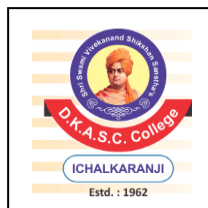
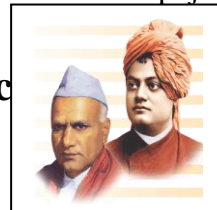


“Dissemination of Education for Knowledge, Science and Culture”

-Shikshanmaharshi Dr. Bapuji Salunkhe



Shri Swami Vivekanand Shikshan Sanstha's
Dattajirao Kadam Arts, Science & Commerce
College, Ichalkaranji.
DEPARTMENT OF CHEMISTRY



Course Outcomes
Bachelor of Science

B. Sc.-I Chemistry, NEP 2.0, From June, 2024 onwards	
Course	Outcomes
Paper No. I (Inorganic Chemistry)	After completion of these courses, students should be able to, <ol style="list-style-type: none">1. Able to write electronic configuration of elements, fill electrons in different orbitals, draw energy level sequence of different orbitals, differentiate between electronegativity and electron affinity.2. Differentiate between different types of bonds and able to identify the ionic bond in compounds.3. To learn and understand the properties and uses of the compounds of Boron, Carbon and Nitrogen from p-block elements.4. To understand the role of acids and bases in chemistry. The study is useful in all chemical areas.
Paper No. II (Organic Chemistry)	<ol style="list-style-type: none">1. Understand the basic concepts of Organic Chemistry.2. Understand the concept of chirality, optical isomerism, and nomenclature.3. Learn aromatic-non-aromatic compounds and to understand the mechanism of electrophilic substitution reactions.4. To understand the basic knowledge of heterocyclic compounds. To get knowledge of methods to preparation, physical and chemical properties of some heterocyclic compounds with five and six membered heterocycles containing N as the hetero atom (Pyrrole and Pyridine).
Paper No. III (Physical Chemistry)	<ol style="list-style-type: none">1. Understand the Carnot cycle and its efficiency and concepts of enthalpy and entropy, Understand the free energy and laws of chemical equilibrium.2. Learning and coherent understanding of basic concepts and rules of logarithms, graphs, derivative and integrations.3. Learning and coherent understanding of surface tension, viscosity and refractive index with suitable examples.4. Learning and coherent understanding of basic concepts in electrochemistry, conductors and conductivity cells, measurement of conductance with suitable examples and numerical problems.

Paper No. IV (Analytical Chemistry)	<ol style="list-style-type: none"> Understand the difference between qualitative and quantitative analysis, understand the terms error and accuracy in analytical experiments. Able to calculate the mean, median of analytical data. Understand the importance of chromatography in analysis and the principles of separation of analyte from mixture using paper chromatography and thin layer chromatography. Able to find out unknown concentration of analyte from sample by performing titration. Understand the hardness, pH, alkalinity, acidity, BOD and COD of water. <ol style="list-style-type: none"> Distinguish between classical and industrial chemistry Learning and Understanding basic concepts and concentration terms Knowledge of IPR
B.Sc.-I (Chemistry Practical)	
Laboratory practical	<ol style="list-style-type: none"> To know the unknown compounds by Organic Qualitative Analysis. To learn the preparation of organic and inorganic materials. To learn kinetics of reaction. To learn equivalent weight of Magnesium, heat of ionization, heat capacity, enthalpy of hydration, solubility and enthalpy of neutralization of different chemicals. To learn separation and identification of different cations by Paper Chromatographic technique. <p>To learn preparation of standard solution. To understand the estimation of metal ions.</p>
B.A./B.Com./B.Sc.-I Open Elective Chemistry, NEP 2.0, From June, 2024 onwards	
Semester-I Water Analysis	<ol style="list-style-type: none"> To learn and understand basic knowledge of physico-chemical properties of water. To learn about general water quality analysis techniques. To acquire hands-on skills to perform actual practical analysis in the laboratory.
Semester-II Soil Analysis	<ol style="list-style-type: none"> To learn and understand basic knowledge of physico-chemical properties of soil. To learn about general soil quality analysis techniques. To acquire hands-on skills to perform actual practical analysis in the laboratory.

