



VIVEKANANDA COLLEGE

TIRUVEDAKAM WEST, MADURAI DISTRICT - 625 234, TAMIL NADU

Vision & Mission and PEOs, PSO & POs

DEPARTMENT OF CHEMISTRY

**Choice Based Credit System (CBCS)
and
Learning Outcomesbased Curriculum Framework
(LOCF)**

DEPARTMENT OF CHEMISTRY

Vision

- ✓ To prepare the students of chemistry in such a way that they are self-reliant, highly informative and a better candidate in the demanding and ever changing world.
- ✓ To prepare the knowledgeable graduates for careers in academia, industry and government.

Mission

- ✓ To foster robust degree programme that prepare students for advanced studies in chemistry and careers in chemical industry.
- ✓ To encourage students to face IIT-JAM, CSIR-NET, GATE, SET and other competitive examinations.
- ✓ To invite scientists from National/International laboratories for lectures of global standard.
- ✓ To function as a vibrant and high quality research centre by supporting the faculty involved in such pursuits.

Programme Educational Objectives (PEOs)

A graduate of B.Sc., Chemistry programme after three years will have

PEO 1	Depth knowledge in fundamentals of chemistry, effective skills to critically assess, analyze and solve problems in chemistry
PEO 2	Enormous job opportunities at all level of chemical, pharmaceutical, paper, food, leather, cement and materials related industry
PEO 3	Ability to qualify common entrance, competitive and service commissions examinations
PEO 4	Extending continuous progress in their professional career through lifelong learning and respecting human values and ethics with environment concern
PEO 5	Developing teamwork, leadership skills and moral values procured through life training for the welfare of their working environment and society

Programme Outcomes (POs)

On completion (after three years) of B. Sc. Chemistry Programme, the students are expected to

P.No.	Programme Outcome	Description
PO1	Disciplinary Knowledge and Critical Thinking	Take informed actions after identifying the assumptions that frame our thinking and actions, checking out degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from perspectives.
PO2	Effective Communication and Digital Literacy	Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
PO3	Social Interaction and Problem Solving	Elicit views of others, mediate disagreements and help reach conclusions in group settings.
PO4	Effective Citizenship and Social Responsibility	Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering and life training.
PO5	Professional Ethics and Human	Recognize different value systems including your own,

	Values	understand the moral dimensions of your decisions, and accept responsibility for them.
PO6	Environment and Sustainability	Understand the issues of environmental contexts and Sustainable development.
PO7	Self –directed and life – long learning	Acquire the ability to engage in independent and life – long learning in the broadest context socio- technological changes

Programme Specific Outcomes (PSOs)

PSO 1	The students will understand the existence of matter in the universe as solids, liquids, and gases which are composed of molecules, atoms and sub atomic particles.
PSO 2	Students will learn to estimate inorganic salt mixtures and organic compounds both qualitatively and quantitatively using the classical methods of analysis in practical classes.
PSO 3	Students will grasp the mechanisms of different types of reactions both organic and inorganic and will try to predict the products of unknown reactions.
PSO 4	Students will learn to synthesize the chemical compounds by maneuvering the addition of reagents under optimum reaction conditions.
PSO 5	Students will get aware and handle the sophisticated instruments/equipment and Develop research oriented skills.

PART – III : Core Theory	Course Code: 07CT11
Course Title : GENERAL CHEMISTRY - I	

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Recall the fundamentals of atomic structure and apply this knowledge to predict the stability of atom	K1 & K2
CO 2	Study, understand and apply the periodic properties and chemical bonding of elements	K1, K2 & K3
CO 3	Learn and apply nomenclature rule of naming organic compounds and aromaticity	K1, K2 & K3
CO 4	Learn and understand various types of organic reactions and its electronic effects	K1 & K2
CO 5	Familiar with surface chemistry and catalysis	K1

K1- Remembering

K2-Understanding

K3-Applying

PART – III : Core Theory	Course Code: 07CT12
Course Title : GENERAL CHEMISTRY - II	

