



THE MADURA COLLEGE

An Autonomous Institution affiliated to Madurai Kamaraj University

Re-accredited (3rd cycle) with 'A' grade by NAAC

Vidya Nagar, T.P.K. Road, Madurai – 625 011

DEPARTMENT OF CHEMISTRY

Course Outcomes mapped with POs

PROGRAMME : M.Sc. (Chemistry)

Course Code	Course Title	CLO	Mapping of CO with PO				
			PO1	PO2	PO3	PO4	PO5
21P1CMC1	Organic Chemistry-I	Understand the concept of aromaticity and to know the nature of bond, electronic effects and other properties of molecules	2	-	2	-	-
		Recognise the type of mechanism & intermediates involved in the given organic reaction and to prove mechanism for the reaction	2	-	2	-	-
		Identify the ways to modify aromatic compounds <i>via</i> electrophilic substitution reactions.	2	-	2	2	-
		Analyse chemical transformations based on aliphatic nucleophilic substitution reaction	2	-	2	2	-
		Organize the techniques of aromatic nucleophilic substitution reactions for synthesizing/transforming molecules	2	-	2	2	-
21P1CMC2	Inorganic Chemistry-I	To predict the structure and types of bond in inorganic molecules using VB and MO theories	1	-	3	1	2
		To illustrate the various types packing in solids	1	-	3	1	2
		To organize the knowledge on band theories of solids and diffraction studies	1	-	3	1	2
		To infer knowledge about structure and bonding in boron compounds	1	-	3	1	2
		To illustrate the structure of inorganic chain and cluster compounds	1	-	3	1	2
21P1CMC3	Physical Chemistry-I	Summarize the theories of kinetics, and mechanism of enzyme catalysis.	3	1	3	3	2
		Develop equations based on the theories and mechanisms of kinetics.	3	1	2	3	2
		Illustrate the various aspects of photochemistry, radiation chemistry and its applications	3	1	1	3	2
		Make use of concepts of ionic interactions, theory of electrolytes, double layer models, Debye-Hückel limiting law.	3	1	2	3	2
		Analyze the problem in the concept of electrical double layers, design of Batteries, Fuel cells and ion selective electrodes	3	1	3	3	2

21P1CME1	Biomolecules and Separation Techniques	To understand the Structures and work functions of Metalloproteins and apply the knowledge of work function on synthetic oxygen carries	2	2	3	1	1
		To illustrate the various functions of metalloenzymes and apply the knowledge on detoxification	2	2	3	1	1
		To focus on the components and approach to determine the structure of amino acids, proteins, nucleic acids and carbohydrate.	2	2	3	1	1
		To identify the method of synthesis and physiological action of antibiotics and vitamins.	2	2	3	-	1
		To inspect the suitable techniques for the separation of organic as well as bio molecules.	2	2	3	1	1
21P1CME2	Forensic Analysis	Outline the fundamental principles and functions of forensic science.	3	1	3	-	3
		Examine the techniques for analysis of different types contaminants in crime scene evidence.	3	1	3	-	3
		Analyse methods to identify different types of poisons.	3	1	3	2	3
		Apply physical ,chemical and biological method in analysis of samples	3	1	3	2	3
		Apply instrument methods in analysis of samples	3	1	3	2	3
21P1CMP1	Organic qualitative analysis	To inspect the method for separating the binary organic mixture	1	3	1	3	1
		To apply the basic organic theoretical concepts for analyzing the unknown compound	1	3	1	3	1
		To apply the basic organic theoretical concepts for analyzing the unknown compound	1	3	1	3	1
		To select an appropriate derivative and acquire skills to prepare it	1	3	1	3	1
		To interpret the physical properties of the derivative	1	3	1	3	1
21P1CMP2	Inorganic Semi Micro Qualitative Analysis	Demonstrate the basic laboratory techniques of qualitative analysis of Inorganic salts containing four cations.	1	3	-	1	2
		To design the basic laboratory techniques of salt analysis	1	3	2	1	2
		Develop the skills for doing systematically analyse the general group cations and their individual separation of cations.	1	3	2	1	2
		Interpret the analytical data.	1	3	2	1	2
		To communicate the finding	1	3	2	1	2
21P2CMC4	Organic Chemistry-II	Correlate mechanisms of addition reactions and examine the synthetic routes for organic transformations in carbon-carbon multiple bonds	3	2	3	2	1
		Organise and analyse mechanisms involved in addition across carbon heteroatom bonds and elimination reactions	3	2	3	2	1
		Inspect the molecule on the basis of chirality and other stereochemical aspects.	3	2	3	2	1
		Interpret usages of the various oxidizing and reducing reagents to synthesize organic compounds.	3	2	3	2	1

