

A.T.V.V. Mandal's
B. D. Kale Mahavidyalaya, Ghodegaon
 DEPARTMENT OF CHEMISTRY
Course Outcomes
T.Y. B.Sc. (Chemistry)

Sr.No.	Class	Course	Course Outcome
	T. Y. Semester III	CH-331 Physical Chemistry	<p>CO1: 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.</p> <p>CO2: Ohm's law and electrical units such as coulomb, Ampere, Ohm and Volt, Meaning of specific resistance, specific conductance, cell constant and their units, Cell constant, its theoretical and experimental determination, Preparation of conductivity water, Experimental determination of conductance.</p> <p>CO3: Understand the term additive and constitutive properties, Understand the term specific volume, molar volume and molar refraction, Understand the meaning of electrical polarization of molecule.</p> <p>CO4: Meaning and Types of equilibrium such as true or static, metastable and Unstable Equilibrium, Meaning of phase, component and degree of freedom, Derivation of phase rule. Explanation of water system : Description of the curve, Phase rule relationship and typical features. Explanation of sulphur system</p>
		CH-332 Inorganic Chemistry	<p>CO1: i. Know the meaning of various terms involved in coordination chemistry.</p> <p>CO2: Know the different types of Ligands.</p> <p>CO3: Understand the chelating agents, chelate and stability of chelates and complexes.</p> <p>CO4: Calculate the charge on complex ion and the oxidation number.</p> <p>CO5: Be able to give the IUPAC name the co-ordination compound.</p> <p>CO6: Know the application of co-ordination compounds in biology and chemistry.</p>

		CH-333: Organic Chemistry	<p>CO1: Definition and types of organic acid and base The pka and pkb concepts, Effect of temperature on pka/pkb, Comparison between strengths of acids/bases</p> <p>CO2: To draw different types of disubstituted cyclohexane in Chair form, To distinguish between geometrical and optical isomerism</p> <p>CO3: Definition and type of nucleophiles and leaving groups, Different types of nucleophilic substitution reactions, Definition of inversion and racemisation</p> <p>CO4: Different types of carbon-carbon unsaturated compounds, Orientation / rules in addition reactions, The structure of carbonyl group</p> <p>CO5: Statement of Hoffmann and Saytzeff rule The evidences, mechanism & stereochemical aspects of these reactions, Whether a given reaction follows E1, E2 or E1cB mechanism?, Comparison between E1 & E2 reactions</p> <p>CO6: Definition and types of aromatic substitution reactions, Classification of directing groups, What is an arenium ion and Ipso substitution?, The evidences, reactivity and mechanism of these reactions.</p>
		CH-334 Analytical Chemistry	<p>CO1: Principles of common ion effect and solubility product, Formation of complex ion, Factors affecting on solubility of precipitation, Phenomenon of super saturation and precipitation formation, Meaning of co-precipitation and post precipitation.</p> <p>CO2: Principles of TGA and DTA, Types of TGA, Relation between TGA and DTA, Thermal equation of TGA.</p> <p>CO3: 1. Principles of Spectrophotometric analysis and properties of electromagnetic radiations, Different Terms like absorbance, transmittance, and molar absorptivity, Mathematical Statement and derivation of Lambert's Law and Beer's Law.</p> <p>CO4: Voltammetry and polarography as an analytical tool, Construction, working, advantages and disadvantages of DME.</p> <p>CO5: Atomic absorption spectroscopy as an analytical tool, Measurement of absorbance of atoms by AAS, Interferences in atomic absorption spectroscopy.</p> <p>CO6: Emission spectroscopy as an analytical tool, Measurement of emission of atomic</p>

