

# THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS), SIVAKASI – 626 123.

(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade by NAAC, College with Potential for Excellence by UGC and Mentor Institution under UGC PARAMARSH)

#### DEPARTMENT OF CHEMISTRY

#### UG DEGREE PROGRAMME IN CHEMISTRY

(For those who have joined June 2020 and later)

## PROGRAMME EDUCATIONAL OBJECTIVES

The Graduates will			
PEO1.	nurture the essential requisites to pursue higher studies and satisfy the needs of analyst in industries and chemical laboratories.		
PEO2.	possess skills of keen observation and drawing logical inferences from the practical experiments and adopt safety measures in the laboratory.		
PEO3.	emerge as a successful women entrepreneur to establish consultancies for quality analysis and small scale industries.		

PROGRAMME SPECIFIC OUTCOMES			
By the Completion of B.ScChemistry programme, the learners will be able to			
PSO1.	recall the comprehensive knowledge acquired in chemistry.		
PSO2.	utilize the critical thinking and logical reasoning to find solutions for chemical problems locally and globally.		
PSO3.	develop skills in safe handling of apparatus, chemicals, maintain record and interpret the results of experiments.		
PSO4.	utilize computers in data processing, chemical simulation and computational softwares for data analysis.		
PSO5.	work in teams to arrive at solutions for problems in laboratories and environmental issues.		
PSO6.	follow safe, ethical and responsible practices of chemistry in the society.		
PSO7.	emerge as a self- paced and self-directed learner and recognize their responsibility in preserving the renewable resources.		

## **COURSE OUTCOME**

Core Course			
<b>Course Code: BDCH11</b>		Course Title: INORGANIC CHEMISTRY-I	
On successful completion of the course, the learners should be able to			
CO1[K2]:	recall the primethods, class of bonding.	nciples behind hygiene and safety measures in laboratory, s sification of periodic properties of elements, nuclear chemistry	semi-micro and theory
CO2[K2]:	explain the radioactivity,	principles of semi-micro qualitative analysis and the nuclear transformation and chemical bonding.	neories of
CO3[K3]:	illustrate the	periodic properties and safety measures followed in the laborator	·y.
CO4[K4]:	apply the cor	ncepts of chemical bonding to deduce the geometry of mole	cules.
CO5[K5]:	analyze work laboratory hy	king of Nuclear Reactors, the periodic properties of elements giene and safety.	and adopt

	Core Course				
Course Code: BDCH12		Course Title: PHYSICAL CHEMISTRY-I			
On successful completion of the course, the learners should be able to					
CO1[K2]:	outline the behavior of liquids & basic concepts about kinetics, adsorption and polymer chemistry.				
CO2[K3]:	identify the	e physical properties of liquids and chemical kinetic theories.			
CO3[K3]:	classify the	e types of reactions, adsorption, polymers and polymerization process.			
CO4[K4]:	compare th	e characteristics of reactions of different order and adsorption isother	ms.		
CO5[K5]:	extend the period of re	chemical kinetics concept to determine the order, molecularity and eactions.	half-life		

Core Course			
Course Code:	BDCH21	Course Title: ORGANIC CHEMISTRY - I	
On successful	completion	of the course, the learners should be able to	
CO1[K2]:	summarize cycloalkan	the IUPAC, nomenclature, source and nature of aliphatic alkanes, es, cycloalkenes, halogen compounds and nitrogen compounds.	
CO2[K3]:	illustrate t	he preparation, properties of aliphatic alkanes, cycloalkanes, cycloalkenes,	
	halogen co	ompounds, nitrogen compounds.	

CO3[K4]:	apply the IUPAC nomenclature for naming the organic compounds.
CO4[K4]:	analysis the importance petroleum products, stability of intermediates.
CO5[K5]:	justify the application of aliphatic alkanes, cycloalkanes, cycloalkenes, petroleum products, halogen compounds and nitrogen compounds.

	Core Course			
<b>Course Code:</b>	BDCH2L	Course Title: INORGANIC QUALITATIVE ANALYSIS		
On successful completion of the course, the learners should be able to				
CO1[K2]:	recall the p	rinciples behind micro qualitative analysis and adulteration of food materials.		
CO2[K3]:	identify th	e anions and cations present in the mixture.		
CO3[K3]:	apply the n	nethods to eliminate various interfering radical		
CO4[K3]:	apply the in	ntergroup separation to categorize the metal ions into different groups.		
CO5[K4]:	analyse the	cations and anions present in pyrotechnic chemicals.		

		Core Course
<b>Course Code:</b>	BDCH31	Course Title: ORGANIC CHEMISTRY-II
On successful	completior	of the course, the learners should be able to
CO1[K2]:	recall the sketones and	ource and nature of aromatic hydrocarbon, hydroxyl compounds, aldehydes, d heterocyclic compounds.
CO2[K2]:	apply the reactions.	theory of aromatic hydrocarbons and mechanism of aromatic substitution
CO3[K3]:	summarise compounds	the properties aromatic hydrocarbons, alcohols, aldehydes, ketones, amino and nitrogen compounds.
CO4[K4]:	compare the compounds	e reactions and uses of aromatic hydrocarbon, alcohols, nitrogen containing e, carbonyl and heterocyclic compounds.
CO5[K5]:	illustrate the compounds	e application of aromatic hydrocarbons, alcohols, aldehydes, ketones, amino and nitrogen compounds.

	Core Course
Course Code	e: BDCH32 Course Title: INORGANIC CHEMISTRY-II
On successf	ul completion of the course, the learners should be able to
CO1[K2]:	recall definitions, principles of volumetric analysis, acids and bases; el configuration of elements and preparation of halogen compounds.
CO2[K2]:	summarize the concepts of acids and bases, indicators, reactions occurring NH <sub>3</sub> , properties of d and f-block elements, and halogen compounds and noble
CO3[K3]:	identify& describe the type and structure of halogen & xenon compounds; so problems in concentration units.
CO4[K4]:	analyze the acidity of bases and basicity of acids; compare the chemical react occurring in liquid NH <sub>3</sub> & H <sub>2</sub> O, properties of d-block elements and lanthanid actinides; stability of complexes.
CO5[K5]: Course Code	evaluate the effect of molecular structure on the relative acidity of HY and molecules; oxidation states of different oxidation states and electronic config of d –block elements; choice of indicators and criteria for primary standards. Core Course e: BDCH41 Course Title: PHYSICAL CHEMISTRY-II
CO5[K5]: Course Code On successf	evaluate the effect of molecular structure on the relative acidity of HY and molecules; oxidation states of different oxidation states and electronic configuration of d –block elements; choice of indicators and criteria for primary standards.         Core Course         e: BDCH41       Course Title: PHYSICAL CHEMISTRY-II         ul completion of the course, the learners should be able to
CO5[K5]: Course Code On successf	evaluate the effect of molecular structure on the relative acidity of HY and molecules; oxidation states of different oxidation states and electronic configuration of d –block elements; choice of indicators and criteria for primary standards.         Core Course         e: BDCH41       Course Title: PHYSICAL CHEMISTRY-II         ul completion of the course, the learners should be able to       explain the principles, postulates, theories and concepts of quantum mechanic
CO5[K5]: Course Code On successf CO1[K2]:	evaluate the effect of molecular structure on the relative acidity of HY an molecules; oxidation states of different oxidation states and electronic config of d –block elements; choice of indicators and criteria for primary standards.         Core Course         e: BDCH41       Course Title: PHYSICAL CHEMISTRY-II         ul completion of the course, the learners should be able to       explain the principles, postulates, theories and concepts of quantum mechanic catalysis, electrical and magnetic properties, colligative properties of dilute so
CO5[K5]: Course Code On successf CO1[K2]:	evaluate the effect of molecular structure on the relative acidity of HY and molecules; oxidation states of different oxidation states and electronic configored d-block elements; choice of indicators and criteria for primary standards.         Core Course         e: BDCH41       Course Title: PHYSICAL CHEMISTRY-II         ul completion of the course, the learners should be able to       explain the principles, postulates, theories and concepts of quantum mechanic catalysis, electrical and magnetic properties, colligative properties of dilute so and crystal symmetry.
CO5[K5]: Course Code On successf CO1[K2]: CO2[K2]:	evaluate the effect of molecular structure on the relative acidity of HY an molecules; oxidation states of different oxidation states and electronic config of d –block elements; choice of indicators and criteria for primary standards.         Core Course         e: BDCH41       Course Title: PHYSICAL CHEMISTRY-II         ul completion of the course, the learners should be able to       explain the principles, postulates, theories and concepts of quantum mechanic catalysis, electrical and magnetic properties, colligative properties of dilute so and crystal symmetry.         enumerate the postulates of quantum mechanics, types of catalysis and par affecting it, solids and elements of symmetry, reason out for abnormal co properties; magnetic susceptibility determination experiment; mechanism of e catalyzed reactions.
CO5[K5]: Course Code On successf CO1[K2]: CO2[K2]: CO3[K3]:	evaluate the effect of molecular structure on the relative acidity of HY an molecules; oxidation states of different oxidation states and electronic configor of d –block elements; choice of indicators and criteria for primary standards.         Core Course         e: BDCH41       Course Title: PHYSICAL CHEMISTRY-II         ul completion of the course, the learners should be able to         explain the principles, postulates, theories and concepts of quantum mechanic catalysis, electrical and magnetic properties, colligative properties of dilute so and crystal symmetry.         enumerate the postulates of quantum mechanics, types of catalysis and par affecting it, solids and elements of symmetry, reason out for abnormal co properties; magnetic susceptibility determination experiment; mechanism of e catalyzed reactions.         expressions for Schrodinger''s wave equation, colligative properties, kine catalytic reactions, Clausius-Mosotti equation and Debye equation.
CO5[K5]: Course Code On successf CO1[K2]: CO2[K2]: CO3[K3]: CO4[K4]:	evaluate the effect of molecular structure on the relative acidity of HY ar molecules; oxidation states of different oxidation states and electronic confi of d –block elements; choice of indicators and criteria for primary standards.         Core Course         E: BDCH41       Course Title: PHYSICAL CHEMISTRY-II         ul completion of the course, the learners should be able to       explain the principles, postulates, theories and concepts of quantum mechanic         catalysis, electrical and magnetic properties, colligative properties of dilute so and crystal symmetry.       enumerate the postulates of quantum mechanics, types of catalysis and paraffecting it, solids and elements of symmetry, reason out for abnormal co properties; magnetic susceptibility determination experiment; mechanism of e catalyzed reactions.         expressions for Schrodinger''s wave equation, colligative properties, kine catalytic reactions, Clausius-Mosotti equation and Debye equation.         determine the Miller indices from the intercepts, molar masses from co properties, analyze commutation of operators; molecular interpret of diama and paramagnetism.