		Conclude the potential applications of various rearrangements and name reactions in the synthesis of organic compounds and giving mechanism pertaining to them.	3	2	3	2	1
21P2CMC5	Inorganic Chemistry-II	To learn stability and stereochemistry of metal complexes	2	3	-	1	2
		To explain metal ligand bonding using CFT and MOT in various geometrical environments	2	3	-	1	2
		To interpret the electronic spectra for the determination of the structure of complexes	2	3	-	1	2
		To evaluate electron transfer reactions of octahedral and tetrahedral complex	2	3	-	1	2
		To analyses and apply the substitution reaction and trans effect in complex	2	3	-	1	2
21P2CMC6	Physical Chemistry-II	Organize basic concepts of quantum mechanics and to apply operators to solve simple eigen values problems and approximation methods used in solving molecular energy.	3	2	-	1	1
		Connect various theories behind quantum mechanics to illustrate multi-electron system and to calculate the energy of simple multi-electron atoms and molecules.	3	2	-	1	1
		Use kinetic behaviour of surface reactions in order to develop various mechanisms	3	1	2	-	1
		Categorize Maxwell distribution of molecular velocities and to illustrate liquid crystals and various transport properties of matter	3	2	2	2	2
		Describe the phase behaviour of three component systems in terms of molecular properties	3	1	2	1	-
21P2CME3	Synthetic methods, Green Chemistry & Re100%able energy	Devise the disconnection of a given organic molecule and can find the synthetic equivalents and synthetic route	2	-	3	-	-
		Connect the knowledge of reagents for chemical transformations and discover the nature of chirality	2	-	2	-	-
		Illustrate the knowledge of structural elucidation for a natural product.	2	-	2	2	-
		Apply green chemistry techniques for a given conventional thermal reactions	2	-	2	2	-
		Identify the alternative energy resources for chemical conversions	2	-	-	2	-
21P2CME4	Supramolecular Chemistry	Outline the fundamental principles and basics of Supramolecular chemistry	3	1	3	-	3
		Analyze the molecular recognition of cations and anions	3	1	3	-	3
		Apply knowledge on analytical skills to molecules from supramolecular chemistry	3	1	3	2	3
		Connect the applications with respect to molecules	3	1	3	2	3
		Examine the techniques of crystal engineering using multiple hydrogen bonds	3	1	3	2	3
21P2CMP3	Organic Estimation	To get domain knowledge in estimation of organic compounds	2	3	1	2	2

