LESSON PLAN OF PHYSICAL CHEMISTRY FOR B.Sc. 4th SEMESTER SESSION 2021-2022

NAME OF LECTURE:-Ankita

SUBJECT: - PHYSICAL CHEMISTRY

SR.NO.	DATE	TOPIC
1	April 2nd week	UNIT 2ND:- **Electrochemistry: -** Electrolytic and Galvanic cells – reversible & irreversible cells.
2		Electrode Potential, Measurement of standard electrode Potential and **emf** of the cell and its measurement
3	April 3rd week	Standard cell- **weston** standard cell, electrical energy and **emf** of reversible cell.
4		Conventional representation of electrochemical cells. Calculation of thermodynamic quantities of cell reaction (▲G, ▲H, change in entropy & K).
5	April 4th week	refrence electrode and electrochemical series and its application.
6		Activity and activity coeffiecnt , Types of reversible electrodes – metal-metal ion, gas electrode, metal –insoluble salt- anion and redox electrodes
7	MAY 1st week	Types of reversible electrodes redox electrodes Electrode reactions, Nernst equations.
8		Effect of electrolytic concentration and temp. On electrode potential. derivation of cell EMF and single electrode potential
9	MAY 2nd week	Derivation of equilibrium constant from Nernst equation.
10		Electrolytic polarization-concentration polarization.
11	MAY 3rd week	Decomposition voltage or decomposition potential.
12		Standard Hydrogen electrode, reference electrodes, standard electrode potential, sign conventions
13	MAY 4th week	Concentration cells with and without transference, liquid junction potential and its measurement
14		Applications of EMF measurement in solubility product and potentionmetric titrations using glass electrode
15	JUNE 1st week	More stress on numerical problems
16		Numerical on the bases of Ecell and E0cell and nernest equation.
17	JUNE 2nd week	TEST

18		UNIT 1ST:- **Thermodynamics:-INTRODUCTION FROM 1ST LAW OF THERMODYNAMIC.**
19	JUNE 3rd week	Second law of thermodynamics, need for the law, different statements of the law,
20		CYCLIC PROCESS, CARNOT CYCLIC AND ITS IFFICIENCY.
21	JUNE 4th week	Carnot' s theorem, Thermodynamics scale of temperature.
22		Concept of entropy entropy as a state function, entropy as a function of V & T, entropy as a function of P & T.
23	JULY 1ST week	Entropy CHANGE IN reversible and irreversible process.
24		Entropy CHANGE IN accompanying phase transition mixing of ideal gases.
25		Standard entropy and standard change in a chemical reaction.
26		Gibbs free energy or Gibbs free energy function. Variation of work function with temp.and pressure.
27		entropy change in physical change, entropy as a criteria of spontaneity and equilibrium
28	JULY 2ND	Third law of thermodynamic s: Nernst heat theorem, statement of concept of residual entropy
29		evaluation of absolute entropy from Heat capacity data. Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, G as criteria for thermodynamic equilibrium and spontaneity
30		Its advantage over entropy change. Variation of G with P, V and T
31		Test of 1st unit.

Lesson Plan (April 2021 - July2022)

Name of Assistant Professor: Ms.Ankita

Subject: Inorganic Chemistry

Class: B.Sc. II (IV SEM)

S.N	Month	Week	Topic
1.	April	I	Introduction to Chemistry of f-block elements, Introduction to Lanthanide
		II	Lanthanides: Electronic structure, oxidation states,
		III	Ionic radii and Lanthanides contraction
		IV	Complex formation
		V	Occurrence and isolation of Lanthanides
2.	May	I	Isolation of Lanthanides
		II	Lanthanide compounds
		III	Actinides: General features and chemistry of actinides
		IV	Chemistry of separation of Np, Pu, and Am from U,
		V	Chemistry of separation of Np, Pu, and Am from U,
3.	June	I	Comparison of properties of Lanthanides and Actinides and with transition elements
		II	Theory of qualitative and quantitative analysis-1

4.	June July	III IV V I II III IV	Chemistry of analysis of various acidic radicals Chemistry of identification of acid radicals in typical combination, Chemistry of analysis of various basic radicals Chemistry of interference of acid radicals including their removal in the analysis of basic radicals Common ion effect, solubility product Theory of precipitation, theory of post-precipitation Purification of precipitation

Lesson Plan (April 2021 - July2022)

Name of Assistant Professor: Ms.Ankita

Subject: Inorganic Chemistry

Class: B.Sc. III (VI SEM)

S.N	Month	Week	Topic
1.	April	I	Introduction to Acid Bases: Different concepts of acid and bases
		II	Arrhenius, Bronsted-Lowry concepts of acids and bases
		III	Solvent system and Lewis concept of acids and bases
		IV	Relative strength of acids and bases
		V	Leveling solvents
2.	May	I	Hard and soft acids and Bases,
		II	Applications of HSAB principle
		III	Organometallic compounds -Classification,
		IV	Nomenclature Organometallic compounds,
		V	Nature of bonding,
3.	June	I	Metal carbonyl- Bonding and nomenclature
		II	Bioinorganic chemistry: role of metal ions in biological system,

	June July	III IV V I II III IV	Metalloporphyrin, nitrogen fixation, uses Silicones: Classification, Nomenclature, Nature of bonding Phosphozenes: Classification, Nomenclature, Nature of bonding, uses Phosphozenes: Classification, Nomenclature, Nature of bonding, uses Phosphozenes: Classification, Nomenclature, Nature of bonding, uses Phosphozenes: Classification, Nomenclature, Nature of bonding, uses

Lesson Plan (April 2021 - July2022)

Name of Assistant Professor: Ms. Ankita

Subject: Organic Chemistry

Class: B.Sc. II (IV SEM)

S.N	Month	Week	Topic
1.	April	I	Introduction to Infrared (IR) absorption spectroscopy Molecular vibrations, Hooke's law,
		II	
		III	Selection rules, intensity and position of IR bands,
		IV	Measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds. Applications of IR spectroscopy in structure elucidation of simple organic compounds.
		V	Amines Structure and nomenclature of amines, physical properties.
2.	May	I	Separation of a mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds.
		II	Gabrielphthalimide reaction, Hofmann bromamide reaction. Electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid.
		III	Diazonium Salts Mechanism of diazotisation, structure of benzene diazonium chloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO2 and CN groups, reduction of diazonium salts to hyrazines, coupling reaction and its synthetic application.
		IV	Aldehydes and Ketones Nomenclature and structure of the carbonyl group. Wittig reaction. Mannich reaction.
		V	Oxidation of aldehydes, Baeyer– Villiger oxidation of ketones, Cannizzaro reaction. MPV, Clemmensen, WolffKishner, LiAlH4 and NaBH4 reductions.
3.	June	I	Physical properties, Comparison of reactivities of aldehydes and ketones.

	June	II III IV	 Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides,
4.	July	I II	Advantage of oxidation of alcohols with chromium trioxide (Sarett reagent) pyridinium chlorochromate (PCC) and pyridinium dichromate., Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives.