WEEKS	CHAPTER
1.	**Alkenes :-**Nomenclature of alkenes, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides,.
2.	The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes
3.	Chemical reactions of alkenes, mechanisms involved in hydrogenation, electrophilic and free radical additions,
4.	Markownikoff's rule, hydroboration–oxidation, oxymercurationreduction
5.	ozonolysis, hydration, hydroxylation and oxidation with $KMnO_4$,
6.	**Arenes and Aromaticity:-** Nomenclature of benzene derivatives:. Aromatic nucleus and side chain.
7.	Aromaticity: the Huckel rule, aromatic ions, annulenes up to 10 carbon atoms,aromatic, anti - aromatic and non – aromatic compounds
8.	Aromatic electrophilicsubstitution general pattern of the mechanism, mechansim of nitration,halogenation, sulphonation, and Friedel-Crafts reaction.
9.	Energy profile diagrams, Activating , deactivating subs tituents and orientation.
10.	**Dienes and Alkynes:-**Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes.Structure of butadiene,. Chemical reactions 1,2 and 1,4 additions (Electrophilic &free radical mechanism),
11.	Diels-Alder reaction, Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes.Mechanism of electrophilic and nucleophilic addition reactions, hydroborationoxidationof alkynes
12.	**Alkyl and Aryl Halides:-**Nomenclature and classes of alkyl halides, methods of formation, chemical reactions.
13.	Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides , S_N2 and $S_N1$reactions with energy profile diagrams.
14.	Methods of formation and reactions of aryl halides,
15.	The additionelimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vsallyl, vinyl and aryl halides.

Amit Gupta (Ext Lecturer) Lesson plan of Physical Chemistry B.Sc – Non-medical, Medical and BioTech 4th semester, (2020-2021)	
WEEKS	**CHAPTER**

1.	**Thermodynamics** :- Second law of thermodynamics, Need for the Law and its different statements, Carnot cycle
2.	Thermodynamics scale of temperature. Concept of entropy- Entropy as a state function, entropy as a function of "V", "T" and "P",Entropychange in reversible and irreversible process
3.	Criteria for Spontaneity, Entropy change in ideal gases and mixing of gases
4.	Gibbs (G) and Helmholtz functions (A) as thermodynamic quantities
5.	Assignment and Unit Test of Thermodynamics
6.	**Electrochemistry :-** Electrolytic and Galvanic cells – Reverssible and irreversible cells
7.	Conventional representation of electrochemical cells, emf of cell and its measurement
8.	Westron standard cell, Activity and activity coefficients, Calculation
9.	Calculation of thermodynamic quantities (Δ G, Δ A & K), Types of reversible electrodes Metal-metal ion gas electrode, metal ion soluble salt anion and redox electrodes, Electrode reactions
10.	Nernst equations, derivation of cell EMF and single electrode potential, Standard hydrogen Electrode, reference electrodes, standard Electrode potential
11.	Electrochemical series and its Applications, Concentration Cells With and without transference, Liquid junction potential
12.	Applications of EMF measurement i.eValency of ions, Solubility of product, activity coefficient
13.	Potentiometric titrations (Acid base and redox), determination of pH using hydrogen electrode
14.	Quinhydrone electrode and glass electrode and glass electrode by potentiometric methods
15.	Assignment and test of Electrochemistry

Name Dr Manju Lesson plan of Physical Chemistry **B.Sc. -Nonmedical, Medical and Biotech 6th semester, session-2021-2022**		
WEEKS	**CHAPTER**	

1.	Electronic Spectrum -Concept of potential energy curves for bonding and antibonding molecular orbitals	
2.	qualitative description of selection rules	
3.	Franck Condon principle	
4.	Qualitative description of sigma and pie and n molecular orbital (MO)	
5.	energy level and respective transitions.	
6.	Doubts, Class test	
7.	Photochemistry- Interaction of radiation with matter, difference between thermal and photochemical processes.	
8.	Laws of photochemistry: Grotthus-Drapper law, Stark Einstein law (law of photochemical equivalence)	
9.	Jablonski diagram depiciting -various processes occurring in the excited state,	
10.	qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing)	
11.	Quantum yield, photosensitized reactions-energy transfer processes (simple examples).	
12.	Doubts ,Class test	

Manju Bala
Chemistry Department
Lesson Plan of Physical Chemistry
B.Sc 1st .-Pass course(non- medical, medical and biotech) (2nd semester, 2020-2021)

WEEKS	CHAPTER
1	**Kinetics-I** Rate of reaction, rate equation, factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst.
2	Order of a reaction, integrated rate expression for zero order, first order,
3	Second and third order reaction. Half life period of a reaction. Methods of determination of order of reaction.
4	**Kinetics-II** Effect of temperature on the rate of reaction – Arrhenius equation. Theories of reaction rate – Simple collision theory for unimolecular and bimolecular collision.
5	Transition state theory of Bimolecular reactions.
6	ASSIGNMENT AND TEST OF CHEMICAL KINETICS CHAPTER
7	**Electrochemistry-I** Electrolytic conduction, factors affecting electrolytic conduction, specific, conductance, molar conductance,equivalent conductance and relation among them, their vartion with concentration.Arrhenius theory of ionization,
8	Ostwald's Dilution Law. Debye- Huckel – Onsager's equation for strong electrolytes (elementary treatment only) Transport number, definition and determination by Hittorfs methods, (numerical included)
9	**Electrochemistry-II** Kohlarausch's Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it. Application of Kohlarausch's Law in calculation of conductance of weak electrolytes at infinite diloution.
10	Applications of conductivity measurements: determination of degree of dissociation, determination of Ka of acids .determination of solubility product of spa ringly soluble salts,
11	Conductometric titrations. Definition of pH and pKa, Buffer solution, Buffer action, Henderson
12	ASSIGNMENT AND TEST OF ELECTROCHEMISTRY