		To design the basic laboratory techniques of volumetric analysis	2	3	1	2	-
		To develop the skills for doing any titrations and recording data	2	3	1	3	1
		To make scientific claims that is supported by their data and other observations	2	2	1	2	1
		To communicate the finding	2	1	1	1	1
21P2CMP4	Inorganic Estimation & Complex Preparation	To demonstrate the basic laboratory techniques of volumetric analysis of given samples.	2	3	1	2	2
		To estimate the amount of metal ions such as Zinc, Magnesium and Copper present in the given solution by EDTA volumetric method	2	3	1	2	-
		To understand the preparation of inorganic complex	3	3	1	2	1
		To interpret analytical data	2	2	1	2	1
		To communicate the finding	2	1	1	1	1
21P3CMC7	Organic Chemistry- III	Correlate the UV absorption values as well as IR stretching frequencies of organic compounds with their functional groups.	2	-	2	-	-
		Interpret the structure of organic compounds using ^1H spectra	2	-	2	-	-
		Interpret different types of carbons and other organic compounds using ^{13}C NMR spectral editing and 2D-NMR techniques	2	-	2	2	-
		Apply mass spectral cleavage pattern of organic compounds	2	-	2	2	-
		Analyze the structure of simple organic compounds from UV, IR, NMR and Mass spectral data	2	-	2	2	-
20P3CMC8	Inorganic Chemistry – III	Understand the chemistry of organometallics	3	2	1	-	-
		know the outcome of various organometallic catalysis	3	2	1	-	-
		Infer the character and separation of f block elements	3	2	1	-	-
		interpret the PES spectra of various compounds	3	2	1	-	-
		Analyse and Apply the concepts of nuclear and radiation chemistry	3	2	1	-	-
21P3CMC9	Physical Chemistry III	Understand and explore the reaction kinetics and catalysis	1	3	2	-	1
		To learn the theory, kinetics and mechanism of enzyme catalysis	1	1	2	-	2
		To Understand the photochemical process and solar energy conversion process	1	3	3	-	2
		To analyze theory of electrolyte and Debye-Hückel limiting law.	1	2	3	-	1
		To Understand concepts double layer models and Fuel cell	1	3	2	-	1
21P3CMDC	Polymer, Nano and Fundamental Mathematics	Understand the theory behind correlation and fundamentals of calculus	-	-	-	-	-
		Acquire knowledge about preparation and characterization of nanomaterials	2	2	1	2	1
		Understand the different mechanism for polymerization	2	2	1	2	1
		Understand the properties and characterization of polymers	2	2	1	2	2
		Know the applications of polymers in various fields	2	2	1	2	2
21P3CME5	Medicinal Chemistry	Generalize the drug and its delivery systems.	2	-	2	-	-
		Infer on the insilico studies on drugs with lead optimization	2	-	2	-	-

		Focus about pharmacokinetics and pharmaco dynamics of drugs	2	-	2	2	-
		Make use of the structure of drugs based on heterocycles for therapeutic purpose	2	-	2	2	-
		Classify the various cardiovascular drugs and cancer drugs	2	-	2	2	-
21P3CMP5	Physical Chemistry Lab - I	demonstrate the basic laboratory techniques of Physical Chemistry Experiments.	3	2	-	-	-
		Train the students for thermodynamics experiments	3	2	-	-	-
		test the Experimental validity of Basic Laws of Concerned experiments	3	2	-	-	-
		train to handle the students for time sensitive kinetic experiment	3	2	-	-	-
		create scientific awareness of their observation and experiments	3	2	-	-	-
21P3CMP6	Inorganic Gravimetric Estimation	Demonstrate the basic laboratory techniques of quantitative and estimation of binary mixture of metal ions.	1	3	-	1	2
		design the basic quantitative analysis of separation, precipitation, filtration and weighing concept of gravimetric and volumetric analysis	1	3	2	1	2
		Develop the skills for doing systematic estimation in terms of quantitative aspects	1	3	2	1	2
		Interpretation of analytical and spectral data	1	3	2	1	2
		communicate the effective separation of mixture in to components in efficient manner	1	3	2	1	2
21P4CMC10	Organic Chemistry-IV	Appreciate the photochemistry and the significance of photochemistry in organic reactions	2	-	2	3	-
		Classify pericyclic reactions and interpret the product formation based on stereo chemical methods	2	-	3	3	-
		able to synthesis and compare the reactivity of O,N, S heterocycles	2	-	3	3	-
		Understand to define and classify the terpenes, steroids and their structural elucidation with their synthesis	2	-	2	2	-
		Sketch out the synthesis of of alkaloids and elucidate the structure	2	-	2	2	-
21P4CMC11	INORGANIC CHEMISTRY-IV	To predict the structure of inorganic compounds using IR, Raman and NMR spectroscopy	3	2	-	-	-
		To illustrate the inorganic complex using electron spin resonance spectroscopy	3	2	-	-	-
		To organize the knowledge on error analysis and analytical techniques	3	2	-	-	-
		To infer knowledge about surface and thermal analysis techniques	3	2	-	-	-
		To illustrate Principles, theory and applications of electroanalytical techniques	3	2	-	-	-
21P4CMC12	Physical Chemistry - IV	Summarize the Basics of molecular spectroscopy, and applications of rotational and IR spectra	3	1	3	3	2
		Develop knowledge to solve problems regarding dissociation energy and internuclear distance.	3	1	2	3	2