	Core Course				
<b>Course Code:</b>	BDCH41	Course Title: PHYSICAL CHEMISTRY-II			
On successful	On successful completion of the course, the learners should be able to				
	explain the	e principles, postulates, theories and concepts of quantum mechanics,			
CO1[K2]:	catalysis, e	electrical and magnetic properties, colligative properties of dilute solutions			
	and crystal	symmetry.			
CO2[K2]:	enumerate affecting i	the postulates of quantum mechanics, types of catalysis and parameters t, solids and elements of symmetry, reason out for abnormal colligative			
	properties; magnetic susceptibility determination experiment; mechanism of enzymes catalyzed reactions.				
CO3[K3]:	expressions for Schrodinger"s wave equation, colligative properties, kinetics for catalytic reactions, Clausius-Mosotti equation and Debye equation.				
CO4[K4]:	determine the Miller indices from the intercepts, molar masses from colligative properties, analyze commutation of operators; molecular interpret of diamagnetism				
	and paramagnetism.				
CO5[K5]:	discuss the applications of radius ratio rule, dipole moments and magnetic susceptibility measurement, SWE to a particle in 1D box.				

	Core Course				
Course Code:	BDCH4L	Course Title: VOLUMETRIC ESTIMATION			
On successful completion of the course, the learners should be able to					
CO1[K2]:	explain the principles underlined in the volumetric analysis viz.,acid-base, dichrometry, permanganometry, iodometry and EDTA titrations.				
CO2[K3]:	apply the law of volumetric analysis to estimate the amount of substances.				
CO3[K3]:	demonstra	te the water quality parameters.			
CO4[K4]:	estimate th	ne strength of the acids and bases by volumetric titrations.			
CO5[K5]:	determine	the strength of metal ions by complexometric titrations.			

		Non-Major Elective
<b>Course Code:</b>	BDCH4N	Course Title: CHEMISTRY IN DAILY LIFE
On successful	completion	of the course, the learners should be able to
CO1[K2]:	summarize pharmaceu	the types of soaps and detergents, food chemistry, milk products and tical chemistry.
CO2[K2]:	illustrate fo	ood preservation and processing techniques.
CO3[K3]:	identify the	e role of drugs, food adulteration and soaps and detergents in daily life.
CO4[K3]:	categorize	different types of food adulterants and classification of drugs.
CO5[K4]:	discuss inr	ovative ideas on drug synthesis and preventing food adulteration.

Non-Major Elective			
Course Code: BDCH4DSL		Course Title: CHEMINFORMATICS - PRACTICALS	
On successful completion of the course, the learners should be able to			
CO1[K2]:	explain the fur	damentals of cheminformatics software.	
CO2[K3]:	apply the know	vledge of docking and molecular dynamics in drug discovery process.	

CO3[K4]:	analyze the molecular property of chemical compounds.
CO4[K4]:	analyze biological activity of a molecule by various software.
CO5[K4]:	evaluate the knowledge of cheminformatics software in drug designing.

Core Course			
Course Code: BDCH51		Course Title: ORGANIC AND PHARMACEUTICAL CHEMISTRY	
On successful	completior	of the course, the learners should be able to	
CO1[K2]:	outline the concept of stereochemistry, spectroscopy and chemotherapy of organic compounds, nature and source of the chemistry of carboxylic acids.		
CO2[K2]:	determine the stereoisomers and assign the configuration to various organic molecules.		
CO3[K3]:	illustrate the properties of carboxylic acids, carboxylic acid derivatives and applications of spectroscopic techniques.		
CO4[K4]:	analyze th	e structure of the organic compounds using spectral technique.	
CO5[K5]:	discuss th	e importance and therapeutic uses of pharmaceutical drugs.	

Elective Course				
Course Code: BDCH5E1 Course Title: INORGANIC CHEMISTRY – III				
On successful	On successful completion of the course, the learners should be able to			
CO1[K2]:	restate the fundamentals of coordination chemistry, electron deficient compounds, bioinorganic chemistry and organometallic compounds.			
CO2[K3]:	apply the tl	heories of co-ordination chemistry in complexes.		
CO3[K3]:	classify the silicones, s	e types, properties and structure of co-ordination complexes, boranes, silicates and ferrocene.		
CO4[K4]:	justify the silicones an	e importance of metal carbonyls, metal nitrosyl complexes, boranes, nd detect the structure of the complexes.		
CO5[K5]:	explain the	e toxicity, role of metal ions and function of enzymes in living systems.		

Elective Course			
Course Code:	BDCH5E2	Course Title: NON – CONVENTIONAL ENERGY RESOURCES	
On successful	completion	of the course, the learners should be able to	
CO1[K2]:	restate the f	undamentals of energy science and different sources of energy.	
CO2[K3]:	classify the	sources of energy.	
CO3[K3]:	explore the significance and applications of non-conventional energy resources.		
CO4[K4]:	discuss the	advantages and disadvantages of non-conventional energy resources.	
CO5[K5]:	create awar	eness on preserving the available non-conventional energy resources.	

Elective Course			
Course Code:BDCH5E3 Course Title:PHYSICAL CHEMISTRY – III			
On successful	completion	of the course, the learners should be able to	
CO1[K2]:	summarize the basic concepts related to electrolytes, titrations, catalysis,		
	thermodynamics and group theory.		
CO2[K3]:	apply the relationship between microscopic properties of molecules with macroscopic thermodynamic observables to arrive at thermodynamic expressions.		
CO3[K4]:	analyse the symmetry elements in molecules, first, second and third law of thermodynamics and the concepts of catalysis.		
CO4[K4]:	derive expressions for the thermodynamic properties and construct the Group multiplication table.		
CO5[K5]:	calculate the	e magnitude of various thermodynamic properties and solve problems	
		ine equinoria.	

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Elective Course		
Course Code:BDCH5E4 Course Title: COMPUTER APPLICATIONS IN CHEMISTRY		Course Title: COMPUTER APPLICATIONS IN CHEMISTRY
On successful completion of the course, the learners should be able to		
CO1[K2]:	summarise	the fundamental concepts of C language.

CO2[K3]:	solve the chemistry problems by writing programs.
CO3[K3]:	discriminate various branching and looping.
CO4[K4]:	construct programs for various concepts of chemistry.
CO5[K5]:	draw chemical structures using Chem. Draw Software.

Core Course				
Course Code:	Course Code:BDCH5L2 Course Title:PHYSICAL CHEMISTRY PRACTICAL			
On successful	On successful completion of the course, the learners should be able to			
CO1[K2]:	explain the procedures and instrumental operations applied in the physical chemistry practicals.			
CO2[K3]:	apply the micro scale handling in the laboratory in order to reduce the usage of chemicals.			
CO3[K3]:	utilize their	skills in carrying out physical chemistry laboratory techniques.		
CO4[K4]:	analyse the observed and recorded experimental data.			
CO5[K5]:	interpret th	e observed data following the laboratory ethics.		

Core Course				
Course Code:BDCH5V		Course Title:INTERNSHIP/ ON-THE- JOB TRAINING		
On successful	On successful completion of the course, the learners should be able to			
CO1[K2]:	relate the c	lass room theory with work place practice.		
CO2[K23]:	apply the practices / procedures observed in real time working environment.			
CO3[K4]:	analyse the workflow and communication flow prevailing in the institution/industry.			
CO4[K5]:	assess inter	rests and abilities in their field of study.		
CO5[K6]:	propose s industrial/i	strategies, policies and guidelines for enhancing efficiency on nstitutional operations.	of	

Ability Enhancement Course			
Course Code:BDCG51		Course Title:CAREER GUIDANCE	
On successful	completion	of the course, the learners should be able to	
CO1[K1]:	recall the basic concepts about history, culture of India and languages.		
CO2[K2]:	summarize the various events related to Indian economy and Indian national movement.		
CO3[K2]:	explain the	multi - dimensional aspects of science.	
CO4[K3]:	apply the n	nathematical knowledge to solve different problems.	
CO5[K5]:	analyze the	problems related to mental ability and reasoning power.	

Non Major Elective				
Course Code:	Course Code:BDCH5N Course Title:INDUSTRIAL CHEMISTRY			
On successful	On successful completion of the course, the learners should be able to			
CO1[K1]:	recall the fundamentals of polymer chemistry, pyrotechnic chemistry, explosives, and toiletry and household products.			
CO2[K2]:	classify the	resins, rubber, plastics, matches, pyrotechnic and explosives.		
CO3[K3]:	explain the preparation and properties of polymer chemistry, pyrotechnic chemistry, explosives, and toiletry and household products.			
CO4[K4]:	identify the	composition present in the matches, pyrotechnic and explosives.		
CO5[K4]:	compare th	e resins, plastics and rubber.		

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Core Course			
Course Code:	BDCH61	Course Title:PHYSICAL CHEMISTRY-IV	
On successful completion of the course, the learners should be able to			
CO1[K2]:	summarize t and phase eq	he basic concepts about electrochemical cells, molecular spectroscopy quilibria.	

والعراقة علاقة فأعداها فلاقت فالعثاقة فلافت فالعثاقة فلاقت فالعثاقة فلاقت فلاقت فلاقت فلاقت فالعثاقة فلاقت فالعثاقة فلاقت فلاقت فلاقت فالعالية فالعناقة فلاقت فالعالية فالعناقة فلاقت فالعالية فالعناقة فالمناقلة فالعناقة فالعناقة فالمناقلة فالمناقلة فالمناقلة فالمناقة فالمناقلة فالمناقلة فالمناقلة فالمناقلة فالمناقلة فالمناقلة فالمناقلة فالمناقلة فالمناقلة فالم

CO2[K3]:	apply the phase rule to the one and two component systems as well as to apply the spectroscopic techniques to various molecules.
CO3[K3]:	utilize the EMF measurements for the determination of electrochemical and thermo chemical properties.
CO4[K4]:	solve the problems related to electrochemistry, spectroscopy and phase rule.
CO5[K5]:	evaluate the molecular interaction by choosing the suitable spectroscopic method and interpreting the corresponding data.

Core Course		
Course Code:BDCH62		Course Title:ANALYTICAL CHEMISTRY
On successful	completion of	of the course, the learners should be able to
CO1[K2]:	state the prin	ciple and theories of safety data sheet and various analytical techniques.
CO2[K2]:	illustrate the errors.	role of analytical chemistry, different ways of minimizing experimental
CO3[K3]:	apply the kn determinatio	owledge of chromatographic techniques for qualitative and quantitative n.
CO4[K4]:	analyze the p analysis	principle and techniques in gravimetric colorimetric and chromatographic
CO5[K5]:	evaluate dat analysis.	a from a variety of analytical chemistry techniques and statistical

Elective Course				
Course Code:BDCH6E1		Course Title: ORGANIC CHEMISTRY - IV		
On successful	On successful completion of the course, the learners should be able to			
CO1[K2]:	outline the c polymers, al	hemistry of amino acids and proteins, nucleic acids, carbohydrates, dyes, kaloids and terpenoids.		
CO2[K2]:	classify varie carbohydrate	ous types of dyes and polymer, amino acids and proteins, nucleic acids, es, alkaloids and terpenoids.		
CO3[K3]:	identify the s	structure and functions of amino acids, proteins and nucleic acids.		
CO4[K4]:	illustrate the alkaloids and	structure and synthesis of amino acids proteins, nucleic acids, dyes, l terpenoids.		

CO5[K5]:	discuss the biological importance of carbohydrates, amino acids and proteins, nucleic
	acids, alkaloids and terpenoids.

Elective Course					
Course Code:BDCH6E2		Course Title: STEREOCHEMISTRY			
On successful	On successful completion of the course, the learners should be able to				
CO1[K1]:	recall the co	ncepts of stereo chemical reactions.			
CO2[K3]:	apply the stereochemistry in substitution reactions.				
CO3[K2]:	discuss the i	mportance of stereochemistry in elimination relations.			
CO4[K6]:	illustrate the	applications of stereochemistry in addition reactions.			
CO5[K4]:	analyze and	draw the conformations of acyclic and cyclic compounds			

		Core Course
<b>Course Code:</b>	BDCH6L1	Course Title:
On successful	completion	of the course, the learners should be able to
CO1[K2]:	restate the l	pasic concepts of organic estimation and preparation.
CO2[K3]:	apply these techniques to carry out analysis in Research laboratories and industries.	
CO3[K4]:	estimate the amount of organic compound in solution.	
CO4[K5]:	analyse the laboratories	organic compounds apply these techniques to carry out analysis in research and industries.
CO5[K6]:	design simp	ble methodology for synthesizing and purification of organic compounds.

Core Course		
Course Code: BDCH6L2	Course Title:	
On successful completion of the course, the learners should be able to		

CO1[K2]:	summarize the basic principle behind gravimetric estimation and organic preparations.
CO2[K2]:	estimate metal ions using gravimetric and colorimetric techniques.
CO3[K3]:	prepare organic complexes.
CO4[K4]:	estimate the amount of metal ions present in the alloy using electrogravimetric method.
CO5[K5]:	assess the quality of pyrotechnic raw materials.

CO1[K2]:	summarize the basic principle behind gravimetric estimation and organic preparation	ons.	
CO2[K2]:	estimate metal ions using gravimetric and colorimetric techniques.		
CO3[K3]:	prepare organic complexes.		
CO4[K4]:	estimate the amount of metal ions present in the alloy using electrogravimetric met	hod.	
CO5[K5]:	assess the quality of pyrotechnic raw materials.		
	Self-Employment Courses		
Course Code	:BDSE63 Course Title: BASICS OF PRINTING PROCESSES		
On successfu	Il completion of the course, the learners should be able to		
CO1[K2]:	summarize the basic principles of mini offset, screen printing and modern p processes.	rinting	
CO2[K2]:	describe the various modern printing processes and techniques, delivery unit an	d it	
	parts, methods of stencils making.		
CO3[K3]:	apply the basics of printing processes and classify their types, inks, mesh materials.		
CO4[K3]:	analyse advantages of different printing units, use of chemicals in printing industry.		
CO5[K5]:	enumerate the applications, screen printing and inkjet printing.		
	Self-Employment Courses		
Course Code	:BDSE63L Course Title: PRINTING PRIMER PRACTICAL		
On successfu	Il completion of the course, the learners should be able to		
CO1[K2]:	summarize the basic principles of mini offset, screen printing and modern p processes.	rinting	
CO2[K3]:	preparepolymaster, screen.		
CO3[K3]:	prepare stencil.		
CO4[K3]:	mount polymaster, Plate in flexography printing machine, gravure printing machine.		

Self-Employment Courses			
Course Code:BDSE63L		Course Title: PRINTING PRIMER PRACTICAL	
On successful completion of the course, the learners should be able to			
CO1[K2]:	summarize the basic principles of mini offset, screen printing and modern printing processes.		
CO2[K3]:	preparepolymaster, screen.		
CO3[K3]:	prepare stenci	1.	
CO4[K3]:	mount polyma machine.	aster, Plate in flexography printing machine, gravure printing	

CO5[K5]:	

print by Screen Printing method and mini offset.

Allied Course			
Course Code:BDCH1A Course Title: FUNDAMENTALS OF CHEMISTRY			
On successful completion of the course, the learners should be able to			
CO1[K2]:	restate the fundamentals of organic chemistry, carbohydrates, analytical chemistry, metallurgy and dyes.		
CO2[K2]:	outline the importance and chemistry of carbohydrates, metallurgy and dyes.		
CO3[K3]:	identify the suitable qualitative and quantitative methods for the analysis and separation of elements and radicals.		
CO4[K4]:	explain the of metals of ore	occurrence of ores and the various steps involved in the extraction of es.	
CO5[K5]:	discuss the t of dyes, anal	heory of chromophores and auxochromes on the colour and constitution ytical technique, structure of carbohydrates and hybridization.	

Allied Course			
Course Code:BDCH2A Course Title: PHYSICAL AND INDUSTRIAL CHEMISTRY			
On successful completion of the course, the learners should be able to			
CO1[K2]:	restate the basic concepts of photochemistry, industrial and water chemistry, amino acids, proteins, chemical kinetics and catalysis.		
CO2[K2]:	explain the chemistry of fuel gases, fertilizers, silicones, water and catalysis.		
CO3[K3]:	Classify photophysical process, fuel gases, fertilizers, silicones, hardness of water, amino acids, proteins, nucleic acids and catalysis.		
CO4[K4]:	examine the photochemi	e biological importance of amino acids, proteins, peptides, nucleic acids, stry.	
CO5[K5]:	discuss the o	rder of the reactions, mechanism and application of catalyst.	

		Allied Practical		
Course Code	:BDCH2AL	Course Title: VOLUMETRIC ESTIMATION		
On successfu	l completion	of the course, the learners should be able to		
CO1[K2]:	summarise the procedure for different types of volumetric analysis.			
CO2[K3]:	apply the la	w of volumetric analysis for determining the strength of analyte.		
CO3[K4]:	apply the l present in th	knowledge on concentration units to calculate the amount of analyte ne whole of the given solution.		
CO4[K4]:	demonstrate	e the analysis of hardness of water.		
CO5[K5]:	follow the chemicals, i	laboratory safety measures and ethics to use acids, bases and other record note books and avoid malpractices, data manipulation and copying.		
		Allied Course		
Course Code	:BDCH3A	Course Title: EUNDAMENTALS OF CHEMISTRY		
On successfu	l completion	of the course, the learners should be able to		
CO1[K2]:	summarize pesticides.	summarize the chemistry of vitamins, carbohydrates, fertilizers, insecticides and		
CO2[K3]:	classify di insecticides	classify different types of vitamins carbohydrates, fertilizers, pesticides and insecticides.		
CO3[K3]:	explain the	explain the importance and structure of carbohydrates and vitamins.		
CO4[K4]:	illustrate the principles and manufacturing process of, fertilizers, oils, fats.			
CO5[K5]:	discuss the fertilizer in	discuss the applications of essentiality of vitamins, pesticides, insectides and fertilizer in biological system.		
		Allied Course		
Course Code	:BDCH4A	Course Title: PHYSICAL AND INDUSTRIAL CHEMISTRY		
On successfu	ll completion	of the course, the learners should be able to		
CO1[K2]:	acquire the amino acids	basic idea on photochemistry, nuclear chemistry, water technology, s, proteins, nucleic acids, silicones and bioinorganic compounds.		
CO2[K3]:	outline the proteins, nu	photophysical process, fuels, silicones, water treatment, amino acids, cleic acids and bioinorganic compounds.		
	classify the hardness of water, amino acids proteins nucleic acids and compare the			

		Allied Practical	
Course Cod	e:BDCH2AL	Course Title: VOLUMETRIC ESTIMATION	
On successf	ul completion	of the course, the learners should be able to	
CO1[K2]:	summarise	the procedure for different types of volumetric analysis.	
CO2[K3]:	apply the la	w of volumetric analysis for determining the strength of analyte.	
CO3[K4]:	apply the lappesent in the	knowledge on concentration units to calculate the amount of ne whole of the given solution.	
CO4[K4]:	demonstrate	e the analysis of hardness of water.	
CO5[K5]:	follow the chemicals, r	laboratory safety measures and ethics to use acids, bases and record note books and avoid malpractices, data manipulation and co	
		Allied Course	
Course Cod	e:BDCH3A	Course Title: FUNDAMENTALS OF CHEMISTRY	
On successf	ul completion	of the course, the learners should be able to	
CO1[K2]:	summarize pesticides, c	the chemistry of vitamins, carbohydrates, fertilizers, insecticional poils, fats, soaps and detergent.	
CO2[K3]:	classify dif	fferent types of vitamins carbohydrates, fertilizers, pesticide	
CO3[K3]:	explain the	importance and structure of carbohydrates and vitamins.	
CO4[K4]:	illustrate the	illustrate the principles and manufacturing process of, fertilizers, oils, fats.	
CO5[K5]:	discuss the fertilizer in	applications of essentiality of vitamins, pesticides, insectide biological system.	
		Alliad Course	
		Amed Course	
Course Cod	e:BDCH4A	Course Title: PHYSICAL AND INDUSTRIAL CHEMISTRY	
Course Cod	e:BDCH4A	Course Title: PHYSICAL AND INDUSTRIAL CHEMISTRY of the course, the learners should be able to	
Course Cod On successf CO1[K2]:	e:BDCH4A ul completion acquire the amino acids	Anieu Course         Course Title: PHYSICAL AND INDUSTRIAL CHEMISTRY         of the course, the learners should be able to         basic idea on photochemistry, nuclear chemistry, water technics, proteins, nucleic acids, silicones and bioinorganic compounds.	
Course Cod On successf CO1[K2]: CO2[K3]:	e:BDCH4A ful completion acquire the amino acids outline the proteins, nu	Anneu Course         Course Title: PHYSICAL AND INDUSTRIAL CHEMISTRY         of the course, the learners should be able to         basic idea on photochemistry, nuclear chemistry, water technis, proteins, nucleic acids, silicones and bioinorganic compounds.         photophysical process, fuels, silicones, water treatment, amino cleic acids and bioinorganic compounds.	

Allied Course			
Course Code:BDCH4A		Course Title: PHYSICAL AND INDUSTRIAL CHEMISTRY	
On successful completion of the course, the learners should be able to			
CO1[K2]:	acquire the basic idea on photochemistry, nuclear chemistry, water technology, amino acids, proteins, nucleic acids, silicones and bioinorganic compounds.		
CO2[K3]:	outline the proteins, nuc	photophysical process, fuels, silicones, water treatment, amino acids, eleic acids and bioinorganic compounds.	
CO3[K3]:	classify the l	hardness of water, amino acids proteins nucleic acids and compare the	

	different concepts in photochemistry, nuclear chemistry, and bioinorganic chemistry.
CO4[K4]:	illustrate the biological importance of nucleic acids and proteins.
CO5[K5]:	discuss the structure and uses of amino acids, proteins and metal complexes.

Allied Practical			
Course Code:	Course Code:BDCH4AL Course Title: VOLUMETRIC ESTIMATION		
On successful completion of the course, the learners should be able to			
CO1[K2]:	summarise the procedure for different types of volumetric analysis.		
CO2[K3]:	apply the law of volumetric analysis for determining the strength of analyte.		
CO3[K3]:	apply the knowledge on concentration units to calculate the amount of analyte present in the whole of the given solution.		
CO4[K4]:	demonstrate the analysis of hardness of water.		
CO5[K5]:	follow the la	boratory safety measures and ethics to use acids, bases and other	
	chemicals, re	ecord note books and avoid malpractices, data manipulation and copying.	





## THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS), SIVAKASI – 626 123.

(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade by NAAC, College with Potential for Excellence by UGC and Mentor Institution under UGC PARAMARSH)

#### DEPARTMENT OF CHEMISTRY

PG DEGREE PROGRAMME IN CHEMISTRY

(For those who have joined in June 2020 and later)

## PROGRAMME EDUCATIONAL OBJECTIVES

The Graduate	es will
	apply their competency and analytical skills gained for higher studies and able to be a
PEO1.	professional analyst in research and development laboratories of pharmaceutical, pyro
	technique, paper and pulp and other chemical industries
	employ their critical thinking, scientific inquiry in the performance, design,
PEO2.	interpretation and documentation of innovative research work with ethics, realizing the
	social, economic, environmental and technological implications of chemistry.
PEO3.	establish analytical laboratories and small scale industries, learning support centers for
	competitive examinations.

## PROGRAMME SPECIFIC OUTCOMES

By the Completion of M.Sc Chemistry programme, the learners will be able to

PSO1.	comprehend the conceptions inorganic, inorganic, physical, pharmaceutical, computational and analytical chemistry and apply them in their higher studies research.
PSO2.	identify, reason out, formulate and solve the complications and modernize chemical industries by applying the concepts of chemistry.
PSO3.	design, develop and demonstrate the research problems related to safety, industrial, global, social and environmental issues.
PSO4.	defend the findings of research by communicating effectively and deliver messages and suggestions in national, international level seminars/symposium and conferences with the aid of ICT tools.

play the role of team leader and imbibe the value based behaviors such as tolerance, to
carry out research in team.
be a responsible citizen with ethical and human values in research and related fields.
evolve as lifelong learners in their chosen carriers and update the recent developments
in both chemistry and allied fields in science and technology.

## OUTCOME

Core Course			
Course Code: MDCH11		Course Title: ORGANIC CHEMISTRY - I	
On successful completion of the course, the learners should be able to			
CO1[K2]:	list out the principles of stereochemistry, selection rules for UV, IR spectroscopy and understand the mechanism of aromatic substitution reactions, aromaticity and computational chemistry.		
CO2[K2]:	illustrate the applications of UV and IR spectroscopic techniques in studying organic reactions.		
CO3[K3]:	assign the complexity molecules.	onfiguration and identify the stable conformers of various organic	
CO4[K4]:	determine th techniques, but	e structure of the organic compounds using UV and IR spectral uild the LEAD like compounds using computational software.	
CO5[K5]:	explain the in	portance of Chem draw, energy minimization, docking procedures.	

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Core Course			
Course Code: MDCH12		Course Title: INORGANIC CHEMISTRY - I	
On successful completion of the course, the learners should be able to			
CO1[K2]:	summarize th state, fluxior aqueous solve	e fundamentals and trends in periodic properties, bonding and the solid al behavior and pseudo rotation in molecules, properties of non ents and periodic anomalies of nonmetals and post transition metals.	
CO2[K2]:	illustrate the various scales of electronegativity, types and structure of crystal lattices, reaction chemistry in non aqueous solvents and molten salts, size effects and diagonal relationship in non metals.		
CO3[K3]:	justify the var	iation in periodicity and structure of crystal lattices,	
CO4[K4]:	analyze the fluxionality o	structure of molecules based on VSEPR theory, MO diagrams and f molecules.	
CO5[K5]:	explain the a determine th	ngular, radial wave functions, symmetry and energies of orbitals and e term symbols for ground state atoms/ions	

		Core Course
Course Code	e: MDCH13	Course Title: PHYSCIAL CHEMISTRY - I
On successful	completion of	the course, the learners should be able to
CO1[K2]:	Summarise th thermodynam	e concepts of electrolytic conductance of solutions, emf of cells, and ic properties of real and ideal gases.
CO2[K2]:	describe the the	neories of electrolysis, corrosion, polarization, chemical equilibrium
	and non-equil	ibrium thermodynamics
CO3[K3]:	calculate the e	electrical and thermodynamic properties of molecules
CO4[K4]:	discover the p of preventing	roperties of ideal, non-ideal, electrolytic solutions, types and methods corrosion.
CO5[K5]:	evaluate the c electrochemic	oncentrations of solutions and other constants applying al measurements.

		Core Course
Course Co	de: MDCH13	Course Title: PHYSCIAL CHEMISTRY - I
On successf	ful completion of	f the course, the learners should be able to
CO1[K2]:	Summarise thermodynam	e concepts of electrolytic conductance of solutions, emf of cells ic properties of real and ideal gases.
CO2[K2]:	describe the t	heories of electrolysis, corrosion, polarization, chemical equilibri
	and non-equi	ibrium thermodynamics
CO3[K3]:	calculate the	electrical and thermodynamic properties of molecules
CO4[K4]:	discover the p of preventing	properties of ideal, non-ideal, electrolytic solutions, types and me corrosion.
CO5[K5]:	evaluate the c electrochemic	concentrations of solutions and other constants applying cal measurements.
	·	
		Core Course
Course Coo	le: MDCH1L1	Core Course Course Title: ORGANIC CHEMISTRY PRACTICALS - I
Course Coo On successf	de: MDCH1L1	Course Title: ORGANIC CHEMISTRY PRACTICALS - I f the course, the learners should be able to
Course Coo On successf CO1[K2]:	de: MDCH1L1 ful completion of separate the n	Course Title: ORGANIC CHEMISTRY PRACTICALS - I f the course, the learners should be able to ixture of organic compounds in Microscale
Course Coo On successf CO1[K2]: CO2[K3]:	de: MDCH1L1 Ful completion of separate the m apply chroma	Course Course         Course Title: ORGANIC CHEMISTRY PRACTICALS - I         f the course, the learners should be able to         ixture of organic compounds in Microscale         cographic methods in separation.
Course Coo On successf CO1[K2]: CO2[K3]: CO3[K4]:	de: MDCH1L1         ful completion of         separate the m         apply chromat         analyze the or	Course Course         Course Title: ORGANIC CHEMISTRY PRACTICALS - I         f the course, the learners should be able to       ixture of organic compounds in Microscale         ixture of organic compounds in Microscale       ixture of organic compounds in separation.         ganic compounds for functional group       ixture
Course Coo On successf CO1[K2]: CO2[K3]: CO3[K4]: CO4[K5]:	Ite: MDCH1L1         ful completion of         separate the m         apply chromat         analyze the or         adapt new me	Course Course         Course Title: ORGANIC CHEMISTRY PRACTICALS - I         f the course, the learners should be able to       Image: State of Stat
Course Coo On successf CO1[K2]: CO2[K3]: CO3[K4]: CO4[K5]: CO5[K5]:	de: MDCH1L1         ful completion of         separate the n         apply chromat         analyze the or         adapt new me         determine the	Course Course         Course Title: ORGANIC CHEMISTRY PRACTICALS - I         f the course, the learners should be able to       ixture of organic compounds in Microscale         ixture of organic compounds in Microscale       ixture of organic compounds in separation.         cographic methods in separation.       ganic compounds for functional group         ethods to synthesize various organic compounds.       melting points / boiling points using digital apparatus.
Course Coo On successf CO1[K2]: CO2[K3]: CO3[K4]: CO4[K5]: CO5[K5]:	de: MDCH1L1         ful completion of         separate the m         apply chromat         analyze the or         adapt new me         determine the	Core Course         Course Title: ORGANIC CHEMISTRY PRACTICALS - I         If the course, the learners should be able to       ixture of organic compounds in Microscale         ixture of organic compounds in Microscale       ixture of organic compounds in separation.         cographic methods in separation.       ganic compounds for functional group         ethods to synthesize various organic compounds.       melting points / boiling points using digital apparatus.         Core Course
Course Coo On successf CO1[K2]: CO2[K3]: CO3[K4]: CO4[K5]: CO5[K5]:	de: MDCH1L1         ful completion of         separate the m         apply chromat         analyze the or         adapt new me         determine the	Core Course Course Course Title: ORGANIC CHEMISTRY PRACTICALS - I f the course, the learners should be able to ixture of organic compounds in Microscale cographic methods in separation. ganic compounds for functional group ethods to synthesize various organic compounds. melting points / boiling points using digital apparatus. Core Course Course Course Title: INORGANIC CHEMISTRY PRACTICALS - I
Course Coo On successf CO1[K2]: CO2[K3]: CO3[K4]: CO4[K5]: CO5[K5]: CO5[K5]:	de: MDCH1L1         ful completion of         separate the m         apply chromat         analyze the or         adapt new me         determine the	Core Course         Course Title: ORGANIC CHEMISTRY PRACTICALS - I         F the course, the learners should be able to       ixture of organic compounds in Microscale         ixture of organic compounds in Separation.       ixture of organic compounds for functional group         ethods to synthesize various organic compounds.       ixture of organics / boiling points using digital apparatus.         Core Course         Course Title: INORGANIC CHEMISTRY PRACTICALS - I         f the course, the learners should be able to       ixture of organic course
Course Coo On successf CO1[K2]: CO2[K3]: CO3[K4]: CO4[K5]: CO5[K5]: CO5[K5]: Course Coo On successf CO1[K2]:	de: MDCH1L1         ful completion of         separate the m         apply chromat         analyze the or         adapt new me         determine the         determine the         ful completion of         identify the c	Core Course         Course Title: ORGANIC CHEMISTRY PRACTICALS - I         If the course, the learners should be able to       ixture of organic compounds in Microscale         ixture of organic compounds in Separation.       ganic compounds for functional group         ethods to synthesize various organic compounds.       melting points / boiling points using digital apparatus.         Core Course       Course Title: INORGANIC CHEMISTRY PRACTICALS - I         f the course, the learners should be able to       ations into various groups

		Core Course
Course Code:	MDCH1L2	Course Title: INORGANIC CHEMISTRY PRACTICALS - I
On successful	completion of	the course, the learners should be able to
CO1[K2]:	identify the ca	ations into various groups
CO2[K2]:	synthesize of	various inorganic complexes

CO3[K3]:	analyse the familiar cations in a mixture
CO4[K4]:	analyse the less familiar cations in a mixture
CO5[K5]:	estimate the analyte by spectrofluorimetric and spectrophotometric method

		Elective Course
Course Code	MDCH1E1	Course Title: PHARMACEUTICAL CHEMISTRY
On successful	completion of	the course, the learners should be able to
CO1[K2]:	list the source	s, synthesis and metabolism of various drugs and clinical chemistry
CO2[K2]:	summarize th suitable drugs	e relation between chemical structure and pharmaceutical activity and for various diseases.
CO3[K3]:	apply the know	vledge gained about the various drugs
CO4[K4]:	analyze the set	rum, blood and urine using various analytical techniques.
CO5[K5]:	explain the me	chanism of action and adverse effects of various drugs.

		Elective Course
Course Code:	: MDCH1E2	Course Title: CHEMINFORMATICS
On successful	completion of	the course, the learners should be able to
CO1[K2]:	understand th	e principles of cheminformatics
CO2[K2]:	predict the bio	pactivity using structure and evolutionary relationship
CO3[K3]:	apply 2D, 3D investigation	) structure in the evaluation of similarity method, 3D pharmacophore and drug designing process.
CO4[K4]:	realize the im drug discover	portance of data base, sequence analysis, QSAR and docking in the y process
CO5[K5]:	discuss data l designing pro	base, structure analysis, sequence analysis and computer aided drug cess

	Core Course	
Course Co	de: MDCH21 Course Title: ORGANIC CHEMISTRY - II	
On successf	ul completion of the course, the learners should be able to	
CO1[K2]:	recall the principles of nucleophilic substitution, elimination reactions, mass spectrometry ORD,CD and NMR spectral techniques and recognize the structure of steroids.	
CO2[K3]:	write the mechanism of nucleophilic substitution, elimination reactions and variou stages involved in the synthesis of steroids.	
CO3[K3]:	illustrate the applications of Mass spectrometry ORD,CD and NMR spectral techniques.	
CO4[K4]:	elucidate the structure of steroids	
CO5[K5]:	solve the spectroscopy problems using Mass and NMR spectral techniques	
	Core Course	
Course Co	de: MDCH22 Course Title: INORGANIC CHEMISTRY - II	
On successf	ul completion of the course, the learners should be able to	
CO1[K2]:	summarize the concepts of bonding theories, applications of CFT, electronic spectra structure and isomerism, macrocyclic ligands, stability, reaction, kinetics in coordination complexes.	
CO2[K3]:	construct Orgel and Tanabe - Sugano diagrams for complexes	
CO3[K4]:	analyze the structure, isomerism, stability, stereochemical aspects, reaction kinetics and mechanism of coordination compounds.	
CO4[K4]:	assign the possible electronic transitions and calculate 10Dq and B for complexes	
CO5[K5]:	Discuss the stability of constants and composition of the complexes; synthesize the coordination compounds using electron transfer and substitution reactions.	
	Core Course	
Course Co	de: MDCH23 Course Title: PHYSICAL CHEMISTRY - II	
On successf	ul completion of the course, the learners should be ar3ble to	
CO1[K2]:	outline the basic concepts of quantum chemistry and biophysical chemistry.	
CO2[K3]:	make use of operator algebra to prove the various concepts and solve simple problems.	
	apply the Schrodinger wave equation for simple systems	

		Core Course
Course Code	e: MDCH22	Course Title: INORGANIC CHEMISTRY - II
On successful	completion of	the course, the learners should be able to
CO1[K2]:	summarize th structure and coordination	e concepts of bonding theories, applications of CFT, electronic spectra, l isomerism, macrocyclic ligands, stability, reaction, kinetics in complexes.
CO2[K3]:	construct Org	el and Tanabe - Sugano diagrams for complexes
CO3[K4]:	analyze the s and mechanis	tructure, isomerism, stability, stereochemical aspects, reaction kinetics m of coordination compounds.
CO4[K4]:	assign the pos	sible electronic transitions and calculate 10Dq and B for complexes
CO5[K5]:	Discuss the s coordination of	tability of constants and composition of the complexes; synthesize the compounds using electron transfer and substitution reactions.

		Core Course	
Course Code	e: MDCH23	Course Title: PHYSICAL CHEMISTRY - II	
On successful	completion of	f the course, the learners should be ar3ble to	
CO1[K2]:	outline the ba	sic concepts of quantum chemistry and biophysical chemistry	7.
CO2[K3]:	make use of problems.	operator algebra to prove the various concepts and sol	lve simple
CO3[K3]:	apply the Sch	rodinger wave equation for simple systems.	