WEEKS	Topics to be covered	
1.	**Unit-3:** Solutions: Dilute Solutions and Colligative Properties Ideal and non-ideal solutions. Methods of expressing concentrations of solutions,	
2.	Activity and activity coefficient. Dilute solution,Colligative properties, Raolut's law	
3.	Relative lowering of vapour pressure, molelcular weight determination, Osmosis law of osmotic pressure and its measurement	
4.	Determination of molecular weight from osmotic pressure. Elevation of boiling point and depression of freezing point	
5.	Thermodynamic derivation of relation between molecular weight and elevation in boiling point and depression in freezing point	
6.	Experimental methods for determining various colligative properties.Abnormal molar mass, degree of dissociation and association of solutes.	
7.	Doubts, Class test	
8.	Phase Equillibrium- Statement and meaning of the terms – phase component and degree of freedom.	
9.	Thermodynamic derivation of Gibbs phase rule	
10.	Phase equilibria of one component system –Example – water and Sulpher systems.	
11.	Phase equilibria of two component systems solid-liquid equilibria, Simple eutectic Example Pb-Ag system, desilerisation of lead ,	
12.	Doubts ,Class test	

Name of the Teacher – Pooja Rani

Paper - Inorganic Chemistry

Semester – IInd Session 2020- 2021

Days	Topic to be covered
First Week	Hydrogen Bonding Definition, Types, Effects of Hydrogen Bonding on Properties of Substances, Application Brief discussion of various types of Vander Waals Forces
Second Week	Metallic Bond-Brief Introduction to Metallic Bond, Band Theory of Metallic Bond Semiconductors- Introduction, Types and Applications.
Third Week	Comparative Study of the Elements Including, Diagonal Relationships, Salient Features of Hydrides (Methods of Preparation Excluded), Solvation and Complexation Tendencies Including Their function in Biosystems.
Fourth Week	Chemical Properties of the Noblegases with Emphasis on their Low Chemical Reactivity
Fifth Week	Chemistry of Xenon, Structure and Bonding of Fluorides, Oxides & Oxyfluorides of Xenon
Sixth Week	Emphasis on Comparative Study of Properties of P-Block Elements (Including Diagonal Relationship and Excluding Methods of Preparation)
Seventh Week	Diborane – Properties and Structure (as an example of Electron – Deficient Compound and Multicentre Bonding), Borazene
Eight Week	Chemical Properties and Structure Trihalides of Boron – Trends in Fewis Acid Character Structure of Aluminium (III) chloride.
Ninth Week	Catenation, $p\pi - d\pi$ Bonding (an Idea), Carbides, Fluorocarbons, Silicates (Structural Aspects), Silicons – General Methods of Preparations, Properties and Uses.
Tenth Week	Oxides – Structures of Oxides of N,P. Oxyacids – Structure and Relative Acid Strengths of Oxyacids of Nitrogen and Phosphorus. Structure of White, Yellow and Red Phosphorus.
Eleventh Week	Oxyacids of Sulphur – Structures and Acidic Strength H_2O_2 – Structure, Properties and Uses.
Twelfth Week	Basic Properties of Halogen, Interhalogens Types Properties, Hydro and Oxyacids of Chlorine – Structure and Comparison of Acid Strength

Department of Chemistry

Name- Anu Yadav (Assistant Professor)

Subject- Inorganic Chemistry

Class- B.Sc. Nonmedical, Medical and Biotech

Semester-4th semester session 2020-2021

WEEKS	CHAPTER	
1.	**Lanthanides**- Introduction, electronic structure and position in the periodic table, oxidation state, magnetic Doubts	
2.	Ionic radio and lanthanides contraction and it's consequences	
3.	Complex formation by lanthanides , occurrence , Extraction of lanthanides from monazite sand ,	
4.	Lanthanides compound ,Assignment and unit test	
5.	**Actinides:**-Introduction , electronic structure and position in the periodic table, oxidation states, physical pr	
6.	Transuranic elements , separation of Pu,Np,Am,fromU	
7.	Comparison of lanthanides and actinides , Possible new elements, Doubts, Assignment, Class test	
8.	**Theory of Qualitative and Quantitative Inorganic:**-Introduction, Qualitative analysis, Preliminary tests	
9.	Wet test for Acid radicals	
10.	Analysis of group 1,2,3,4,5,6 cations	
11.	Identification of acid radicals in typical combinations, Interference of acid radicals in the analysis of basic r	
12.		Solubility product,PHvalue,effect of temperature
		Unit test