		Analyse the structural aspects by applying NMR	3	1	1	3	2
		Make use of concepts of EPR to spectra of organic radicals, Application of ESCA to simple molecules.	3	1	2	3	2
		Apply the concept of photochemistry to concept of photosensitization, chemiluminescence.	3	1	3	3	2
21P4CME6	CSIR/NET/GATE/SET Examination Preparation Objective Pattern only)	Illustrate the structure and types of bond in inorganic molecules using VB and MO theories	3	-	2	1	1
		Illustrate the structure of inorganic chain and cluster compounds; Inspect the characterisation of inorganic compounds by various spectroscopic techniques like IR, Raman, NMR, EPR, Mössbauer, UV-vis etc.	3	-	2	1	1
		Connect various theories behind quantum mechanics to illustrate multi-electron system and to calculate the energy of simple multi-electron atoms; Organize basic concepts of quantum mechanics and approximation methods used in solving molecular energy; analyze the symmetries and the crystal structures of molecules and organize concepts of ionic interactions, theory of electrolytes, Debye-Hückel limiting law; focus on various concepts like phase rule, kinetics, thermodynamics, solid state etc.	3	1	2	-	1
		Recognise the type of mechanism & intermediates involved in the given organic reaction and to prove mechanism for the reaction; To analyse chemical transformations based on nucleophilic and electrophilic substitution reaction	3	2	2	2	2
		Make use of the various oxidizing and reducing reagents and to inspect the molecule on the stereochemical aspects and also apply knowledge to determine the structure of organic compounds by various spectroscopic techniques	3	1	2	1	-
21P4CME7	Agrochemicals	Classify the different agrochemicals and their management in the agricultural field.	3	1	1	2	1
		Categorize the various types of herbicides and fungicides, their selective mode of action on unwanted plants and on fungal cells respectively.	3	1	1	2	1
		Identify nutritional deficiency in plants and rectify it by applying various types of fertilizers viz., nitrogen, phosphatic and potassic fertilizers.	3	1	1	2	1
		Recognise the green chemistry method for carrying out organic farming, biocomposting, vermi composting etc.	3	1	2	2	1
		Infer about the effects of pesticide residues in atmosphere, water, soil and harmful impact of pesticide residue on human life.	3	1	1	1	1

21P4CMP7	Physical Chemistry Laboratory - II	Demonstrate the basic laboratory techniques of handling instruments like conductometer and potentiometer	3	3	2	1	3
		Make use of conductivity cell and other electrodes practiced in both conductometer and potentiometer	1	3	1	1	1
		Apply the principle of conductometry and potentiometry for the estimation of ionic solutions	3	3	1	1	2
		Infer analytical results	2	3	3	1	3
		Make them understand practical skills related to ionic equilibria and electrochemistry	2	3	2	1	1
21P4CMP8	Organic preparation	To apply the mechanism of double stage organic preparations.	1	3	1	3	1
		To develop experimental skills of various preparation	1	3	1	3	1
		To analyze the compounds and purification	1	3	1	3	1
		To interpret structural elucidation of compounds.	1	3	1	3	1
		To infer the physical properties of the compounds	1	3	1	3	1
21P4CMR	Chemistry Project	Survey scientific literature available and identify gaps in existing studies	3	3	3	3	3
		Design a scientific study taking practical constraints into account	3	3	3	3	3
		Perform the scientific study taking practical constraints into account.	3	3	3	3	3
		Analyze the results.	3	3	3	3	3
		Communicate the findings based on ethical standards of reporting.	3	3	3	3	3



Chairman BoS

Dr. A. XAVIER, M.Sc., M.Phil., Ph.D.,
 Head and Associate Professor of Chemistry
 Department of Chemistry
 The Madura College (Autonomous)
 MADURAI-625 011