		CH-335 Industrial Chemistry	<p>species, Different methods of analysis</p> <p>CO1: Principles of common ion effect and solubility product, Formation of complex ion Factors affecting on solubility of precipitation Phenomenon of super saturation and precipitation formation, Meaning of co-precipitation and post precipitation, Choice of liquid for washing the precipitate.</p> <p>CO2: Principles of TGA and DTA, Types of TGA Relation between TGA and DTA, Thermal equation of TGA, Different factors affecting TGA curve.</p> <p>CO3: Principles of Spectrophotometric analysis and properties of electromagnetic radiations, Different Terms like absorbance, transmittance, and molar absorptivity, Mathematical Statement and derivation of Lambert's Law and Beer's Law</p> <p>CO4: Voltammetry and polarography as an analytical tool, Construction, working, advantages and disadvantages of DME</p> <p>CO5: Atomic absorption spectroscopy as an analytical tool, Measurement of absorbance of atoms by AAS.</p> <p>CO6: Emission spectroscopy as an analytical tool Measurement of emission of atomic species Different methods of analysis</p>
		CH-336-E Agriculture Chemistry	<p>CO1: Importance of chemical industry, Meaning of the terms involved, Comparison between batch and continuous process, Knowledge of various industrial aspects.</p> <p>CO2: Various insecticides, Pesticides, Fungicides, Rodenticides & biopesticides used in agriculture field with their synthesis and applications.</p> <p>CO3: Concept of basic chemicals, their uses and manufacturing process, They should also know the physicochemical principles involved in manufacturing process.</p> <p>CO4: Introduction, occurrence, composition of petroleum, resources, processing of petroleum, other properties, Fuels and eco-friendly fuels, use of solar energy etc.</p> <p>CO6: Scope, Nutritive aspects of food constituents, Quality factors and their measurements</p> <p>CO7: Learn importance of these industries, Manufacture of cement by modern methods, Definition of setting and</p>

			hardening, Reinforced concrete, To learn about making of glass by different methods, Properties and uses of special glasses.
	T. Y. Semester IV	CH-341: Physical Chemistry	<p>CO1: Origin of EMF of electrochemical cell, Conventions used to represent electrochemical cell, Thermodynamic conditions of reversible cell, Explanations of reversible and irreversible electrochemical cell with suitable example, reference electrode?, Primary and secondary reference electrode, Construction, representation, working and limitation of Standard hydrogen Electrode, Construction, representation and working of Calomel and Silver –Silver Chloride electrode, Types of electrodes, Conditions of Standard Cell.</p> <p>CO2: The atom its nucleus and outer sphere. Classification of nuclides with suitable examples such as isotope, isobar, isotone and isomers Explanation of stability of nucleus through neutron to proton ratio, odd and even nature of proton and neutron, Mean binding energy.</p> <p>CO3: Explain the term crystallography and laws of crystallography, Weiss and Millers Indices Crystal system and their characteristics Explain the term polymorphism /allotrophism</p> <p>CO4: Concept of quantization, Atomic spectra Wave particle duality, Uncertainty principle and its physical significance, Derivation of time independent Schrodinger wave equation.</p>
		CH-342: Inorganic Chemistry	<p>CO1: The meaning of term f-block elements, Inner transition elements, lanthanides, actinides. Electronic configuration of lanthanides and actinides, Oxidation states of lanthanides and actinides and common oxidation states, Separation lanthanides by modern methods, Lanthanide contraction and effects of lanthanide contraction on post-lanthanides.</p> <p>CO2: The meaning of metal & semiconductor, The difference between metal, semiconductor and insulator, Metallic bond on the basis of band theory, The energy band and energy curve, Draw n (E) & N (E) curves.</p> <p>CO3: Know the nature of solids, Know the crystal structures of solids, Draw the simple cubic, BCC and FCC structures, Identify the C.N. of an ion in ionic solid, Identify the type of void.</p>