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Define and compare the various concepts of acids and bases and illustrate the reactions of non-aqueous solvents	K1 & K2
CO 2	Recall the basic chemistry of hydrogen, heavy water and demonstrate the properties s block elements	K1 & K2
CO 3	Understand the preparation and properties of alkanes, alkenes and alkynes	K2
CO 4	Understand the basic concept of chemical equilibrium and apply Le Chatlier's principle	K2 & K3
CO 5	Explain the various phenomena involved in colloidal state	K2

K1- Remembering

K2-Understanding

K3-Applying

PART – III : Allied Theory	Course Code: 07ATB1/ 07ATZ1
Course Title: CHEMISTRY FOR BIOLOGIST-I	

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Relate the types of isomerism and understand the fundamentals of organic chemistry	K1 & K2
CO 2	Classify the types electrophiles and nucleophiles and understand the types of organic reactions	K2
CO 3	Understand the types of cleavage and have an idea about the formation and stability of intermediates	K2
CO 4	Define the laws of photochemistry and demonstrate the types of catalysis	K1 & K2
CO 5	Explain the basic concepts of titrimetric	K2

K1- Remembering

K2-Understanding

K3-Applying

PART – III : Allied Theory	Course Code: 07ATP1
Course Title: CHEMISTRY FOR PHYSICIST-I	

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Explain the basic concepts of atomic structure	K2
CO 2	Understand the VB theory and chemical bonding	K2
CO 3	Demonstrate the VSEPR theory and identify the types of bonding	K2 & K3
CO 4	Illustrate the basic concept of nuclear chemistry	K2
CO 5	Experiment and infer the general principles of titrimetry	K2 & K3

K1- Remembering

K2-Understanding

K3-Applying

PART – III : Core Theory	Course Code: 07CT21
Course Title : GENERAL CHEMISTRY - III	

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	recall the fundamentals of bonding and theory. Apply this knowledge to predict the molecular shapes, bond order and magnetic properties	K1 & K3
CO 2	compare and contrast the structure and aromatic properties of benzene with naphthalene, anthracene and phenanthrene. Recognize and able to predict the directing properties of substituted benzene	K2 & K3
CO 3	learn the important physical properties of alcohols, thioalcohols and phenols	K1 & K2
CO 4	learn and understand the derivations and calculations related to liquids and solutions	K1
CO 5	familiar with <i>colligative properties</i> and to use them to determine the molecular weight of an unknown compound.	K1 & K3

K1- Remembering

K2-Understanding

K3-Applying

PART – III : Core Theory	Course Code: 07CT22
Course Title: GENERAL CHEMISTRY - IV	

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	explain the basic concepts of nuclear chemistry and radioactivity	K2
CO 2	understand the preparation and properties of ethers, thioethers and epoxides	K2
CO 3	outline the preparation and apply the use of organometallic reagents in synthetic organic chemistry	K2, K3
CO 4	define the laws of photochemistry and demonstrate the various photochemical phenomenon	K1, K2
CO 5	illustrate the basic theoretical concepts of chemical kinetics	K2

K1- Remembering

K2-Understanding

K3-Applying

PART – III : Allied Theory	Course Code: 07ATB2/07ATZ2
Course Title : CHEMISTRY FOR BIOLOGIST-II	

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Learn the historical development for the definitions of acid and base.	K1
CO 2	Understand the different approaches to types of chemical bonding	K2
CO 3	Acquire knowledge of aminoacids, proteins and vitamins and their biological functions	K2&K3
CO 4	Learn and assess the effect of selected pesticides, fungicides and polutions	K1&K2
CO 5	Obtained the knowledge of different types of air polution	K1 & k2

K1- Remembering

K2-Understanding

K3-Applying

PART – III : Allied Theory	Course Code: 07ATP2
Course Title : CHEMISTRY FOR PHYSICIST-II	