B.Sc.-II Chemistry, NEP-2020 From June 2023	
Paper No. V (Physical Chemistry)	<ol style="list-style-type: none"> 1. Understand the basic terminologies, electrolytic conductivity and different types of conductometric titrations. 2. Understand the order of reaction and theories of reaction rate. 3. Knowledge and coherent understanding of basic concepts in thermodynamics and concept of Entropy will be gained by the student. 4. Learning and coherent understanding of behavior of gases, ideal gas as model system and its extension to real gases. The dependence of physical state on P, V and T. Liquid crystals are essentials in all common and research devices, hence they are introduced with suitable examples. 5. Learning and understanding of theoretical basis of adsorption phenomenon, dynamic nature of surface and its applications.
Paper No. VI (Analytical Chemistry)	<ol style="list-style-type: none"> 1. Study basic principle of corrosion and electroplating. Learn different types of corrosion, applications of chromium electroplating 2. Learning and understanding of basic concepts in gravimetric analysis 3. Students will learn the different water analysis techniques 4. Learning and coherent understanding of column and ion exchange chromatography 5. Learning of working of petroleum industries, understanding of biofuels, copyrights and trademarks
Paper No. VII (Inorganic Chemistry)	<ol style="list-style-type: none"> 1. Understand the basic concepts of coordination chemistry. Able to find the geometries of different transition metal complexes using Valence bond theory. Study the concept of chelate formation. 2. Understand the properties of elements of 3d series. 3. Learn the basic knowledge about inorganic semi-micro qualitative analysis 4. Understanding the properties of 4f elements.
Paper No. VIII (Organic Chemistry)	<ol style="list-style-type: none"> 1. Learn about the synthesis, reactivity and applications of carboxylic acids. 2. Study about classification, preparation and applications of amines and diazonium salts. 3. Understand the classification, configuration and structure of carbohydrates. Understand the nomenclature and reactivity of aldehydes and ketones. 4. Study the basic knowledge of conformational analysis of organic compound

B.Sc.-II (Chemistry Practical)	
Laboratory practical	<ol style="list-style-type: none"> 1. Identification of organic compounds including acids, bases, phenols and neutrals. Preparation of organic compounds and their purification. Organic estimations such as acetone, Vitamin-C and ester. Separation, identification and determination of R_f values using TLC. 2. Understand the gravimetric analysis of Fe and Ba. Preparation of inorganic complexes. Able to find out the unknown concentration by performing titration. 3. Understand semi-micro analysis. 4. Study the chemical kinetics of hydrolysis of ester. Illustrate the experiment of instrumental methods such as conductometry, refractometry, polarimetry etc. Able to measure viscosities of different liquids.
B.Sc.-III Chemistry, NEP-1.0, From June, 2024 onwards	
Paper No. IX (Inorganic Chemistry)	<ol style="list-style-type: none"> 1. Study the theoretical concepts of hard and soft acids and bases. 2. Understand the metal-ligand bonding in transition metal complexes. 3. Study classification of conductors, insulators and semiconductor 4. Study synthesis and structures of organo-metallic compounds. The classification, types, mechanism and applications of catalyst in industrial fields is explained.
Paper No. X (Organic Chemistry)	<ol style="list-style-type: none"> 1. Study the basic concept of spectroscopy. Understand factors affecting UV-absorption spectra. Understand factors affecting vibrational frequency. 2. Interpret IR-spectra on basic values of IR-frequencies. 3. Learn basic principles of NMR spectroscopy, chemical shift, shielding and deshielding. 4. Study instrumentation of Mass Spectroscopy and fragmentation pattern. Solve the combined problems of UV, IR, NMR and MASS
Paper No. XI (Physical Chemistry)	<ol style="list-style-type: none"> 1. Learn and understand quantum Chemistry, Heisenberg's uncertainty principle, concept of energy operators (Hamiltonian), learning of Schrodinger wave equation. Physical interpretation of the ψ and ψ^2. Particle in a one-dimensional box. Gain Knowledge about spectroscopy. 2. Learn and understand photochemical laws, reactions and various photochemical phenomena. 3. Learn the various types of solutions, vapour pressure, temperature relations. 4. Learn and understand the knowledge of emf measurements, types of electrodes, different types of cells, various applications of emf measurements.

