SYLLABUS OF CHEMISTRY (MINOR) FOR PG CLASSES

BACHELOR RESEARCH in CHEMISTRY	Year-FOURTH	Semester-SEVENTH(VII)
Paper-I (Theory) CHEMISTRY (MINOR)		
CREDITS=4	COMPULSORY	
MAX MARKS:100	MIN PASSING MARKS:33	
TOTAL NUMBER OF LECTURES=50		

UNIT	TOPICS	No of Lectures
I	**General Inorganic Chemistry-** Modern periodic law and periodic table, electronic configuration of elements and their periodic properties. Kossel-Lewis Approach to Chemical Bonding, Ionic or Electrovalent Bond, Bond parameters, The Valence Shell Electron Pair Repulsion (VESPR) Theory, Valence Bond Theory, Hybridization, Molecular Orbital Theory, Bonding in some Homonuclear diatomic molecules, Hydrogen bonding.	12
II	**General Organic Chemistry-** Introduction, Structural representation of organic compounds, Classification of organic compounds, Nomenclature of Organic compounds, Fundamental concept of Organic Reaction Mechanism, Qualitative and quantitative analysis, General idea of alkanes, alkenes, alkynes, and aromatic hydrocarbons.	12
III	**General Physical Chemistry-** Intermolecular Forces, Ideal Gas Forces, The Gaseous State, The Gas Laws, Ideal Gas Equation, Kinetic Molecular Theory of Gases. Rate of Chemical Reaction, Factors influencing rate of reaction, Collision theory of Chemical Reaction. Types of solution, Expressing concentration of solutions, Solubility, Ideal and Non ideal solutions.	12
IV	**Environmental Chemistry-** Atmosphere, Environmental Pollution, Air Pollution, Water pollution, Soil Pollution, Noise pollution, Industrial and municipal wastes, Strategies to control Environmental Pollution, Green Chemistry.	07
V	**Chemistry in Everyday Life-** Drugs and their classification, Drug and their classification, Drug target interaction, Therapeutic action of different classes of drugs, chemicals in food, cleansing agents	07

Recommended Books:

1. Advanced Inorganic Chemistry, F. A. Cotton and G. Wilkinson, John Wiley
2. Inorganic Chemistry, J. E. Huheey, Ellen A. Keiter, Richard L. Keiter, Addison Wesley Longman (Singapore) Pvt. Ltd.
3. Organic Chemistry, R. T. Morrison, R.N. Boyd, Pearson.
4. Organic Chemistry, Bahal & Bahal, S. Chand Publications.
5. Physical Chemistry P.W. Atkins, ELBS.
5. Principals of Physical Chemistry, Puri, Sharma & Pathania, Vishal Publication, Jalandhar
6. Environmental Chemistry, A K De, New Age International Publishers
7. Water Pollution, Shafqat Alauddin, Akhand Publishing House, New Delhi
8. Noise Pollution, Shafqat Alauddin, Akhand Publishing House, New Delhi
9. Understanding Chemistry, C N R RAO, Universities Press.
10. The Chemistry of Life, Martin Olomucki, McGraw Hill Publications.

SYLLABUS OF CHEMISTRY (MINOR) FOR UG CLASSES

UG CHEMISTRY (Minor)	Year-First	Semester- First (I)
Paper-I (Theory) CHEMISTRY (MINOR)-I		
CREDITS=4	COMPULSORY	
MAX MARKS:100	MIN PASSING MARKS:33	
TOTAL NUMBER OF LECTURES=50		

UNIT	TOPICS	No of Lectures
I	**PHYSICAL INTERACTIONS** Formal Charges, hydrogen bonding, Van der Waal's forces, Dipole Moment and Molecular structures (diatomic and polyatomic molecules), Percentage ionic character from dipole moment, Fajjan's rule, Aufbau's principle.	10
II	**CHEMICAL BONDING** Concept of hybridization, Hybrid orbitals and molecular geometry, Vallance shell electron pair repulsion (VSEPR) Theory, Shapes of following molecules and ions: H_2O, NH_3, PCl_5, SF_6, SF_4, ClF_3, I_3^- and ICl_4^-	10
III	**GENERAL ORGANIC CHMISTRY** General Introduction to Organic Compounds, allotropes of carbon, hybridization, shapes of organic compounds, bond length, bond angle, bond energy, nomenclature, isomerism, inductive effect, hyperconjugation, concept of resonance, Huckel's rule for aromaticity.	10
IV	**CHEMICAL KINETICS AND SURFACE CHEMSTRY** Rate of chemical reaction, order and molecularity of the reactions, Integrated rate equations, Pseudo first order reactions, collision theory of chemical reactions, catalysis, Adsorption, Colloids, Emulsion.	10
V	**STATE OF MATTERS** General Characteristics of different state of matters, The Gaseous state, Gaseous laws, Ideal gas equation, Kinetic Molecular theory of gases, Liquid state and its different characteristics, Solid state, Amorphous and crystalline solids, Crystal Lattices and unit Cells	10

Recommended Books:

1. Advanced Inorganic Chemistry, F. A. Cotton and G. Wilkinson, John Wiley
2. Inorganic Chemistry, J. E. Huheey, Ellen A. Keiter, Richard L. Keiter, Addison Wesley Longman (Singapore) Pvt. Ltd.
3. Organic Chemistry, R. T. Morrison, R.N. Boyd, Pearson.
4. Physical Chemistry P.W. Atkins, ELBS.
5. Principals of Physical Chemistry , Puri , Sharma & Pathania, Vishal Publication , Jalandhar

UG CHEMISTRY (Minor)	Year-Second	Semester- Third (III)
Paper-II (Theory) CHEMISTRY (MINOR)-II		
CREDITS=4	COMPULSORY	
MAX MARKS:100	MIN PASSING MARKS:33	
TOTAL NUMBER OF LECTURES=50		

UNIT	TOPICS	No of Lectures
I	**COARDINATION COMPOUNDS** Werner's coordination theory and its experimental verification, effective atomic number concept, chelates, nomenclature of coordination compounds, valence bond theory of transition metal complexes.	10
II	**ACIDS AND BASES** Arrhenius, Bronsted-Lowry, the Lux-Flood, Solvent system and Lewis concept of acids and bases.	08
III	**HYDROCARBONS** IUPAC nomenclature of branched and unbranched alkanes, alkenes and alkynes, classification of carbon atoms in alkanes, sources of alkanes, methods of preparation of alkanes (Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids), chemical reactions of alkanes, Bayer's strain theory and its limitations, theory of stainless rings. Methods of preparation pf alkenes (Dehydration of alcohols and dehydrogenation of alkyl halides), The Saytzeff rule, Hofmann elimination, chemical reactions of alkenes (electrophilic and free radical additions , Markownikoff's rule).	12
IV	**STRUCTURE OF ATOM** Sub-atomic particles, atomic models, development leading to the Bohr's Model of atom, Bohr's model of Hydrogen atom. Quantum Mechanical model of atom.	10
V	**SOLUTIONS** Types of solutions, methods to express concentration of solution, solubility, vapour pressure of liquid solutions, Ideal and non-ideal solutions, Colligative properties.	10

Recommended Books:

1. Advanced Inorganic Chemistry, F. A. Cotton and G. Wilkinson, John Wiley
2. Inorganic Chemistry, J. E. Huheey, Ellen A. Keiter, Richard L. Keiter, Addison Wesley Longman (Singapore) Pvt. Ltd.
3. Organic Chemistry, R. T. Morrison, R.N. Boyd, Pearson.
4. Physical Chemistry P.W. Atkins, ELBS.
5. Principals of Physical Chemistry , Puri , Sharma & Pathania, Vishal Publication , Jalandhar

SYLLABUS OF INDUSTRIAL CHEMISTRY (MINOR) FOR UG CLASSES

UG CHEMISTRY (Minor)	Year-First	Semester- First (I)
Paper-I (Theory) FUNDAMENTALS OF INDUSTRIAL CHEMISTRY (MINOR)-I		
CREDITS=4	COMPULSORY	
MAX MARKS:100	MIN PASSING MARKS:33	
TOTAL NUMBER OF LECTURES=50		

UNIT	TOPICS	No of Lectures
I	**INDIAN ANCIENT CHEMISTRY AND FUNDAMENTALS OF CHEMICAL CALCULATIONS** Introduction of Indian ancient chemistry, contribution of Indian chemists in context to the holistic development of modern science and technology. Atomic weight, molecular weight, equivalent weight, mole concept, percentage yield, molarity, molality and normality.	10
II	**CHEMICAL BONDING** Concept of hybridization, Hybrid orbitals and molecular geometry, Vallance shell electron pair repulsion (VSEPR) Theory, Shapes of following molecules and ions: H_2O, NH_3, PCl_5, SF_6, SF_4, ClF_3, I_3^- and ICl_4^-	10
III	**GENERAL ORGANIC CHMISTRY** General Introduction to Organic Compounds, allotropes of carbon, hybridization, shapes of organic compounds, bond length, bond angle, bond energy, nomenclature, isomerism, inductive effect, hyperconjugation, concept of resonance, Huckel's rule for aromaticity.	10
IV	**CHEMICAL KINETICS AND SURFACE CHEMISTRY** Rate of chemical reaction, order and molecularity of the reactions, Integrated rate equations, Pseudo first order reactions, collision theory of chemical reactions, catalysis, Adsorption, Colloids, Emulsion.	10
V	**STATE OF MATTERS** General Characteristics of different state of matters, The Gaseous state, Gaseous laws, Ideal gas equation, Kinetic Molecular theory of gases, Liquid state and its different characteristics, Solid state, Amorphous and crystalline solids, Crystal Lattices and unit Cells	10

Recommended Books:

1. Advanced Inorganic Chemistry, F. A. Cotton and G. Wilkinson, John Wiley
2. Inorganic Chemistry, J. E. Huheey, Ellen A. Keiter, Richard L. Keiter, Addison Wesley Longman (Singapore) Pvt. Ltd.
3. Organic Chemistry, R. T. Morrison, R.N. Boyd, Pearson.
4. Physical Chemistry P.W. Atkins, ELBS.
5. Principals of Physical Chemistry , Puri , Sharma & Pathania, Vishal Publication , Jalandhar