EWING CHRISTIAN COLLEGE, PRAYAGRAJ

(A Christian Minority Institution of Church of North India, Diocese of Lucknow)
&
(An Autonomous Constituent PG College of University of Allahabad)
711, Gaughat, Mutthiganj, Prayagraj – 211 003

DEPARTMENT OF CHEMISTRY

TEACHING PLAN

Name of the Teacher: Dr. Ebenezer Samuel

Course Name: B.Sc. **Semester: I**

Paper Name: Inorganic Chemistry **Paper Code:** 1CHETH01

Year: 2021-22

Lecture No.	Topic
1.	Atomic Structure: Bohr's Theory – Assumptions
2.	Atomic Structure: Bohr's Theory – Success & Drawbacks
3.	Atomic Structure: Sommerfeld atomic model
4.	Atomic Structure: Absorption Emission spectra, Rydberg's equation
5.	Atomic Structure: Applications of Absorption Emission spectra, spectral series
6.	Atomic Structure: Dual behavior of matter and radiation,
7.	Atomic Structure: de-Broglie's relationship, Heisenberg's Uncertainty principle
8.	Concept of orbitals, Quantum Numbers - Definition, types
9.	Quantum Numbers - Determination and significance
10.	Shapes of s, p, d and f orbitals, nodes and nodal planes, orientation of s-, p-, and d-atomic orbitals.
11.	Electronic Configuration : Definition, Rules of filling electrons in various orbitals: Pauli Exclusion principle,
12.	Aufbau principle
13.	Electronic Configuration: Hund's rule of maximum multiplicity, their significance, stability of half and fully filled orbitals, exchange energy,
14.	Relative energies of various atomic orbitals, Anomalous electronic configurations.
15.	Periodic Classification of Elements: Periodic law, Periodicity with respect to electronic configuration of elements.
16.	General description of long form of periodic table
17.	Periodic Classification of Elements: Electronic configuration of s, p, d and f blocks and characteristics.
18.	Significance and limitations of the periodic Table
19.	Periodic Properties: Atomic and Ionic radii - Concept
20.	Atomic and Ionic radii - Factors effecting, trend in modern periodic table and significance.

21.	Atomic and Ionic radii - Determination
22.	Periodic Properties: Ionization potential (IP) - Concept, determination
23.	Periodic Properties: Ionization potential (IP) - Factors effecting, trend in modern periodic table and significance.
24.	Periodic Properties: Electron Affinity (EA) - Concept, determination
25.	Periodic Properties: Electron Affinity (EA) - Factors effecting, trend in modern periodic table and significance.
26.	Periodic Properties: Electronegativity (EN) - Concept, determination
27.	Periodic Properties: Electronegativity (EN) - Factors effecting, trend in modern periodic table and significance.
28.	Qualitative Analysis: Principles
29.	Qualitative Analysis: Chemical reactions involved in qualitative analysis of Inorganic mixture (for cations and anions)
30.	Qualitative Analysis: Problems based on mixture analysis including identification and tests of cations and anions.

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Justin Masih

Course Name: B.Sc. **Semester: I**

Paper Name: Inorganic Chemistry **Paper Code: 1CHETH01**

Year: 2021-22

Lecture No.	Topic
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Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Sharda Sundaram Sanjay

Course Name: B.Sc. **Semester: I**

Paper Name: Inorganic Chemistry **Paper Code: 1CHETH01**

Year: 2021-22

Lecture No.	Topic
1.	Atomic Structure: Bohr's Theory – Assumptions
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Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Mr. Abhinav Lal

Course Name: B.Sc. **Semester: I**

Paper Name: Inorganic Chemistry **Paper Code: 1CHETH01**

Year: 2021-22

Lecture No.	Topic
1.	Atomic Structure: Bohr's Theory – Assumptions
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7.	Atomic Structure: de-Broglie's relationship, Heisenberg's Uncertainty principle
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10.	Shapes of s, p, d and f orbitals, nodes and nodal planes, orientation of s-, p-, and d-atomic orbitals.
11.	Electronic Configuration : Definition, Rules of filling electrons in various orbitals: Pauli Exclusion principle,
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13.	Electronic Configuration: Hund's rule of maximum multiplicity, their significance, stability of half and fully filled orbitals, exchange energy,
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15.	Periodic Classification of Elements: Periodic law, Periodicity with respect to electronic configuration of elements.
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Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Ebenezer Samuel

Course Name: B.Sc. **Semester: II**

Paper Name: Inorganic Chemistry **Paper Code: 2CHETH02**

Year: 2021-22

Lecture No.	Topic
1.	Chemical Bonding-I: Ionic bonding,
2.	Chemical Bonding-I: Lattice energy
3.	Chemical Bonding-I : Hydration energy
4.	Chemical Bonding-I : Born Haber cycle,
5.	Chemical Bonding-I : Solubility of ionic compounds
6.	Chemical Bonding-I : Covalent bonding, σ and π bonds,
7.	Chemical Bonding-I : Partial covalent character in an ionic bond,
8.	Chemical Bonding-I : Fajan's rule
9.	Chemical Bonding-I : Coordinate bonding
10.	Chemical Bonding-I : Metallic bonding
11.	Chemical Bonding-I : Hydrogen bonding
12.	Chemical Bonding-II : Shape and orientation of orbitals,
13.	Chemical Bonding-II: Directional nature of covalent bond,
14.	Chemical Bonding-II: Sidgwick Powel theory,
15.	Chemical Bonding-II: Valence Shell Electron Pair Repulsion (VSEPR) theory,
16.	Chemical Bonding-II: Effect of lone pair/lone pairs on the geometry of covalent molecules and ions,
17.	Chemical Bonding-II: Effect of electronegativity and size of atoms on the geometry of covalent molecules and ions,
18.	Chemical Bonding-II: limitations of VSEPR theory,Shapes of inorganic molecules and ions having bond pairs and lone pairs such as $BeCl_2$, BF_3, CCl_4, PCl_3, NH_3, H_2O, OF_2, I_3^+, PCl_5, SF_4, I_3^-, ICl_3, IF_7,
19.	Chemical Bonding-II: Concept of hybridization and its applications in determination of geometry of covalent molecules and ions.
20.	Electrode potential, Standard electrode potential
21.	Electrochemical series and its applications,
22.	Redox potential diagrams and their applications.
23.	Chemistry of s-Block And Group 18 Elements ***a.*** ***Hydrogen:*** Ortho and Para Hydrogen, Isotopes of Hydrogen