CO4[K4]	examine the importance of valence bond & molecular orbital theories in solving
CO4[IX4].	molecular systems as well as to analyze the role of thermodynamics & statistical
	mechanics in biopolymers.
CO5[K5]:	evaluate wave function & energy using approximation methods and to assess the effect of forces in biopolymer interactions.

CO4[ <b>K</b> 4].	examine the importance of valence bond & molecular orbital theories in s molecular systems as well as to analyze the role of thermodynamics & sta mechanics in biopolymers.
CO5[K5]:	evaluate wave function & energy using approximation methods and to effect of forces in biopolymer interactions.
	Core Course
Course Coo	e: MDCH2L1 Course Title: ORGANIC CHEMISTRY PRACTICALS-
On successf	al completion of the course, the learners should be able to
CO1[K2]:	recall the principle underlying synthesis and estimation of organic analysis
CO2[K3]:	design two stage preparations of organic compounds.
CO3[K3]:	establish the structure of synthesized organic compounds using spectral data.
CO4[K4]:	estimate the organic compounds in the research laboratories and industry.
CO5[K5]:	adopt green synthetic methods through the sophisticated instruments like oven and sonnicator to protect the environment.
CO5[K5]:	adopt green synthetic methods through the sophisticated instruments like oven and sonnicator to protect the environment.
CO5[K5]:	adopt green synthetic methods through the sophisticated instruments like oven and sonnicator to protect the environment.
CO5[K5]: Course Coo	adopt green synthetic methods through the sophisticated instruments like oven and sonnicator to protect the environment. Core Course e: MDCH2L2 Course Title: PHYSICAL CHEMISTRY PRACTICALS-
CO5[K5]: Course Coo On successf	adopt green synthetic methods through the sophisticated instruments like oven and sonnicator to protect the environment.         Core Course         e: MDCH2L2         Course Title: PHYSICAL CHEMISTRY PRACTICALS-         al completion of the course, the learners should be able to
CO5[K5]: Course Coo On successf CO1[K2]:	adopt green synthetic methods through the sophisticated instruments like oven and sonnicator to protect the environment.         Core Course         e: MDCH2L2       Course Title: PHYSICAL CHEMISTRY PRACTICALS- al completion of the course, the learners should be able to         summarise the principles of conductometry, thermochemistry, phase rule a spectroscopy.       spectroscopy.
CO5[K5]: Course Coo On successf CO1[K2]: CO2[K3]:	adopt green synthetic methods through the sophisticated instruments like oven and sonnicator to protect the environment.         Core Course         e: MDCH2L2       Course Title: PHYSICAL CHEMISTRY PRACTICALS-         al completion of the course, the learners should be able to       summarise the principles of conductometry, thermochemistry, phase rule a spectroscopy.         apply the electrochemical methods for determination of concentration a physical constants.       apply the electrochemical methods for determination of concentration a physical constants.
CO5[K5]: Course Coo On successf CO1[K2]: CO2[K3]: CO3[K4]:	adopt green synthetic methods through the sophisticated instruments like oven and sonnicator to protect the environment.         Core Course         e: MDCH2L2       Course Title: PHYSICAL CHEMISTRY PRACTICALS-         al completion of the course, the learners should be able to       summarise the principles of conductometry, thermochemistry, phase rule a spectroscopy.         apply the electrochemical methods for determination of concentration a physical constants.       record and interpret the experimental data and construct phase diagram.
CO5[K5]: Course Coo On successf CO1[K2]: CO2[K3]: CO3[K4]: CO4[K5]:	adopt green synthetic methods through the sophisticated instruments like oven and sonnicator to protect the environment.         Core Course         e: MDCH2L2       Course Title: PHYSICAL CHEMISTRY PRACTICALS-         al completion of the course, the learners should be able to       summarise the principles of conductometry, thermochemistry, phase rule a spectroscopy.         apply the electrochemical methods for determination of concentration a physical constants.       record and interpret the experimental data and construct phase diagram.         determine the heat of solution by solubility method.       determine the heat of solution by solubility method.

CO4[K4]:	examine the importance of valence bond & molecular orbital theories in solving molecular systems as well as to analyze the role of thermodynamics & statistical mechanics in biopolymers	
CO5[K5]:	evaluate wave function & energy using approximation methods and to assess the effect of forces in biopolymer interactions.	
	Core Course	
Course Code	e: MDCH2L1 Course Title: ORGANIC CHEMISTRY PRACTICALS- II	
On successfu	l completion of the course, the learners should be able to	
CO1[K2]:	recall the principle underlying synthesis and estimation of organic analysis.	
CO2[K3]:	design two stage preparations of organic compounds.	
CO3[K3]:	establish the structure of synthesized organic compounds using spectral data.	
CO4[K4]:	estimate the organic compounds in the research laboratories and industry.	
CO5[K5]:	adopt green synthetic methods through the sophisticated instruments like microwave oven and sonnicator to protect the environment.	
	<u> </u>	
	Core Course	
Course Code	e: MDCH2L2 Course Title: PHYSICAL CHEMISTRY PRACTICALS- I	
On successfu	l completion of the course, the learners should be able to	
CO1[K2]:	summarise the principles of conductometry, thermochemistry, phase rule and spectroscopy.	
CO2[K3]:	apply the electrochemical methods for determination of concentration and other physical constants.	
CO3[K4]:	record and interpret the experimental data and construct phase diagram.	
CO4[K5]:	determine the heat of solution by solubility method.	
CO5[K5]:	justify the validity of Beer – Lambert's law and measure the strength of the colored solution.	

Elective Course		
Course Code	: MDCH2E	Course Title: SAFETY FIREWORKS
On successful completion of the course, the learners should be able to		
CO1[K2]:	outline the his	story, hazards, general rules, guidelines, fire prevention and safety
	aspects of fire	work industry.
CO2[K2]:	list the ingredi	ents of chemicals used in the m
CO3[K3]:	identify the ha	zards and factors responsible for fire accidents
CO4[K4]:	inspect the ge	neral regulations and guidelines for housekeeping.
CO5[K5]:	discuss the sa	fety methods to prevent accidents

Core Course		
Course Code	e: MDCH31	Course Title: ORGANIC CHEMISTRY - III
On successful completion of the course, the learners should be able to		
CO1[K2]:	state the ess	ential concepts of reaction mechanism, energy correlation, steroids,
	molecular rea	rrangements, photochemistry and pericyclic reactions.
CO2[K2]:	illustrate the 1	nechanism of molecular rearrangements and photochemical reactions in
	organic chem	istry.
CO3[K3]:	apply energy	correlation to study the reaction mechanism.
CO4[K4]:	analyze the pe	ericyclic reactions using symmetry properties.
CO5[K5]:	elucidate the s	tructure of carbohydrates and terpenoids.

		Elective Course	
Course Code:	MDCH2E	Course Title: SAFETY FIREWORKS	
On successful c	ompletion of	f the course, the learners should be able to	
O1[K2]:	outline the history, hazards, general rules, guidelines, fire prevention and safety		
;	aspects of fire	ework industry.	
CO2[K2]:	list the ingred	ients of chemicals used in the m	
CO3[K3]:	identify the ha	zards and factors responsible for fire accidents	
:O4[K4]:	inspect the ge	neral regulations and guidelines for housekeeping.	
CO5[K5]:	discuss the sa	fety methods to prevent accidents	
·			
		Core Course	
Course Code:	MDCH31	Course Title: ORGANIC CHEMISTRY - III	
On successful c	ompletion of	the course, the learners should be able to	
CO1[K2]:	state the ess	ential concepts of reaction mechanism, energy correlation, steroids,	
1	molecular rea	rrangements, photochemistry and pericyclic reactions.	
CO2[K2]:	illustrate the	mechanism of molecular rearrangements and photochemical reactions in	
	organic chemistry.		
CO3[K3]:	apply energy correlation to study the reaction mechanism.		
CO4[K4]:	analyze the pericyclic reactions using symmetry properties.		
CO5[K5]:	elucidate the structure of carbohydrates and terpenoids.		
		Core Course	
Course Code:	MDCH32	Course Code: MDCH32	
Jn successful c	completion of	the course, the learners should be able to	
CO1[K2]:	summarize th cluster compo	e structure and bonding in boron compounds, inorganic chains and bunds, principles of EPR, NQR, NMR and PES and catalysis.	
	interpret the structure of inorganic compounds and explain the structure of boranes, carborane and polyacids.		
CO2[K3]:	interpret the carborane and	l polyacids.	
CO2[K3]:	interpret the carborane and determine th heteropolyaci	e structure and bonding of phosphazenes, borazines, isopoly and ds and carboranes, boranes by Wade's rule.	
CO2[K3]:	determine the carborane and determine the heteropolyaci discuss the fu catalysis reac	e structure and bonding of phosphazenes, borazines, isopoly and ds and carboranes, boranes by Wade's rule. nction of organometallic compounds in homogenous and heterogeneous tions.	