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	describe what the periodic properties are, how it varies within the groups and periods, and explain why it varies the way it does	K1 & K2
CO 2	to learn the chemical reactions and physical behavior that may occur under the influence of visible and/or ultraviolet light	K1, K2 & K3
CO 3	this module introduces some basic concepts of solid state chemistry	K1
CO 4	learn to identify the parts of and be able to describe an electrochemical cell, including the electrolyte, electrodes, conductivities.	K1
CO 5	able to calculate cell potential (Eo) to predict spontaneity of redox reactions and different types of electrochemical cells	K2& K3

K1- Remembering

K2-Understanding

K3-Applying

PART – III : Core Theory	Course Code: 07CT31
Course Title: ORGANIC CHEMISTRY - I	

On the successful completion of the course, students will be able to

No.	Course outcome(s)	Knowledge Level (according to Bloom's Taxonomy)
CO1	Relate, outline and identify the reaction mechanism of alkyl and aryl halides	K1, K2 & K3
CO2	Explain the preparation and make use of the properties of aliphatic and aromatic nitro compounds and diazonium salts in organic chemistry	K2 & K3
CO3	Demonstrate the preparation and utilize properties of aliphatic and aromatic amines and quaternary ammonium salts	K2 & K3
CO4	Illustrate the preparation and utilize the properties of carbonyl compounds	K2 & K3
CO5	Define the basic terminology in stereochemistry and explain and apply CIP rules to identify the absolute of organic molecules	K1, K2 & K3

K1- Remembering

K2-Understanding

K3-Applying

PART – III : Core Theory	Course Code: 07CT32
Course Title: PHYSICAL CHEMISTRY - I	

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	To understand the concept of thermodynamics and apply it to physical and chemical system	K1, K2 & K3
CO 2	Learn the concept of residual entropy and entropy of perfectly crystalline solid with respect to temperature	K1 & K2
CO 3	Learn the concept of buffer solution, hydrolysis of salts and solubility product and apply it to solutions	K1, K2 & K3
CO 4	Learn and understand various physical properties and its uses to determine unknown chemical structure of the compounds	K1 & K2
CO 5	To understand Nernst distribution law and utilize it in various applications	K2 & K3

K1- Remembering

K2-Understanding

K3-Applying

PART – III : Core Theory	Course Code: 07CT41
Course Title : INORGANIC CHEMISTRY - I	

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Compare, contrast and discuss the basic properties p-block elements and its compounds of carbon and boron families	K2
CO2	Explain the basic properties of nitrogen and oxygen families and illustrate the preparation, properties and structures of their compounds	K1 & K2
CO 3	Explain and summarize the basics of chemistry of halogens and noble gas	K3
CO 4	Describe and compare the basic properties of transition and inner transition elements	K2
CO 5	Outline the various principles and methods involved in metallurgy	K1 & K3

K1- Remembering

K2-Understanding

K3-Applying

PART – III : Core Theory	Course Code: 07CT42
Course Title: PHYSICAL CHEMISTRY - II	

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Learn the arrangement of atoms or ions in a crystal lattices and sketch the seven crystal systems and fourteen Bravais lattices.	K1 & K2
CO 2	Correlate X-ray diffraction information with crystal structure, understand the conducting behavior and point defects in crystalline solids	K1 & K2
CO 3	Familiar with different types of crystals and liquid crystal	K1, K2 & K3
CO 4	Describe the assumptions made in the kinetic-molecular theory and how the distribution of speeds of gas molecules change with temperature	K1 & K2
CO 5	Explain anomalous behavior of real gas, types of intermolecular forces in gases and methods of liquefaction of gases	K1

K1- Remembering

K2-Understanding

K3-Applying

PART – III : Core Theory	Course Code: 07CT51
Course Title : ORGANIC CHEMISTRY - II	

On the successful completion of the course, students will be able to

No.	Course outcome(s)	Knowledge Level (according to Bloom's Taxonomy)
CO1	Relate and explain the preparation and properties of mono and dicarboxylic acids	K1 & K2
CO2	Demonstrate the preparation and properties of carboxylic acid derivatives and utilize of the synthetic utility of active methylene compounds	K2 & K3
CO3	Demonstrate and apply the chemistry of heterocyclic compounds	K2 & K3
CO4	Identify and outline the mechanism of naming reactions and reagents	K2 & K3
CO5	Relate and apply the detailed knowledge of conformational analysis	K2 & K3