24.	***b. I A and II A Groups:*** Electronic configuration, Position in periodic table, Physical properties, Storage, Bonding, Chemical reactions with air, water, acids and bases,
25.	Chemical compounds - Hydrides, Halides, Oxides, Carbonates, Bicarbonates, Solution in Ammonia.
26.	c. ***Inert gases:*** Electronic configuration, Position in periodic table, Inertness,.
27.	Properties and some important types of chemical compounds, Isolation and separation from air
28.	Volumetric Analysis : General principles, Kinds of volumetric analysis, significances, Determination and strength of a chemical substance in a solution,
29.	Concept of equivalent weight, Normality, Molarity, Molality, Mole concept etc.
30.	Complexometric titrations with special reference to EDTA titrations.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Justin Masih

Course Name: B.Sc. **Semester: II**

Paper Name: Inorganic Chemistry **Paper Code: 2CHETH02**

Year: 2021-22

Lecture No.	Topic
1.	Chemical Bonding-I: Ionic bonding,
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5.	Chemical Bonding-I : Solubility of ionic compounds
6.	Chemical Bonding-I : Covalent bonding, σ and π bonds,

7.	Chemical Bonding-I : Partial covalent character in an ionic bond,
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20.	Electrode potential, Standard electrode potential
21.	Electrochemical series and its applications,
22.	Redox potential diagrams and their applications.
23.	Chemistry of s-Block And Group 18 Elements ***b.*** ***Hydrogen:*** Ortho and Para Hydrogen, Isotopes of Hydrogen
24.	***b. I A and II A Groups:*** Electronic configuration, Position in periodic table, Physical properties, Storage, Bonding, Chemical reactions with air, water, acids and bases,
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29.	Concept of equivalent weight, Normality, Molarity, Molality, Mole concept etc.
30.	Complexometric titrations with special reference to EDTA titrations.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Sharda Sundaram Sanjay

Course Name: B.Sc. **Semester: II**

Paper Name: Inorganic Chemistry **Paper Code: 2CHETH02**

Year: 2021-22

Lecture No.	Topic
1.	Chemical Bonding-I: Ionic bonding,
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22.	Redox potential diagrams and their applications.
23.	Chemistry of s-Block And Group 18 Elements ***c.*** ***Hydrogen:*** Ortho and Para Hydrogen, Isotopes of Hydrogen

24.	***b. I A and II A Groups:*** Electronic configuration, Position in periodic table, Physical properties, Storage, Bonding, Chemical reactions with air, water, acids and bases,
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29.	Concept of equivalent weight, Normality, Molarity, Molality, Mole concept etc.
30.	Complexometric titrations with special reference to EDTA titrations.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Sharda Sundaram Sanjay

Course Name: B.Sc. **Semester: IV**

Paper Name: Inorganic Chemistry **Paper Code: 4CHETH01**

Year: 2021-22

Lecture No.	Topic
1	**Chemistry Of P-Block Elements** : Electronic Configuration, position in periodic table, metallic and non-metallic properties, middle row anomaly,
2	**Chemistry Of P-Block Elements** : Inert pair effect, oxidation states, oxidizing states, oxidizing behavior, bonding (sigma bonding, pπ – pπ bonding and pπ – dπ bonding)
3	**General Group Discussion:** Comparative group study and periodic trends in the light of hydrides of B, Al, Ga, In, Tl;
4	**General Group Discussion:** Comparative group study and periodic trends in the light of oxides of B, Al, Ga, In, Tl;
5	**General Group Discussion:** Comparative group study and periodic trends in the light of halides of B, Al, Ga, In, Tl;
6	**General Group Discussion:** Comparative group study and periodic trends in the light of hydrides, of C, Si, Ge, Sn, Pb;
7	**General Group Discussion:** Comparative group study and periodic trends in the light of oxides of C, Si, Ge, Sn, Pb;
8	**General Group Discussion:** Comparative group study and periodic trends in the light of halides of C, Si, Ge, Sn, Pb;
9	**General Group Discussion:** Comparative group study and periodic trends in the light of hydrides, of ; N, P, As, Sb, Bi;
10	**General Group Discussion:** Comparative group study and periodic trends in the light of, oxides of ; N, P, As, Sb, Bi;
11	**General Group Discussion:** Comparative group study and periodic trends in the light of halides of ; N, P, As, Sb, Bi; (application of redox potential diagrams)
12	**General Group Discussion:** Comparative group study and periodic trends in the light of hydrides of O, S, Se, Te
13	**General Group Discussion:** Comparative group study and periodic trends in the light of oxides of O, S, Se, Te
14	**General Group Discussion:** Comparative group study and periodic trends in the light of halides of O, S, Se, Te (application of redox potential diagrams)
15	**General Group Discussion:** Comparative group study and periodic trends in the light of hydrides of , F, Cl, Br; , I
16	**General Group Discussion:** Comparative group study and periodic trends in the light of oxides of , F, Cl, Br; , I
17	**General Group Discussion:** Comparative group study and periodic trends in the light of halides of , F, Cl, Br; , I (application of redox potential diagrams)
18	**General Characteristics And Trends Of D-Block Elements** **Electronic configuration:** Position in Periodic Table, Transition Series.