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	Core Course
Course Co	de: MDCH33 Course Title: PHYSICAL CHEMISTRY - III
On successf	ul completion of the course, the learners should be able to
CO1[K2]:	illustrate the fundamental terminologies, principles, phenomenon, effects and theorems of group theory and molecular spectroscopy
CO2[K3]:	apply the basic knowledge to derive matrix representation for symmetry operation predict point groups of molecules, construct the multiplication & character table solve delocalization energy, molecular bonding and spectral problems.
CO3[K4]:	analyze spectral activity and spectral lines of molecules; examine the transiti between rotational, vibrational, electronic and spin energy levels.
CO4[K4]:	analyze factors affecting chemical shift in NMR; hyperfine and zero-field sp ESR spectra and advantages of FT-IR over dispersive FT-IR.
CO5[K5]:	discuss the applications of Fermi resonance, Fortrat diagram, double resonance techniques and Nuclear Overhauser effects.
	Core Course
Course Coo	Core Course le: MDCH3L1 Course Title: INORGANIC CHEMISTRY PRACTICALS-
Course Coo On successf	Core Course           Ie: MDCH3L1         Course Title: INORGANIC CHEMISTRY PRACTICALS-           Ful completion of the course, the learners should be able to         State of the course, the learners should be able to
Course Coo On successf CO1[K2]:	Core Course         de: MDCH3L1       Course Title: INORGANIC CHEMISTRY PRACTICALS-         ful completion of the course, the learners should be able to         recall the principle, theory and applications of gravimetric analysis, is complex and electrochemical measurements.
Course Coo On successf CO1[K2]: CO2[K2]:	Core Course         Ie: MDCH3L1       Course Title: INORGANIC CHEMISTRY PRACTICALS-         Ful completion of the course, the learners should be able to         recall the principle, theory and applications of gravimetric analysis, is complex and electrochemical measurements.         restate the applications of cyclic voltammetry.
Course Coo On successf CO1[K2]: CO2[K2]: CO3[K3]:	Core Course         de: MDCH3L1       Course Title: INORGANIC CHEMISTRY PRACTICALS-         ful completion of the course, the learners should be able to         recall the principle, theory and applications of gravimetric analysis, is complex and electrochemical measurements.         restate the applications of cyclic voltammetry.         determine the concentration of metal ions by complexometric method.
Course Coo On successf CO1[K2]: CO2[K2]: CO3[K3]: CO4[K4]:	Core Course         de: MDCH3L1       Course Title: INORGANIC CHEMISTRY PRACTICALS-         ful completion of the course, the learners should be able to         recall the principle, theory and applications of gravimetric analysis, i         complex and electrochemical measurements.         restate the applications of cyclic voltammetry.         determine the concentration of metal ions by complexometric method.         determine the amount of metals ions present in a binary mixture quantitatively.
Course Coo On successf CO1[K2]: CO2[K2]: CO3[K3]: CO4[K4]: CO5[K5]:	Core Course         Ie: MDCH3L1       Course Title: INORGANIC CHEMISTRY PRACTICALS-         Ful completion of the course, the learners should be able to       Ful completion of the course, the learners should be able to         recall the principle, theory and applications of gravimetric analysis, is complex and electrochemical measurements.       Ful concentration of cyclic voltammetry.         determine the concentration of metal ions by complexometric method.       determine the amount of metals ions present in a binary mixture quantitatively.         explain the separation of binary mixture for various inorganic comportion of metals.       ful complex inorganic comportion of the component of the component of the complex inorganic component of the complex inorganic component of the complex inorganic component of the complex inorganic component of the complex inorganic component of the complex inorganic component of the componen
Course Coo On successf CO1[K2]: CO2[K2]: CO3[K3]: CO4[K4]: CO5[K5]:	Core Course         Ie: MDCH3L1       Course Title: INORGANIC CHEMISTRY PRACTICALS-         ful completion of the course, the learners should be able to
Course Coo On successf CO1[K2]: CO2[K2]: CO3[K3]: CO4[K4]: CO5[K5]:	Core Course         de: MDCH3L1       Course Title: INORGANIC CHEMISTRY PRACTICALS-         ful completion of the course, the learners should be able to       in recall the principle, theory and applications of gravimetric analysis, in complex and electrochemical measurements.         restate the applications of cyclic voltammetry.       in the concentration of metal ions by complexometric method.         determine the concentration of metal ions present in a binary mixture quantitatively.       explain the separation of binary mixture for various inorganic comport gravimetric method.         Core Course         Core Course         MDCH3L2         Course Title: PHYSICAL CHEMISTRY PRACTICALS- II
Course Coo On successf CO1[K2]: CO2[K2]: CO3[K3]: CO4[K4]: CO5[K5]: CO5[K5]:	Core Course         Course Title: INORGANIC CHEMISTRY PRACTICALS-         iul completion of the course, the learners should be able to         recall the principle, theory and applications of gravimetric analysis, icomplex and electrochemical measurements.         restate the applications of cyclic voltammetry.         determine the concentration of metal ions by complexometric method.         determine the amount of metals ions present in a binary mixture quantitatively.         explain the separation of binary mixture for various inorganic comporting gravimetric method.         Core Course         determine the course, the learners should be able to
Course Coo On successf CO1[K2]: CO2[K2]: CO3[K3]: CO4[K4]: CO5[K5]: CO5[K5]: Course Coo On successf	Core Course         Ide: MDCH3L1       Course Title: INORGANIC CHEMISTRY PRACTICALS- ful completion of the course, the learners should be able to         recall the principle, theory and applications of gravimetric analysis, in complex and electrochemical measurements.       restate the applications of cyclic voltammetry.         determine the concentration of metal ions by complexometric method.       determine the amount of metals ions present in a binary mixture quantitatively.         explain the separation of binary mixture for various inorganic comport gravimetric method.       Core Course         Core Course         MDCH3L2       Course Title: PHYSICAL CHEMISTRY PRACTICALS- II ful completion of the course, the learners should be able to
Course Coo On successf CO1[K2]: CO2[K2]: CO3[K3]: CO4[K4]: CO5[K5]: CO5[K5]: CO1[K2]:	Core Course         Ide: MDCH3L1       Course Title: INORGANIC CHEMISTRY PRACTICALS- ful completion of the course, the learners should be able to         recall the principle, theory and applications of gravimetric analysis, if complex and electrochemical measurements.       restate the applications of cyclic voltammetry.         determine the concentration of metal ions by complexometric method.       determine the amount of metals ions present in a binary mixture quantitatively.         explain the separation of binary mixture for various inorganic comportion gravimetric method.         Core Course         MDCH3L2       Course Title: PHYSICAL CHEMISTRY PRACTICALS- II         iul completion of the course, the learners should be able to       recall the fundamentals of potentiometric titrations and chemical kinetic method
Course Coo On successf CO1[K2]: CO2[K2]: CO3[K3]: CO4[K4]: CO5[K5]: CO5[K5]: CO1[K2]: CO1[K2]: CO2[K3]:	Image: Core Course         Image: MDCH3L1       Course Title: INORGANIC CHEMISTRY PRACTICALS- iul completion of the course, the learners should be able to         recall the principle, theory and applications of gravimetric analysis, in complex and electrochemical measurements.         restate the applications of cyclic voltammetry.         determine the concentration of metal ions by complexometric method.         determine the amount of metals ions present in a binary mixture quantitatively.         explain the separation of binary mixture for various inorganic comporting gravimetric method.         Image: Core Course         Image: MDCH3L2       Course Title: PHYSICAL CHEMISTRY PRACTICALS- II for the course, the learners should be able to         recall the fundamentals of potentiometric titrations and chemical kinetic metal apply the law of volumetric analysis and evaluate the strength, Ka and Ks of a strength with the strength of the strength o
Course Coo On successf CO1[K2]: CO2[K2]: CO3[K3]: CO4[K4]: CO5[K5]: CO5[K5]: CO1[K2]: CO1[K2]: CO2[K3]: CO3[K3]:	Core Course         Ie: MDCH3L1       Course Title: INORGANIC CHEMISTRY PRACTICALS-         iul completion of the course, the learners should be able to       in complex and electrochemical measurements.         rescall the principle, theory and applications of gravimetric analysis, is complex and electrochemical measurements.       in complex and electrochemical measurements.         restate the applications of cyclic voltammetry.       determine the concentration of metal ions by complexometric method.         determine the amount of metals ions present in a binary mixture quantitatively.       explain the separation of binary mixture for various inorganic comportion gravimetric method.         Core Course         Met MDCH3L2       Course Title: PHYSICAL CHEMISTRY PRACTICALS- II         ul completion of the course, the learners should be able to         recall the fundamentals of potentiometric titrations and chemical kinetic method         algoing the separation of binary mixture for various inorganic comportion of the course, the learners should be able to         Core Course         determine the fundamentals of potentiometric titrations and chemical kinetic method         apply the law of volumetric analysis and evaluate the strength, K <sub>a</sub> and K <sub>s</sub> of a apply potentiometric methods to determine K <sub>a</sub> and K <sub>s</sub> of the analytes.
Course Coo On successf CO1[K2]: CO2[K2]: CO3[K3]: CO4[K4]: CO5[K5]: CO5[K5]: CO1[K2]: CO1[K2]: CO2[K3]: CO3[K3]: CO4[K4]:	Core Course         Ie: MDCH3L1       Course Title: INORGANIC CHEMISTRY PRACTICALS- iul completion of the course, the learners should be able to         recall the principle, theory and applications of gravimetric analysis, icomplex and electrochemical measurements.       restate the applications of cyclic voltammetry.         determine the concentration of metal ions by complexometric method.       determine the amount of metals ions present in a binary mixture quantitatively.         explain the separation of binary mixture for various inorganic comportion gravimetric method.         Core Course         Core Course         Ide: MDCH3L2       Course Title: PHYSICAL CHEMISTRY PRACTICALS- II         iul completion of the course, the learners should be able to         recall the fundamentals of potentiometric titrations and chemical kinetic met         apply the law of volumetric analysis and evaluate the strength, Ka and Ks of a apply potentiometric methods to determine Ka and Ks of the analytes.