K1- Remembering

K2-Understanding

K3-Applying

PART – III : Core Theory	Course Code: 07CT52
Course Title: INORGANIC CHEMISTRY - II	

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Compile and gain knowledge of theories and isomerisms of coordination compounds.	K1 & K2
CO2	Assimilate and interpret elementary concepts and bonding theories of coordination compounds.	K1 & K3
CO 3	Infer and deduce the mechanism for reaction of complexes.	K2 & K3
CO 4	Learn the basics and applications of organometallic compounds.	K2 & K3
CO 5	Substantiate the role of various metal ions in the function of biological systems.	K1 & K2

K1- Remembering

K2-Understanding

K3-Applying

PART – III : Elective Theory	Course Code: 07EP5A
Course Title : PHYSICAL CHEMISTRY-III	

On the successful completion of the course, students will be able to

No.	Course outcome(s)	Knowledge Level (according to Bloom's Taxonomy)
CO1	Compute conductance and recite the diverse laws governing electrochemistry	K1, K2 & K3
CO2	Appreciate the theory of electrochemical cells and correlate them with thermodynamic phenomenon	K1, K2 & K3
CO3	Narrate the vital uses of emf measurements in everyday life	K1, K2 & K3
CO4	Identify the symmetry operation, order and group	K1, K2 & K3
CO5	State the theory behind phase rule	K1, K2 & K3

K1- Remembering K2-Understanding K3-Applying

PART – III : Core Theory	Course Code: 07CT61
Course Title: ORGANIC CHEMISTRY - III	

On the successful completion of the course, students will be able to

No.	Course outcome(s)	Knowledge Level (according to Bloom's Taxonomy)
CO1	Classify the carbohydrates and explain its chemical properties	K2
CO2	Define and explain the basic chemical properties of terpenoids, alkaloids and steroids	K1 & K2
CO3	Interpret and make use of the chemistry of amino acids, peptides, chemotherapy and dyes	K2 & K3
CO4	Outline and identify the mechanism of molecular rearrangement.	K2 & K3
CO5	Define and illustrate the organic photochemical and pericyclic reactions	K1 & K2

K1- Remembering K2-Understanding K3-Applying

PART – III : Elective Theory	Course Code: 07EP6A
Course Title: ANALYTICAL CHEMISTRY	

On the successful completion of the course, students will be able to

No.	Course outcome(s)	Knowledge Level (according to Bloom's Taxonomy)
CO1	Grasp the gist of fundamentals of analytical chemistry and its procedures.	K1, K2 & K3
CO2	Evaluate mean, median, standard deviation, relative and absolute errors.	K1, K2 & K3
CO3	Learn the principle, types and applications of diverse techniques of chromatography	K1, K2 & K3
CO4	Acquire knowledge about extractions involving solvents and solid phases	K1, K2 & K3
CO5	Operate instruments like CV, Polarimeter.	K1, K2 & K3

K1- Remembering K2-Understanding K3-Applying

PART – III : Elective Theory	Course Code: 07EP6C
Course Title: ELEMENTS OF SPECTROSCOPY	

On the successful completion of the course, students will be able to

No.	Course outcome(s)	Knowledge Level (according to Bloom's Taxonomy)
CO1	Understand the basic principles of molecular spectroscopy and its various terminologies	K1 & K2
CO2	Understand the theories behind the IR and Raman spectra and its various modes of vibrations	K1 & K2
CO3	Explain the principles of UV spectroscopy and apply it to calculate the spectral wavelengths of compounds	K1, K2 & K3
CO4	Acquire the detail knowledge in various parameters involved in NMR and EPR spectra	K1 & K2
CO5	Utilize the broad knowledge in understanding the principles of Mass spectra and apply it for the structural characterizations of compounds	K1, K2 & K3

K1- Remembering K2-Understanding K3-Applying