	General Characteristics: Variable oxidation states, complex formation,
19	**General Characteristics And Trends Of D-Block Elements** Colour, magnetic properties, catalytic properties.
20	**General Characteristics And Trends Of d-Block Elements** Comparative accounts of 3d, 4d and 5d transition metals with respect to their atomic and ionic sizes, stability of oxidation states and magnetic properties.
21	**Chemistry of Coordination Compounds:** Complexes and double salts,
22	**Chemistry of Coordination Compounds:** Werner's theory , Sidgwick's theory, EAN,
23	**Chemistry of Coordination Compounds:** IUPAC nomenclature (chelate excluded),
24	**Chemistry of Coordination Compounds:** General idea of isomerism in coordination compounds (definition and some typical examples).
25	**Extraction of Elements :** General principles of extraction and metallurgy.
26	**Extraction of Elements** Chemical principles involved in the extraction and isolation of: B, F,
27	**Extraction of Elements** Chemical principles involved in the extraction and isolation of: Si, Ge,
28	**Extraction of Elements** Chemical principles involved in the extraction and isolation of Cr, and Ni
29	**Gravimetric Analysis** Principles, Super saturation, Co-precipitation, Post-precipitation,
30	**Gravimetric Analysis** Particle size, Precipitation – general procedure, ash treatment and numerical problems.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Justin Masih

Course Name: B.Sc. **Semester: IV**

Paper Name: Inorganic Chemistry **Paper Code: 4CHETH01**

Year: 2021-22

Lecture No.	Topic
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2	**Chemistry Of P-Block Elements** : Inert pair effect, oxidation states, oxidizing states, oxidizing behavior, bonding (sigma bonding, pπ – pπ bonding and pπ – dπ bonding)
3	**General Group Discussion:** Comparative group study and periodic trends in the light of hydrides of B, Al, Ga, In, Tl;
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5	**General Group Discussion:** Comparative group study and periodic trends in the light of halides of B, Al, Ga, In, Tl;
6	**General Group Discussion:** Comparative group study and periodic trends in the light of hydrides, of C, Si, Ge, Sn, Pb;
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8	**General Group Discussion:** Comparative group study and periodic trends in the light of halides of C, Si, Ge, Sn, Pb;
9	**General Group Discussion:** Comparative group study and periodic trends in the light of hydrides, of ; N, P, As, Sb, Bi;
10	**General Group Discussion:** Comparative group study and periodic trends in the light of, oxides of ; N, P, As, Sb, Bi;
11	**General Group Discussion:** Comparative group study and periodic trends in the light of halides of ; N, P, As, Sb, Bi; (application of redox potential diagrams)
12	**General Group Discussion:** Comparative group study and periodic trends in the light of hydrides of O, S, Se, Te

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15	**General Group Discussion:** Comparative group study and periodic trends in the light of hydrides of , F, Cl, Br; , I
16	**General Group Discussion:** Comparative group study and periodic trends in the light of oxides of , F, Cl, Br; , I
17	**General Group Discussion:** Comparative group study and periodic trends in the light of halides of , F, Cl, Br; , I (application of redox potential diagrams)
18	**General Characteristics And Trends Of D-Block Elements** **Electronic configuration:** Position in Periodic Table, Transition Series. **General Characteristics:** Variable oxidation states, complex formation,
19	**General Characteristics And Trends Of D-Block Elements** Colour, magnetic properties, catalytic properties.
20	**General Characteristics And Trends Of d-Block Elements** Comparative accounts of 3d, 4d and 5d transition metals with respect to their atomic and ionic sizes, stability of oxidation states and magnetic properties.
21	**Chemistry of Coordination Compounds:** Complexes and double salts,
22	**Chemistry of Coordination Compounds:** Werner's theory , Sidgwick's theory, EAN,
23	**Chemistry of Coordination Compounds:** IUPAC nomenclature (chelate excluded),
24	**Chemistry of Coordination Compounds:** General idea of isomerism in coordination compounds (definition and some typical examples).
25	**Extraction of Elements :** General principles of extraction and metallurgy.
26	**Extraction of Elements**

	Chemical principles involved in the extraction and isolation of: B, F,
27	**Extraction of Elements** Chemical principles involved in the extraction and isolation of: Si, Ge,
28	**Extraction of Elements** Chemical principles involved in the extraction and isolation of Cr, and Ni
29	**Gravimetric Analysis** Principles, Super saturation, Co-precipitation, Post-precipitation,
30	**Gravimetric Analysis** Particle size, Precipitation – general procedure, ash treatment and numerical problems.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Ebenezer Samuel

Course Name: B.Sc. **Semester: V**

Paper Name: Inorganic Chemistry **Paper Code: 5CHETH01**

Year: 2021-22

Lecture No.	Topic
1	**Statistical Evaluation of Data:** Errors
2	Classification of errors
3	Precision and Accuracy
4	Deviations
5	Standard deviations
6	Significant figures
7	Minimization of errors

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Justin Masih

Course Name: B.Sc. **Semester: V**

Paper Name: Inorganic Chemistry **Paper Code: 5CHETH01**

Year: 2021-22

Lecture No.	Topic
1	Crystalline and Amorphous solids and their characteristics
2	Types of crystalline solids
3	Unit cell and its characteristics
4	Ionic crystalline solids
5	Gouldschmidt coordination number
5	Radius ratio, Crystal systems and their characteristics
6	Acquaintance with structure of Rock salt
7	Caesium chloride, Rutile, Calcium Flourite
8	Zinc blande and Wurzite

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Sharda Sundaram Sanjay

Course Name: B.Sc. **Semester: V**

Paper Name: Inorganic Chemistry **Paper Code: 5CHETH01**

Year: 2021-22

Lecture No.	Topic
1	Wave mechanical concept of atom
2	Concept of sai & Schrodinger wave equation
3	Radial wave function
4	Angular wave function
5	Nature of covalent bond ; Heitler-London theory
5	Nature of covalent bond ; Pauling-Slater theory
6	Nature of covalent bond ; Hunds- Mullikan's theory
7	Molecular Orbital energy level diagrams
8	M.O. electronic configuration of diatomic species , bond order

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Mr. Abhinav Lal

Course Name: B.Sc. **Semester: V**

Paper Name: Inorganic Chemistry **Paper Code: 5CHETH01**

Year: 2021-22

Lecture No.	Topic
1	Air pollutants, their sources, toxic effects
2	Air pollutants - Control measures
3	Particular matter- their sources, toxic effects and control measures
4	Particular matter- Control measures
5	Acid rain, Greenhouse effect
6	Water Pollution- water pollutants, sources
7	Water Pollution- Toxic effects, control measures