			<p>CO4: homogeneous catalysis, examples of homogeneous catalysts</p> <p>CO5: Define the heterogeneous catalyst and heterogeneous catalysis, examples of heterogeneous catalysts, Understand the essential properties of heterogeneous catalysts.</p> <p>CO6: Identify the biological role of inorganic ions & compounds, Know the abundance of elements in living system and earth crust, Give the classification of metals as enzymatic and non-enzymatic, Understand the role of metals in non-enzymatic processes.</p>
		CH-343: Organic Chemistry	<p>CO1: Definition and formation of carbanions, Possible mechanism of some known name reactions involving carbanions.</p> <p>CO2: Meaning of terms Disconnection, Synthons, Synthetic equivalence, Functional Group Interconversion, Target Molecule, What is retrosynthesis?</p> <p>CO3: What is rearrangement reaction?, Different types of intermediate in rearrangement reactions?</p> <p>CO4: What is Spectroscopy?, Different regions of electromagnetic radiations, Various terms used in spectroscopy, What is the interaction of radiation with matter.</p> <p>CO5: What are terpenoids and alkaloids?, Various methods of isolation/extraction of these natural products, Synthesis of Citral and Ephedrin by Barbier- Bouveault and Nagi methods.</p>
		CH-344 Analytical Chemistry	<p>CO1: Principles of solvent extraction. Difference between KD and D Various types of techniques of solvent extraction such as-(a) extraction (b) continuous extraction (c) counter current extraction. Difference between batch and multiple extraction, Advantages and applications of solvent extraction.</p> <p>CO2: Principle of chromatographic methods Relation between theoretical plates and column efficiency, Technique and applications of- Column Chromatography.</p> <p>CO3: Principle of GSC and GLC analysis Separation mechanism involved in GSC and GLC Instrumentation- stationary phases, column types, detectors, Working of gas chromatographic</p>

			<p>apparatus</p> <p>CO4: Need of liquid chromatography Separation mechanism involved in adsorption and partition HPLC, Instrumentation and working of HPLC, Applications of HPLC, Advantages of supercritical fluid chromatography.</p> <p>CO5: Comparison between electrophoresis and chromatography, Principle and theory of electrophoresis, Different types of electrophoresis techniques</p> <p>CO6: Nephelometry and Turbidimetry as an analytical tool, Measurement of turbidance, Difference between Nephelometry and Turbidimet</p>
		CH- 345 Industrial Chemistry	<p>CO1: Basics of polymer, Nomenclature, Degree of polymerization, Classification of polymerization reactions, Thermodynamic and transport properties of polymer, Commercial polymers and their importance, Biomedical polymers: implants, Contact lens and dental polymers.</p> <p>CO2: Importance of sugar industry, Manufacture of direct, Consumption (plantation white) sugar with flow diagram. Cane juice extraction by various methods, Clarification by processes like carbonation, Sulphitation, Phosphatation, etc. Concentration of juice by using multiple effect evaporator system, Crystallization of sucrose by using vacuum pan.</p> <p>CO3: Importance, Basic requirement of fermentation process, Manufacturing of ethyl alcohol by using molasses, Food grains, fruits & ethylene, Manufacturing of wine, beer, whisky, rum etc.</p> <p>CO4: Raw materials, Properties and various types of cosmetics used. Meaning of the terms detergent, Surfactants, emulsion and emulsifying agents, Wetting and non-wetting, Hydrophobic and hydrophilic nature, Amphipathic structures, Types of surfactants, Raw materials for detergents</p> <p>CO5: <i>Dyes</i>: introduction, Dye intermediates, Preparation of dye intermediates, Structural features of a dye; Classification of dyes, Structures and applications</p> <p>CO6: <i>General aspects of drug action</i>: Introduction, classification, Nomenclature, Structure-activity relationship, Action of drugs, Assay of drugs</p>

		CH-336E Dairy Chemistry	<p>and factors affecting drug action, Metabolism of drugs, Chemical structures, . Methods of production and pharmacological activity.</p> <p>CO1: Knowing importance of the subject from the point of rural economy. CO2: Knowing the composition of milk, its food & nutritive value CO3: Understanding the Microbiology of the milk CO4: Understanding various preservation and adulterants, various milk proteins and their role for the human body. CO5: Knowing various milk products, their composition, manufacture and uses.</p>
		CH-347 Physical Chemistry Practical	Chemical Kinetics, Viscosity, Adsorption, Phenol-water system, Transport number, Refractometry, Colorimetry, Potentiometry, pH metry, Radioactivity,
		CH-348 Inorganic Chemistry Practical	
		CH-349 Organic Chemistry Practical	