

Course outcome

F.Y.B.Sc.

Course	Learning out comes
Physical & Inorganic Chemistry	<ul style="list-style-type: none">• understanding of behaviour of gases, ideal gas as a model• System and its extension to real gases. The dependence of physical state on• Pressure, volume and temperature is being realized.• The existence of liquid state, comparison of its properties with other states• Theoretical basis of adsorption phenomena is integrated. Understanding dynamic nature of surface and its applications in catalysis and in dispersed phases will lead to new area of Nanoscience. Mathematical background required for derivations, depictions and problem solving. This• Chapter strengthens these aspects.• 1) Mole concept 2)GMV relationship• Normality, Molarity, Normal solution, Molar solution, equivalent weight, ppm, % w/v,• %v/v & related problems.• Standard solution, primary & secondary standard substances, standardization of solution• Understand the concept of oxidation & reduction, oxidizing agent, reducing agent, redox• reaction, oxidation number, Balance the equation by ion electron method & oxidation number
	<ul style="list-style-type: none">• The fundamental concepts which govern the structure, bonding, properties and reactivities of organic molecules such as covalent character, hybridization, bond angles, bond energies, bond polarities and shapes of molecules.

<p>ORGANIC & INORGANIC CHEMISTRY</p>	<ul style="list-style-type: none"> • Drawing of organic molecules and arrow pushing concept. • Acid-base theories, pKa / pKb values for common organic acids and bases and factors • Affecting strength of acids and bases. • Structural effects and their applications in determining strength of acids and bases. • The common and IUPAC names of alkanes, alkenes, alkynes and homocyclic, polycyclic aromatic hydrocarbons. • Methods of preparation and chemical reactions of alkanes, alkenes, alkynes and homocyclic, polycyclic aromatic hydrocarbons. • Application of Huckel's rule to different organic compounds to find out aromatic /non • Aromatic characters.
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S.Y.B.Sc.

Course	Outcomes
Physical Chemistry	<ul style="list-style-type: none"> • Concept of kinetics , terms used , rate laws , types of order Discuss examples of first order and second order reaction. Pseudo molecular reactions • Factors affecting on rate of reaction Techniques of measurement of rate of reaction • Know about photochemistry • Understand difference between thermal and photochemical reactions • Understand laws of photochemistry • Learn what is quantum yield and it's measurement • Know Types of photochemical reactions and photophysical process Know about quenching and chemiluminescent

	<ul style="list-style-type: none"> • Concept of distribution of solute amongst pair of immiscible solvents ii. Distribution law and it's thermodynamic proof • Distribution law and nature of solute in solution state iv. Application – Solvent extraction • Students should learn • What is Analytical Chemistry • Chemical analysis and its applications • Sampling • Common techniques • Instrumental methods and other techniques • Choice of method • Meaning of error and terms related to expression & estimation of errors • Methods of expressing accuracy and precision • Classification of errors • Significant figures and computations • Distribution of errors • Mean and standard deviations • Reliability of results Basic principles in qualitative analysis • Meaning of common ion effect • Role of common ion effect and solubility product • Different groups for basic radicals • Group reagent and precipitating agents
Organic Chemistry	<ul style="list-style-type: none"> • Students should be able to – • Identify chiral center in the given organic compounds. • Define Erythro, threo, meso, diastereoisomers with suitable examples. • Able to find R/S configuration in compounds containing two chiral centers.

	<ul style="list-style-type: none"> • Explain Bayer's strain theory, Heat of combustion and relates stability of cycloalkanes. • Explain the stability of cyclohexanes. • Draw the structure of boat and chair configuration of cyclohexane. • Draw axial and equatorial bonds in cyclohexane. • Draw structure of conformations of mono- & disubstituted cyclohexanes • Explain the stability of axial and equatorial conformation of monosubstituted • Cyclohexanes. Define and classify heterocyclic compounds. • Use Huckel rule to predict aromaticity. • Suggest synthetic route for preparation of various heterocyclic compounds. • Write and complete various reactions of heterocyclic compounds. • Predict products.
Inorganic Chemistry	<ul style="list-style-type: none"> • A student should be able – • To differentiate between ore and minerals. • To differentiate between calcination and roasting and smelting. • To know the different methods for separation of gangue or matrix from metallic compounds. • To know the terms smelting, flux. • A student should be able - • To know physico-chemical principles involved in electrometallurgy. • To understand electrolysis of alumina and its refining. • To explain the uses of Aluminum and its alloys.

	<ul style="list-style-type: none"> • To know purification of bauxite ore. To explain the term pyrometallurgy and to explain the physico chemical principles • involved in the reduction process by carbon monoxide. • To know different reactions in the blast furnace. • To differentiate between properties of pig iron and wrought iron. • To explain the basic principles of different methods for preparation of steel. • To explain the merits and demerits of different methods.
Analytical Chemistry	<ul style="list-style-type: none"> • Meaning of equivalent weight, molecular weight, normality, molality, primary and secondary standards. • Different way to express concentrations of the solution. Preparation of standard solution. • To solve numerical problems. • Calibrate various apparatus such as burette, pipette, volumetric flask, barrel pipette • etc. • Types instrumental and non instrumental analysis. Explain role of indicators. • Know mixed and universal indicators. • Know neutralization curves for various acid base titration • Know principle of complexometric precipitation and redox titrations. • Know the definitions and difference between iodometry and iodimetry. • To know standardization of sodium thiosulphate and EDTA.

	<ul style="list-style-type: none"> • Reactions between CuSO_4 and Iodine and liberated I_2 and $\text{Na}_2\text{S}_2\text{O}_3$ • Choice of suitable indicator. • Estimate copper from CuSO_4 and available chlorine in bleaching powder. • Prepare standard silver nitrate solution. • Mohr's and Fajan's method. • Determine the amount of halides separately and in presence of each other.
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T.Y.B.Sc

Course	Outcomes
Physical Chemistry	<p>After studying this topic students are expected to know</p> <ul style="list-style-type: none"> • Expression for rate constant k for third order reaction • Examples of third order reaction • Characteristics of third order rate constant k • Derivation for half-life period of third order reaction and to show that half-life • inversely proportional to square of initial concentration of reactants. • Graphical evaluation of energy of activation • xi. Solve the numerical problems based on this topic.
Inorganic Chemistry	<ul style="list-style-type: none"> • ii. Know the assumptions and limitations of VBT • iii. Understand the need of concept of MOT • iv. Know LCAO principal and its approximation • v. Understand and show the formation of bonding and antibonding MO's • vi. Draw the shapes of s, p, d orbital

	<ul style="list-style-type: none"> • vii. Draw combinations of s-s, s-p, p-p and d-d orbital to form σ and π molecular orbitals. • viii. Give the comparison of a) Atomic orbital and molecular orbital • b) BMO and ABMO • c) Sigma and pi MO's
Organic Chemistry	<ul style="list-style-type: none"> • Definition and type of nucleophiles and leaving groups • 2. Different types of nucleophilic substitution reactions • 3. Definition of inversion and racemization • 4. The kinetics, mechanism & stereochemistry of these reactions • 5. Whether a given reaction follows SN1 or SN2 mechanism? • 6. The comparison between SN1 & SN2 reactions • 7. An SNi mechanism in presence and absence of pyridine • 8. To predict product/s or supply the reagent/s for these reactions • Different types of carbon-carbon unsaturated compounds • 2. Orientation / rules in addition reactions • 3. The structure of carbonyl group • 4. Reactivity concept • 5. Correct mechanism of addition reactions using different reagents • 6. Types of some known addition reactions • 7. To predict product/s or supply the reagent/s for such reactions
Analytical Chemistry	<ul style="list-style-type: none"> • Principles of common ion effect and solubility product • 2. Formation of complex ion • 3. Factors affecting on solubility of precipitation • 4. Phenomenon of super saturation and precipitation formation • Methods of thermo gravimetric analysis • 2. Principles of TGA and DTA • 3. Types of TGA • 4. Relation between TGA and DTA • 5. Thermal equation of TGA

	<ul style="list-style-type: none"> • Principles of Spectrophotometric analysis and properties of electromagnetic radiations • 2. Different Terms like absorbance, transmittance, and molar absorptivity • 3. Mathematical Statement and derivation of Lambert's Law and Beer's Law • 4. Different wavelength selectors and their importance
Industrial Chemistry	<p>The students are expected to learn;</p> <ul style="list-style-type: none"> • Importance of chemical industry, • Meaning of the terms involved, • Comparison between batch and continuous process, • Knowledge of various industrial aspects • Students should know • Scope, • Nutritive aspects of food constituents, • Quality factors and their measurements, • Food deterioration factors and their control; • Food preservation and Food additives • Learn importance of these industries, • Manufacture of cement by modern methods • Definition of setting and hardening • iv. Reinforced concrete
Polymer Chemistry.	<p>The students are expected to learn the following aspects of Polymer Chemistry</p> <ul style="list-style-type: none"> • What is polymer degradation? • Chemical and geometric structures of polymers. • Important polymers like PVC, polystyrene, polyvinyl alcohol, Teflon, Resins, nylon, epoxy • Polymers, etc. • 57 • Uses & properties of polymers.

	<ul style="list-style-type: none"> • Role of polymer industry in the economy. • Advantages of polymers. • Some industrially important polymers
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Organic chemistry-I

Inorganic chemistry-I

Physical chemistry-I

CSO-1 Learns the fundamentals of reaction mechanisms

CSO-2 Understands the mechanism of nucleophilic substitution and elimination reactions

CSO-3 Appreciates the fundamentals of aromaticity in organic chemistry

CSO-4 Acquires the 3-D aspects of organic molecules.

CSO-5 Gains the potential about complex vitamin and nucleic acid structure

CSO-1 Understands the background of bonding forces

CSO-2 Appreciates the importance of various theories in bonding

CSO-3 Learns the chemistry basis of solid state

CSO-4 Gains the imagination of 3D structures of silicates and caged compounds

CSO-5 Estimates the importance of extractive metallurgy

CSO-1 Understands the various theories of electrolytic conductance

CSO-2 Recognizes the dynamics of electrode reaction

CSO-3 Learns the classical status of thermodynamics

CSO-4 Appreciates the fundamentals of molecular thermodynamics

CSO-5 Estimates the basis of chemical surfaces

Instrumental method of analysis

Inorganic practical-I

CSO-1 Analysis the variations of practical errors

CSO-2 Gains the potential about different precipitation processes

CSO-3 Determines the procedure for electro analytical techniques

CSO-4 Determines the procedure for thermo analytical techniques

CSO-5 Validates the strength of spectro analytical techniques

CSO-1 Determines the procedure for semi micro analysis of inorganic salt mixture

CSO-2 Understanding the procedure for semi micro qualitative analysis

CSO-3 Estimates the accurate analytical procedure of analysis

CSO-4 Appreciates the procedure for inorganic analysis
CSO-5 Learns the steps involved in the complex formation process
CSO-1 Understands the various source for collection of raw materials
CSO-2 Gains the importance about manufacturing process
CSO-3 Determines the necessity for small scale industries
CSO-4 Learns socio impact of sugar and agro chemicals
CSO-5 Validates the cause, consequence and control of pollution

Organic chemistry-II

Inorganic chemistry-II

Physical chemistry-II

CSO-1 Understands the basis of redox reaction
CSO-2 Appreciates the various steps involved in the molecular rearrangements
CSO-3 Visualizes the aromatic electrophilic substitution mechanism
CSO-4 Analyses the cruciality of the stereochemical process
CSO-5 Perceives the concept of conformational analysis
CSO-1 Learns the structure and properties of coordination compounds
CSO-2 Analyses the reaction pathways of complex formation
CSO-3 Validates the role of bioinorganic chemistry in every day action
CSO-4 Appreciates the vibrant role of catalysts in chemical reaction
CSO-5 Visualizes the energy behind the nuclear reaction

CSO-1 Learns the importance of chemical reaction against time
CSO-2 Validates the theoretical background of rotational spectra
CSO-3 Analyses the physical approach of IR and Raman spectra
CSO-4 Gains knowledge about NQR and ESR spectra
CSO-5 Encompasses the symmetrical utility of molecules

Organic practical-I

Polymer chemistry

Green chemistry

CSO-1 Learns principle of organic estimation
CSO-2 Gains the procedure for organic separation and derivation
CSO-3 Understands the method of organic preparation
CSO-4 Develops the various routes for recrystallization
CSO-5 Identifies the way for identification of components