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Ebenezer Samuel

Course Name: B.Sc. **Semester: VI**

Paper Name: Inorganic Chemistry **Paper Code: 6CHETH01**

Year: 2021-22

Lecture No.	Topic
1	**Chemistry of transition element:** comparative study of the chemistry of d-block elements and their important compounds : Cr, Mo, W
2	Chemistry of transition element: comparative study of the chemistry of d-block elements and their important compounds : Mn, Tc, Te
3	Chemistry of transition element: comparative study of the chemistry of d-block elements and their important compounds : Fe, Co, Ni and Pt metals
4	**Metal Ions of Biologically Significance:** Essential and trace elements
5	Chemistry of chlorophyll
6	Chemistry of Hemoglobin
7	Chemistry of Myoglobin
8	Chemistry of Cyanocobalamine

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Justin Masih

Course Name: B.Sc. **Semester: VI**

Paper Name: Inorganic Chemistry **Paper Code: 6CHETH01**

Year: 2021-22

Lecture No.	Topic
1	**General chemistry of lanthanide:** General characteristics
2	Electronic Configuration, Oxidation State
3	Magnetic Property
4	Colour and Spectra
5	Lanthanide Contraction
6	Modern Techniques of separation
7	Application

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Sharda Sundaram Sanjay

Course Name: B.Sc. **Semester: VI**

Paper Name: Inorganic Chemistry **Paper Code: 6CHETH01**

Year: 2021-22

Lecture No.	Topic
1	Theories of coordination linkage: valance bond theory,
2	Theories of coordination linkage: outer and inner orbital (high and low spin) complexes
3	Theories of coordination linkage: General ideas about crystal field theory
4	Theories of coordination linkage: Crystal field splitting in octahedral field (stereochemistry of coordination number 6)
5	Theories of coordination linkage: Crystal field splitting in Tetrahedral field (stereochemistry of coordination number 4)
6	Factors influencing Crystal field splitting
7	Applications of Crystal field splitting

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Mr. Abhinav Lal

Course Name: B.Sc. **Semester: VI**

Paper Name: Inorganic Chemistry **Paper Code: 6CHETH01**

Year: 2021-22

Lecture No.	Topic
1	**Chemistry of transition element**: comparative study of the chemistry of d-block elements and their important compounds. Sc, Y, La; Ti
2	**Chemistry of transition element**: comparative study of the chemistry of d-block elements and their important compounds. Ti, Zr, Hf
3	**Chemistry of transition element**: comparative study of the chemistry of d-block elements and their important compounds. V, Nb, Ta
4	Nanomaterial - Introduction, principles
5	Nanomaterial - Important discoveries and Application
6	Liquid Crystals - Introduction, principles, Types
7	Liquid Crystals – Physical Properties and Application
8	Inorganic Polymers - Introduction, principles, Types and Properties

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. M Karunakar

Course Name: B.Sc. **Semester: I**

Paper Name: Organic Chemistry **Paper Code: 1CHETH02**

Year: 2021-22

1	**STRUCTURE AND BONDING:** Hybridization, bond length,
2	bond angles and bond energy.
3	***Localized and delocalized chemical bond*** Inductive effect, electromeric effect,
4	Mesomeric effect Applications
5	Hyperconjucation. APPLICATIONS
6	**MECHANISM OF ORGANIC REACTIONS** Bond Fission with special reference to Homolysis and Heterolysis, ***Reactive Intermediates:***Formation, stability and stabilization of Carboniums
7	***Reactive Intermediates:***Formation, stability and stabilization of Carbanions and free radicals.
8	**HYDROCARBONS** ***Alkanes:***Methods of formation with special reference to Wurtz reaction, Kolbe's reaction, Corey-House synthesis
9	Decarbolylation of Carboxylic acids, Chemical reactions of alkanes with special reference to Halogenation
10	Cracking, Aromatization and isomerization.
11	***Alkenes:***Methods of formation with special reference to dehydration of alcohols, (E-1 and E-2). Comparative stabilities of Alkenes.
12	Dehydrohalogenation of alkyl halides (E-1 and E-2). Comparative stabilities of Alkenes.
13	Chemical reactions of Alkenes with special reference to Electrophilic and free radical reactions which include Markownikov and anti Markownikov addition reactions. Hydration,Halogenation
14	Hydroboration-Oxidation, hydroxylation, $KMnO_4$ oxidation
15	Eposidation and Ozonolysis. Allylic Substitutioin and Mustard gas formation
16	***Dienes:***Methods of formation, stability of conjugated Dienes

17	Chemical reactions of Dienes with special reference to Electrophilic addition (Kinetically and Thermodynamically stable products) Diel's Alder reaction and retro Diel's Alder process to identify Dienes and Dienophile structures
18	***Alkynes:***Methods of formation
19	Chemical reaction with special reference to Electrophilic and necleophilic reactions, acidity of alkynes, Hydroation
20	Hydroboration (oxidation and reduction), polymerization and ozonolysis reactions.
21	**AROMATIC HYDROCARBONS** Structure of benzene; molecular formula and Kekule structure, Stability and carbon-carbon bond length of benzene,
22	resonance structure, MO picture. Aromaticity; the Huckel rule applied to compounds and aromatic ions.
23	Directive influence. Identification of di-substituted benzene derivatives by Korner's absolute method and dipole moment studies chemical reactions of benzene ;
24	aromatic electrophilic substitution-general patterens of the mechanism, role of σ and π complexes. Mechanism of nitration halogenations, sulphonation, oxidation, Fidel-Crafts reaction (Alkylation and Acylation)
25	Birch reduction, methods of formation and chemical reactions of Toluene
26	**MONO-HALOGEN COMPOUNDS** Alkyl halides-method of formation
27	chemical reactions, mechanism of nucleophilic substitution reactions (SN2 and SN1)
28	SN1and SN2 effect on optically active alkyl halides with energy profile diagram.
29	Comparative reactivities of alkyl, allyl, vinyl and aryl halides towards nucleophilic substitution reactions.
30	Aryl halides-halides-the addition-elimination and the elimination-addition reaction of nucleophilic aromatic substitution reactions.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Prerna Higgins