<p>Paper No. XII (Analytical Chemistry)</p>	<ol style="list-style-type: none"> 1. Understand the flame photometry, colorimetry and spectrophotometry, its applications and limitations. 2. Understand the different types of chromatographic techniques and their applications. 3. Understanding theory and applications of potentiometric titrations, earning and understanding of physico chemical principles of production of ammonia, sulfuric acid, nitric acid and sodium carbonate along with its manufacturing plant. 4. Learning and understanding the whole process of manufacture of sugar and byproducts of sugar industry
<p>Paper No. XIII (Inorganic Chemistry)</p>	<ol style="list-style-type: none"> 1. Understand the thermodynamic and kinetic aspects of metal complexes. 2. Study the nuclear reactions and role of radio isotopes. 3. Understand properties and classification of lanthanides and actinides. Study techniques involved in extraction of iron from its ore. 4. Understand role of metals and non-metals in our health.
<p>Paper No. XIV (Organic Chemistry)</p>	<ol style="list-style-type: none"> 1. Study the various Name reaction and reagents with examples. Learn mechanism of rearrangement reaction. 2. Understand basic terms used in retrosynthetic analysis. Solve electrophilic and nucleophilic addition reactions problems 3. Study analytical and synthetic evidences of natural products such as citral and nicotine. 4. Learn different types of drugs, their synthesis and uses.
<p>Paper No. XV (Physical Chemistry)</p>	<ol style="list-style-type: none"> 1. Learn and understand phase rule. Learn and understand one component, Two component and Three component system phase diagrams with suitable examples. 2. Gain Knowledge about basic concepts of Thermodynamics, free energy, Gibbs-Helmholtz equation and its applications, Able to solve problems related with it. earning of kinetics, Simultaneous reactions such as i) opposing reaction ii) side reaction iii) consecutive reactions: iv) chain reaction v) explosive reaction. 3. Understand basic concept of solid state chemistry, learn basic terms, Laws of crystallography, learn crystal structure analysis using X-rays. Understand kinetics of Simultaneous reactions. 4. Learning and understanding the knowledge of Colloidal State, understanding of colloidal system, different types of colloidal system, preparation, properties, stability of different colloidal system, General applications of colloids

Paper No. XVI (Analytical Chemistry)	<ol style="list-style-type: none"> 1. Understand the different types of polymers and their applications. 2. Understand the different methods for nano-material preparations and their applications. 3. Knowledge of instrumental analysis of alkali and alkaline earth elements. 4. Knowledge about the chemical nature and cleansing action of soap, Knowledge of analysis of soil essential parameters and nutrients, Understanding the fertilizers used in regular farming.
B.Sc.-III (Chemistry Practical)	
Laboratory practical	<ol style="list-style-type: none"> 1. Understand the gravimetric estimation such as Fe, Ba, and Ni. Study different types of inorganic preparations. Understand percentage purity of different types of analyte samples. 2. Separate binary mixture and identify an individual compound. Prepare organic compounds and purify them. Prepare organic derivatives. Estimate amount of organic content from mixture, tablets etc. 3. Understand the kinetic reactions and their mechanisms, energy of activation, partial molar volume. 4. Understand different instruments such as pH Meter, potentiometer, refractometer, colorimeter etc.



Dr. D. A. Kumbhar