Course Name: B.Sc. **Semester: I**

Paper Name: Organic Chemistry **Paper Code: 1CHETH02**

Year: 2021-22

1	**STRUCTURE AND BONDING:** Hybridization, bond length,
2	bond angles and bond energy.
3	***Localized and delocalized chemical bond*** Inductive effect, electromeric effect,
4	Mesomeric effect Applications
5	Hyperconjucation. APPLICATIONS
6	**MECHANISM OF ORGANIC REACTIONS** Bond Fission with special reference to Homolysis and Heterolysis, ***Reactive Intermediates:***Formation, stability and stabilization of Carboniums
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21	**AROMATIC HYDROCARBONS** Structure of benzene; molecular formula and Kekule structure, Stability and carbon-carbon bond length of benzene,
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23	Directive influence. Identification of di-substituted benzene derivatives by Korner's absolute method and dipole moment studies chemical reactions of benzene ;
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30	Aryl halides-halides-the addition-elimination and the elimination-addition reaction of nucleophilic aromatic substitution reactions.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Vivek Bhaduaria

Course Name: B.Sc. **Semester: I**

Paper Name: Organic Chemistry **Paper Code: 1CHETH02**

Year: 2021-22

1	**STRUCTURE AND BONDING:** Hybridization, bond length,
2	bond angles and bond energy.
3	***Localized and delocalized chemical bond*** Inductive effect, electromeric effect,
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30	Aryl halides-halides-the addition-elimination and the elimination-addition reaction of nucleophilic aromatic substitution reactions.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Mr. Sudhakar (Guest faculty)

Course Name: B.Sc. **Semester: I**

Paper Name: Organic Chemistry **Paper Code: 1CHETH02**

Year: 2021-22

1	**STRUCTURE AND BONDING:** Hybridization, bond length,
2	bond angles and bond energy.
3	***Localized and delocalized chemical bond*** Inductive effect, electromeric effect,
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30	Aryl halides-halides-the addition-elimination and the elimination-addition reaction of nucleophilic aromatic substitution reactions.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. M Karunakar

Course Name: B.Sc. **Semester: III**

Paper Name: Organic Chemistry **Paper Code: 3CHETH01**

Year: 2021-22

ORGANIC CHEMISTRY

1	**MONOHYDRIC COMPOUNDS** Monohydric (primary secondary and tertiary alcohols): General methods of preparation
2	distinction of primary secondary and tertiary alcohols, chemical reactions with special reference to acidic character, esterification
3	reaction with Grignard reagent and phosphorous halides, oxidation and dehydration.
4	**PHENOL:** General methods of preparation,
5	chemical reactions with special reference to acidic character, etherification, esterification
6	Riemer Tiemann reaction, Kolbe-Schmidth reaction, thalien reaction,
7	oxidation and electrophilic substitutuion
8	**STEREOCHEMISTRY OF ORGANIC COMPOUNDS** Optical isomerism, elements of symmetry, molecular chirality, enentiomers, stereogenic centres,
9	properties of enantiomers, compounds containing two stereogenic centres, concept of diastereomers,
10	threo and erythro isomers, meso compounds, resolution
11	inversion, retension, recemisation
12	Relative and absolute configuration, sequence rules, D/L and R/S system, nomenclature. .
13	Geometric isomerism, elementary idea of cis and trans isomerism, determination of configuration, E/Z system of nomenclature
14	Ggeometrical isomerism of oximes. Problems on RS, EZ configuration
15	**CARBONYL COMPOUNDS (ALIPHATIC AND AROMATIC ALDEHYDES AND KETONES)** General methods of preparation with special reference to synthesis from acid chlorides, 1, 3-dithianes, cyanides and carboxylic acids and Oppenauer oxidation.
16	Properties with special reference to aldol condensation, cross aldol condensation,
17	Perkin's reaction, Claisen – Schmidth reaction, Claisen condensation
18	Knovenagel condensation, Benzoin condensation. Reaction with ammonia and alcohol.
19	Wittig's reaction, Mannich's reaction, Bayer-Villige's reaction,

20	Cannizaro's reaction, Tischenko's reaction, MPV reaction
21	halogenations of enolisable ketones and Michael's reaction
22	**ALIPHATIC AND AROMATIC CARBOXYLIC ACIDS** Synthesis of acids, strength of acids
23	effect of substituent on acid strength, and effect of substituent position on acid strength.
24	An elementary idea of ortho effect.
25	Reactions of carboxylic acids with special reference to HVZ reaction, synthesis of acid derivatives and mechanism of decarboxylation
26	Halogen acids: Synthesis and reactions
27	Hydroxy acids: Synthesis and reactions.
28	**CARBOXYLIC ACID DERIVATIVES** Synthesis and properties of acid chlorides, acid anhydrides, esters and amides
29	mechanism of esterification, ester hydrolysis, Hofmann-Bromamide reaction
30	Comparative tendency to undergo nucleophilic substitution reactions

.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Vivek Bhadauria

Course Name: B.Sc. **Semester: III**

Paper Name: Organic Chemistry **Paper Code: 3CHETH01**

Year: 2021-22

ORGANIC CHEMISTRY

1	**MONOHYDRIC COMPOUNDS** Monohydric (primary secondary and tertiary alcohols): General methods of preparation
2	distinction of primary secondary and tertiary alcohols, chemical reactions with special reference to acidic character, esterification
3	reaction with Grignard reagent and phosphorous halides, oxidation and dehydration.
4	**PHENOL:** General methods of preparation,
5	chemical reactions with special reference to acidic character, etherification, esterification
6	Riemer Tiemann reaction, Kolbe-Schmidth reaction, thalien reaction,
7	oxidation and electrophilic substitutuion
8	**STEREOCHEMISTRY OF ORGANIC COMPOUNDS** Optical isomerism, elements of symmetry, molecular chirality, enentiomers, stereogenic centres,
9	properties of enantiomers, compounds containing two stereogenic centres, concept of diastereomers,
10	threo and erythro isomers, meso compounds, resolution
11	inversion, retension, recemisation
12	Relative and absolute configuration, sequence rules, D/L and R/S system, nomenclature. .
13	Geometric isomerism, elementary idea of cis and trans isomerism, determination of configuration, E/Z system of nomenclature
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21	halogenations of enolisable ketones and Michael's reaction
22	**ALIPHATIC AND AROMATIC CARBOXYLIC ACIDS** Synthesis of acids, strength of acids
23	effect of substituent on acid strength, and effect of substituent position on acid strength.
24	An elementary idea of ortho effect.
25	Reactions of carboxylic acids with special reference to HVZ reaction, synthesis of acid derivatives and mechanism of decarboxylation
26	Halogen acids: Synthesis and reactions
27	Hydroxy acids: Synthesis and reactions.
28	**CARBOXYLIC ACID DERIVATIVES** Synthesis and properties of acid chlorides, acid anhydrides, esters and amides
29	mechanism of esterification, ester hydrolysis, Hofmann-Bromamide reaction
30	Comparative tendency to undergo nucleophilic substitution reactions

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Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. M Karunakar

Course Name: B.Sc. **Semester: IV**

Paper Name: Organic Chemistry **Paper Code: 4CHETH02**

Year: 2021-22

1	**Di-hydric :**Methods of formation, Chemical reactions
2	with special reference to HIO_4 cleavage HIO_4 cleavage
3	Pinacol – Pinacalone rearrangements.
4	Pinacol – Pinacalone rearrangements.
5	**Tri-hydric :**Constitution of glycerol, its methods of formation,
6	chemical reactions and oxidation
7	**ETHERS AND EPOXIDES** Ethers General study of methods of preparation
8	Chemical properties.
9	Chemical properties
10	**CYCLOALKANES** Methods of formation
11	Chemical reactions
12	Baeyer's strain theory and its limitations
13	Ring strain in small rings (cyclopropane), theory of strainless rings.
14	The case of cyclopropane ring: banana bonds.
15	**CONFOMATIONAL ISOMERISM** **Introduction,** Newmann projection formula and Fischer formula
16	Conformational analysis of ethane
17	butane and cyclohexane, Axial and equatorial bonds,
18	conformation of mono substituted cyclohexane derivatives
19	**ALIPHATIC AND AROMATIC NITROGEN COMPOUNDS** Preparation of nitroalkanes
20	Preparation of nitroarenes
21	Properties with special reference to reduction in mediums of different pH
22	Preparation and properties of aliphatic and aromatic amines with special reference to Gabriel's Phthalamide, Reductive amination,.
23	Hinsberg and Hoffmann separation of primary, secondary and tertiary amines.
24	Basic character of aliphatic and aromatic amines
25	Basic character of aliphatic and aromatic amines
26	with elementary concept of steric inhibition of resonance
27	Electrophilic substitution in aryl amines.
28	Diazo reaction and properties of diazonium salts,
29	Diazo reaction and properties of diazonium salts,
30	Synthesis and properties of Urea with special reference to condensation reactions.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Vivek Bhadauria

Course Name: B.Sc. **Semester: IV**

Paper Name: Organic Chemistry **Paper Code: 4CHETH02**

Year: 2021-22

1	**Di-hydric :**Methods of formation, Chemical reactions
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27	Electrophilic substitution in aryl amines.
28	Diazo reaction and properties of diazonium salts,
29	Diazo reaction and properties of diazonium salts,
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TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. M Karunakar

Course Name: B.Sc. **Semester: V**

Paper Name: Organic Chemistry **Paper Code: 5CHETH02**

Year: 2021-22

1	**Heterocyclic compounds:** **Introduction:** Molecular orbital picture and aromatic characteristics of Pyrrole, Thiophene and Pyridine.
2	Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution.
3	Mechanism of nucleophilic substitution reaction in pyridine derivatives.
4	Comparison of basicity of pyridine, piperidine and pyrrole.
5	Introduction to condensed six membered heterocyclic compounds. Preparation of quinoline.
6	isoquinoline. Skraup synthesis and Bischler-Napier synthesis
7	Mechanism of electrophilic substitution reaction s of quinoline
8	Mechanism of electrophilic substitution reaction s of isoquinoline
9	**Comparative study**
10	**Problems Practice**
11	**Organomettalic compounds:** Organomegnisium compounds: the Grignard reagents-formation, structure
12	chemical reactions
13	chemical reactions
14	chemical reactions
15	Organozincompounds: formation chemical reactions
16	Organozincompounds: formation chemical reactions
17	Organolithium compounds:formation chemical reactions
18	Organozincompounds: formation chemical reactions
19	**Problems Practice**
20	Comparing reactivity of organo megnisium, organo lithium, organo zinc compounds

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Vivek Bhadauria

Course Name: B.Sc. **Semester: V**

Paper Name: Organic Chemistry **Paper Code: 5CHETH02**

Year: 2021-22

1	**Electromagnetic spectrum: Absorption Spectra** **Ultraviolet (UV) absorption spectroscopy:** absorption laws (Beer-Lambert law) molar absorptivity, presentation and analysis of uv spectra,
2	types of electronic transitions, effect of conjugation.
3	Concept of Chromophore and auxochrome,
4	Bathochromic, hypsochromic, hyperchromic and hypochromic shifts
5	UV spectra of conjugated enes and enones.
6	UV spectra of conjugated enes and enones.
7	Infrared (IR) absorptionspectroscopy: molecular vibrations, Hooke's law selection rules, intensity and position of IR bands
8	measurement of IR spectrum fingerprint region, characteristic absorption of various functional groups
9	interpretation of IR spectra of simple organic compounds.
10	interpretation of IR spectra of simple organic compounds.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. M Karunakar

Course Name: B.Sc. **Semester: VI**

Paper Name: Organic Chemistry **Paper Code: 6CHETH02**

Year: 2021-22

1	**Carbohydrates:** classification and nomenclature, monosaccharide's
2	mechanism of osazone formation, interconversion of glucose and fructose
3	chain lengthening and chain shortening of aldoses
4	Configuration of monosacharides. Erythro and threodiastereomers
5	Conversion of glucose to mannose. Formation of glycosides,ethers and esters
6	Determination of ring size of monosaccharide.
7	Cyclic structure of D(+)-glucose. Mechanism of mutarotation
8	Structure of ribose and deoxyribose
9	An introduction to disaccharides (maltose, sucrose and lactose
10	Polysaccharides(starch and cellulose) without involving structure determination

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Vivek Bhadauria

Course Name: B.Sc. **Semester: VI**

Paper Name: Organic Chemistry **Paper Code: 6CHETH02**

Year: 2021-22

1	**Nuclear Magnetic Resonance(NMR) Spectroscopy:** Protanmagnetiuc resonance (^{1}H-NMR) spectroscopy, nuclear shielding and deshielding,
2	chemical shift and molecular structures, spin -spin splitting and coupling constants, areas of signals,
3	interpretation of PMR spectra of simple organic molecules such as ethyl bromide, ethanol, acetaldehyde, 1,1,2-tribroethane
4	interpretation of PMR spectra of simple organic molecules such asethyl acetate, toluene and acetophenone.
5	Problems pertaining to the structure elucidation of simple organic compounds using UV, IR and PMR spectroscopic techniques
6	Addition or chain growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization,
7	Ziegler- natta polymerization and vinyl polymers
8	Condensation or step growth polymerization. Polyesters, polyamides
9	Phenol formaldehyde resins, urea formaldehyde resins, epoxy resins
10	Polyurethanes, Natural and synthetic rubbers.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Mr Sudhakar Guest Faculty

Course Name: B.Sc. **Semester: VI**

Paper Name: Organic Chemistry **Paper Code: 6CHETH02**

Year: 2021-22

1	**Amino acids, Peptides, Proteins and Nucleic acid** Classification, structure and stereochemistry of amino acids
2	acid base behavior, isoelecric point and electrophoresis
3	Preparation and reaction of a- amino acids
4	Structure and nomenclature of peptides and protein classification of proteins
5	Peptide structure determination, end group analysis, Selective hydrolysis of peptide
6	Classical peptide synthesis, Solid phase peptide synthesis
7	Structure of peptides and proteins. Levels of protein structure.
8	Protein denaturation/renaturation.
9	Nucleic acids**:** Constituents of nucleic acids.
10	Ribonucleosides and Ribonucleotides. The double helical structure of DNA

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Kranthikumar Tungala

Course Name: B.Sc. **Semester: II**

Paper Name: Physical Chemistry **Paper Code: 2CHETH01**

Year: 2021-22

Lecture No.	Topic
1	**REAL GASES:** Basic Laws of Gaseous state and deviation of real gas from ideal behavior
2	van der Waal's equation
3	Critical constants.
4	Principles of corresponding states
5	Qualitative treatment of Maxwell Law of distribution of velocities.
6	**CHEMICAL EQUILIBRIUM:** Law of mass action, Significance of equilibrium constant
7	Relation between K_p and K_c and Applications in homogeneous equilibrium ($\Delta n = 0$ and $\Delta n = +ve$)
8	Applications of equilibrium contant in homogeneous ($\Delta n = -ve$) and heterogeneous equilibria.

9	Effect of pressure and Temperature on the state equilibrium and numerical.
10	Effect of Concentration and Inert substances on the state equilibrium and numerical.
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12	**IONIC EQUILIBRIUM:** Arrhenius, Bonsted-Lowry, and Lewis acid base theories. Buffer solution and its pH (Acidic buffer).
13	Basic Buffer solution and its pH; and numerical.
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17	Quinonoid theory of indicators and Solubility product.
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19	Applications of solubility product.
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	THERMODYNAMICS: Thermodynamic terms.
21	Statements of first law, Thermodynamic reversibility and maximum work.
22	State function and exact differential, Cyclic rule, Integration factor,
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24	Internal energy, variation of internal energy with temperature and volume and Joule's experiment.
25	Enthalpy (H) and H as function of temperature and pressure, and concepts of heat capacity.
26	Joule Thomson experiment and μ_J.
27	Relation between C_p and C_V, and numerical.
28	**Thermochemistry:** Heat of reaction at constant pressure and constant volume, Heat of combustion, Formation and neutralization,
29	Hess's law and its applications.
30	Kirchoff's equation, Bond energy, Resonance energy.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Kranthikumar Tungala

Course Name: B.Sc. **Semester: III**

Paper Name: Physical Chemistry **Paper Code: 3CHETH01**

Year: 2021-22

Lecture No.	Topic
1	**CHEMICAL KINETICS:** Rate of a reaction and factors effecting rate. Rate law, Molecularity and Order of reaction.
2	Rate constants of Zero and first order reactions and their characteristics.
3	Rate constants of second and third order reactions and their characteristics.
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6	Collision theory for bimolecular reactions.
7	Lindemann theory for unimolecular reactions and Qualitative treatment of transition state theory.
8	**PHASE RULE:** Phase and Components.

9	Determination of components and Degree of freedom.
10	Monocomponent system: Application of Phase rule to water system.
11	Application of Phase rule to water system.
12	Application of Phase rule to Sulpher system.
13	Bicomponent system and application of phase rule to (Ag + Pb) system.
14	**THERMODYNAMICS:** Limitations of first law and Carnot cycle.
15	Statement of second law, Concept of Entropy.
16	Combined form of first and second law of thermodynamics, Enthalpy and Entropy.
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18	Entropy change in isolated system and Variation of entropy with temperature and volume.
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20	Helmholtz and Gibbs free energies, Properties of Gibbs Helmholtz equation.
21	Thermodynamic criteria for spontaneity and conditions of equilibrium**.**
22	Clapeyron- Clausius equation and its application.

23	**ELECTRO CHEMISTRY:** Basic terms of electrochemistry and Reversible and irreversible cells
24	E.M.F. of Galvanic cells and free energy change and Nernst equation.
25	Application of E.M.F. to determine Equilibrium constant and numerical.
26	Standard electrode potential and Types of reversible electrodes.
27	Concentration cells without transference.
28	Application of E.M.F. measurements: Determination of solubility product.
29	Application of E.M.F. measurements: Determination of pH.
30	**Application of E.M.F. measurements:** Dissociation constants, Solubility of sparingly soluble salts.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Kranthikumar Tungala

Course Name: B.Sc. **Semester: V**

Paper Name: Physical Chemistry **Paper Code: 5CHETH03**

Year: 2021-22

Lecture No.	Topic
1	**Electrochemistry**: Concept of Galvanic cells: Chemical and concentration cells.
2	E.M.F. determination of electrode concentration cells without transference.
3	E.M.F. determination of concentration cells reversible w. r. t cations and anions (L.J.P. eliminated by salt bridge)
4	E.M.F. determination of concentration cells reversible w. r. t cations and anions (L.J.P. eliminated by chemical cells).
5	Liquid junction potential and cause of L.J.P. Determination of L.J.P of electrolyte concentration of cell with transference reversible w.r.t. cations and anions (when $n_a > n_c$).
6	Determination of L.J.P of electrolyte concentration of cell with transference reversible w.r.t. cations and anions (when $n_c > n_a$).
7	Determination of transport number by e.m.f measurement.
8	Chemical cells without transference.
9	Fuel cells and their applications.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Kranthikumar Tungala

Course Name: B.Sc. **Semester: VI**

Paper Name: Physical Chemistry **Paper Code: 6CHETH03**

Year: 2021-22

Lecture No.	Topic
1	**Atomic structure:** Introduction to Bohr′s theory and postulates of Bohr theory.
2	Determination of radius and energy of orbits. Numericals based on radius and energy.
3	Spectral lines and Numericals. Limitations of Bohr′s theory and Sommerfield′s model.
4	Dual nature of electron and de-broglie′s equation. Numericals based on de-broglie′s equation
5	Experimental verification of the wave nature of electron (Davission and Germer′s experiments).
6	Heisenberg′s uncertainty principle and Stationary waves.
7	Wave function and Physical significance of the wave function.
8	Schrondinger′s time dependent and time independent wave equations.
9	Particle in a one dimensional box: Solution of Schrodinger equation.
10	Particle in a one dimensional box: Energy and nodes.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Shikhi Sahai

Course Name: B.Sc. **Semester: II**

Paper Name: Physical Chemistry **Paper Code: 2CHETH01**

Year: 2021-22

Lecture No.	Topic
1	**REAL GASES:** Basic Laws of Gaseous state and deviation of real gas from ideal behavior
2	van der Waal's equation
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Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Shikhi Sahai

Course Name: B.Sc. **Semester: III**

Paper Name: Physical Chemistry **Paper Code: 3CHETH01**

Year: 2021-22

Lecture No.	Topic
1	**CHEMICAL KINETICS:** Rate of a reaction and factors effecting rate. Rate law, Molecularity and Order of reaction.
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30	**Application of E.M.F. measurements:** Dissociation constants, Solubility of sparingly soluble salts.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Shikhi Sahai

Course Name: B.Sc. **Semester: III**

Paper Name: Physical Chemistry **Paper Code: 3CHETH01**

Year: 2021-22

Lecture No.	Topic
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Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Vikram Mushran/ Dr. Shikhi Sahai/ Dr. Kranthikumar Tungala

Course Name: B.Sc. **Semester: V**

Paper Name: Physical Chemistry **Paper Code: 5CHETH03**

Year: 2021-22

Lecture No.	Topic
1	**Kinetics of catalyzed reactions**: Introduction and Steady state approximation.
2	Kinetics of homogenous acid base catalysis.
3	Enzyme catalysis, negative catalysis and inhibition.
4	Kinetics of gaseous reaction on solid surface.
5	Uni-molecular surface reactions.
6	Bi-molecular surface reactions. Effect of temperature on surface reaction.
7	Primary salt effect.
8	**Radiochemistry**: Definition and measurement of radioactivity. Rate of atomic disintegration.
9	Nnumericals on rate of atomic disintegration. Radioactive equilibrium and theory of radio activity.
10	Artificial transmutation of elements, induced radio activity and nuclear Energy.
11	Nuclear fission and fusion.
12	Radioactive isotopes and their applications.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Shikhi Sahai

Course Name: B.Sc. **Semester: VI**

Paper Name: Physical Chemistry **Paper Code: 6CHETH03**

Year: 2021-22

Lecture No.	Topic
1	**Photochemistry:** Photochemical and thermal reactions.
2	Chain reaction and free radicals chains.
3	Thermal decomposition of acetaldehyde.
4	Thermal decomposition of ethane. Lambert and beers law.
5	Grothus Drapers law and Einstein law of photochemical equivalence.
6	Kinetics of photochemical reactions: Decomposition of hydrogen iodide.
7	Decomposition of hydrogen bromide.
8	Decomposition of acetaldehyde and ethane.
9	Combination of hydrogen-chlorine.
10	Combination of hydrogen-bromine and hydrogen –iodine reactions.
11	Dimerisation of anthracene.
12	Fluorescence, photosensitization, phosphorescence and chemiluminescence.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Vikram Mushran

Course Name: B.Sc. **Semester: III**

Paper Name: Physical Chemistry **Paper Code: 3CHETH01**

Year: 2021-22

Lecture No.	Topic
1	**CHEMICAL KINETICS:** Rate of a reaction and factors effecting rate. Rate law, Molecularity and Order of reaction.
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Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Vikram Mushran

Course Name: B.Sc. **Semester: II**

Paper Name: Physical Chemistry **Paper Code: 2CHETH01**

Year: 2021-22

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Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Vikram Mushran

Course Name: B.Sc. **Semester: V**

Paper Name: Physical Chemistry **Paper Code: 5CHETH03**

Year: 2021-22

Lecture No.	Topic
1	**Thermodynamics:** Partial molar quantities and chemical potential.
2	Gibbs-Duhem equation.
3	Relationship between chemical potential and energy.
4	Relationship of chemical potential with enthalpy and work function.
5	Effect of temperature and pressure on chemical potential. Chemical potential of pure substances.
6	Chemical potential of real gases and fugacity.
7	Chemical potential in ideal gas mixture.
8	Thermodynamic treatment of colligative properties: lowering of vapour pressure.
9	Thermodynamic treatment of osmotic pressure.

Teacher's Signature

TEACHING PLAN

Department: Chemistry

Name of the Teacher: Dr. Vikram Mushran

Course Name: B.Sc. **Semester: VI**

Paper Name: Physical Chemistry **Paper Code: 6CHETH03**

Year: 2021-22

Lecture No.	Topic
1	**Colligative properties**: Elevation of boiling point.
2	Depression of freezing point.
3	Numericals based on elevation of boiling point and depression of freezing point
4	Chemical equilibrium and thermodynamic derivation of law of mass action.
5	Variation of equilibrium constant with temperature, van′t Hoff equation.
6	Condition for equilibrium between phases.
7	Thermal, mechanical and chemical equilibrium.
8	Derivation of phase rule.

Teacher's Signature