Core Course		
Course Code	: MDCH3L1	Course Title: INORGANIC CHEMISTRY PRACTICALS- II
On successful	completion of	the course, the learners should be able to
CO1[K2]:	recall the pr complex and	inciple, theory and applications of gravimetric analysis, inorganic electrochemical measurements.
CO2[K2]:	restate the app	plications of cyclic voltammetry.
CO3[K3]:	determine the	concentration of metal ions by complexometric method.
CO4[K4]:	determine the	amount of metals ions present in a binary mixture quantitatively.
CO5[K5]:	explain the gravimetric m	separation of binary mixture for various inorganic compounds by ethod.

Core Course		
Course Code	: MDCH3L2	Course Title: PHYSICAL CHEMISTRY PRACTICALS- II
On successful completion of the course, the learners should be able to		
CO1[K2]:	recall the fund	lamentals of potentiometric titrations and chemical kinetic methods.
CO2[K3]:	apply the law	of volumetric analysis and evaluate the strength, Ka and Ks of analytes.
CO3[K3]:	apply potention	pmetric methods to determine Ka and Ks of the analytes.
CO4[K4]:	determine 1/n	using Freundlich adsorption isotherm.
CO5[K5]:	develop skill	to work with ORIGIN software and interpret X-ray diffractogram.

Elective Course		
Course Code	MDCH3E1	Course Title: MATERIALS SCIENCE
On successful	completion of	f the course, the learners should be able to
CO1[K2]:	state the princ	iples and properties of materials.
CO2[K3]:	demonstrate th	ne different types of conducting materials.
CO3[K3]:	explore the pr	inciples and theory of modern engineering materials.
CO4[K4]:	analyze the cl	nemistry of nanophase materials.
CO5[K5]:	estimate prop	erties of biomaterials.

Elective Course			
Course Code	Course Code: MDCH3E2 Course Title: NANOCHEMISTRY		
On successful	completion of	f the course, the learners should be able to	
CO1[K2]:	describe the b	packground, synthesis and characterization of nanomaterials.	
CO2[K3]:	synthesis of n	on-oxide nanomaterials, nanotubes and nanoporous, materials.	
CO3[K3]:	characterize electron spect	the nanomaterials by XRD, SAXS, SEM, TEM, SPM, optical and troscopy.	
CO4[K4]:	explain the pr	operties of various nanoporous materials.	
CO5[K5]:	discuss the sy	nthesis and characterization of nanomaterials.	

**Core Course** 

Course Code: MDCH41 Course Title: ORGANIC CHEMISTRY - IV

On successful completion of the course, the learners should be able to

CO1[K2]:	explain the basic concepts of aromaticity, aromatic substitution reactions, synthetic reagents, synthetic methods, phase transfer catalysis & microwave induced green synthesis.
CO2[K3]:	apply Huckel's rule to classify the aromatic and nonaromatic compounds and identify
	the role of synthetic reagents in conventional and green synthesis.
CO3[K3]:	illustrate the different green synthetic methods and their applications in organic synthesis.
CO4[K4]:	analyze the importance of various synthetic methods in developing organic compounds.
CO5[K5]:	justify the principles of green chemistry.

CO1[K2]:	explain the basic concepts of aromaticity, aromatic substitution reactions, synt reagents, synthetic methods, phase transfer catalysis & microwave induced green synthesis.	
CO2[K3]:	apply Huckel's rule to classify the aromatic and nonaromatic compounds and	
	the role of synthetic reagents in conventional and green synthesis.	
CO3[K3]:	illustrate the different green synthetic methods and their applications in synthesis.	
CO4[K4]:	analyze the importance of various synthetic methods in developing compounds.	
CO5[K5]:	justify the principles of green chemistry.	
	a . a	
<u> </u>		
On successfu	all completion of the course, the learners should be able to	
	describe the chemistry in biological systems and principles of Mossbauer	
CO1[K2]:	spectroscopy various electro spectro and thermo analytical techniques and research	
	ethics regarding project preparation.	
CO2[K3]:	apply the various spectro, thermo and electro analytical techniques for the qua and quantitative analysis.	
CO3[K4]:	examine the physiological reactions in biological systems	
CO4[K5]:	interpret the structures of various inorganic compounds using Mo spectroscopy.	
CO5[K5]:	Discuss about the spectro, thermo and electro analytical techniques.	
<u> </u>		
Course Co	te: MDCH43   Course Title: PHYSICAL CHEMISTRY - IV	
On succession	Il completion of the course, the learners should be able to	
CO1[K2]:	summarize the basic concepts and hypothesis of kinetics, statistical thermodyn photochemistry, and surface chemistry.	
CO2[K3]:	apply photochemistry, surface chemistry, and chemical kinetics to derive expr for various parameters.	
	implement statistical principles to formulate the Boltzmann Fermi-Dirac st	

Core Course		
Course Code	e: MDCH43	Course Title: PHYSICAL CHEMISTRY - IV
On successful	completion of	the course, the learners should be able to
CO1[K2]:	summarize th photochemist	e basic concepts and hypothesis of kinetics, statistical thermodynamics, ry, and surface chemistry.
CO2[K3]:	apply photoch for various pa	nemistry, surface chemistry, and chemical kinetics to derive expressions rameters.
CO3[K3]:	implement sta Bose-Einsteir	atistical principles to formulate the Boltzmann, Fermi-Dirac statistics, statistics and partition functions.

CO4[K4]:	analyze the conductivity& defects of solids; photo-physical & quenching processes and adsorption isotherms.
CO5[K5]:	describe fast reaction techniques, types of partition function, various photo physical processes and discuss the applications of photochemistry in energy conserving processes.

Core Course			
Course Code: MDCH4P		Course Title: PROJECT AND VIVA VOCE	
On successful completion of the course, the learners should be able to			
CO1[K2]:	review the lite	rature in their respective research area.	
CO2[K3]:	develop positive attitude and skill in research work and to know about the intellectual property rights in research.		
CO3[K4]:	find the research gap, design and execute the innovative research schemes with		
CO4[K5]:	utilize the knowledge of instrumentation and characterization techniques in their research work.		
CO5[K6]:	evaluate, sum	narize and discuss the scientific results of their team projects.	

Elective Course			
Course Code	MDCH4E1	Course Title: BIOCHEMISTRY	
On successful completion of the course, the learners should be able to			
CO1[K2]:	summarise the nomenclature, structure and properties of amino acids, proteins, enzymes, lipids and vitamins.		
CO2[K2]:	classify biomo	lecules and discuss their reactions.	
CO3[K3]:	illustrate the biological roleand importance of metabolites.		
CO4[K4]:	interpret the r	nechanistic pathway of the metabolic process.	
CO5[K5]:	assess the var life.	ious deficiency diseases and the ways to prevent them to lead a healthy	

Elective Course			
Course Code: MDCH4E2		Course Title: BIOMEDICAL INSTRUMENTATION	
On successful completion of the course, the learners should be able to			
CO1[K2]:	summarise the principles of modern medical equipments used in hospitals and research institutes		
CO2[K2]:	apply the biomedical equipments in medical field.		
CO3[K3]:	assess the nuclear medicine. imaging techniques and their uses.		
CO4[K4]:	handle biomedical equipments.		
CO5[K5]:	design the fur	action of various medical equipments.	



# THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS), SIVAKASI – 626 123.

(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade by NAAC, College with Potential for Excellence by UGC and Mentor Institution under UGC PARAMARSH)

#### DEPARTMENT OF CHEMISTRY

#### M.Phil DEGREE PROGRAMME IN CHEMISTRY

(For those who have joined in June 2020 and later)

#### PROGRAMME EDUCATIONAL OBJECTIVES

The Graduates will			
PEO1.	develop skills in handling scientific instruments, planning and executing laboratory experiments required for performing well in research or industries.		
PEO2.	pursue research and find innovative chemical technological solutions for sustainable development.		
PEO3.	understand the scientific phenomena and their relevancies in the day to day life, imbibe positive attitude, self regulation, and discernment necessary to realize how development of science provide better solutions to lead a successful life and successfully emerge as a young women entrepreneur.		

## PROGRAMME SPECIFIC OUTCOMES

By the Completion of M.Phil Chemistry programme, the learners will be able to

PSO1.	synthesize and characterize the chemical compounds using laboratory skills and instrumentation techniques
PSO2.	analyze critically socially relevant problems and creatively arrive at solutions for them
PSO3.	design research projects which will provide better solutions and new ideas for sustainable development and develop skills such as reading, listening, speaking etc which will help in expressing ideas and views clearly about their research problems effectively in various scientific forums, avoiding falsification, fabrication, misinterpretation of data and plagiarism.
PSO4.	realize that pursuit of knowledge is a lifelong activity and will evolve as a successful chemist.

Core Course			
Course Code:RDCH11 Course Title: RESEARCH METHODOLOGY			
On successful completion of the course, the learners should be able to			
CO1 [K2]:	restate the basic concepts of C language, error analysis and able to review the literature		
CO2 [K3]:	solve chemistry problems in spectroscopy, error analysis.		
CO3 [K3]:	apply C language to solve problems		
CO4 [K4]:	conclude reaction mechanism and summarize the concept of linear free energy relationships.		
CO5 [K5]:	interpret spectrum of compounds and elucidate structure		

Core Course			
Course Code:RDCH12		Course Title: COURSE WORK	
On successful completion of the course, the learners should be able to			
CO1 [K2]:	describe the basics of group theory, bio inorganic chemistry, supramolecular chemistry, Medicinal chemistry, nano chemistry, photochemistry and identify organic reagents in		
CO2 [K2]:	summarize enzyme and proteins and the interaction of metal complexes with nucleic acids		
CO3 [K3]:	apply group	theory to spectroscopy and molecular problems.	
CO4 [K3]:	explain the materials &	preparation, properties and applications of Nanoparticles and nanostructural application of photo chemistry.	
CO5 [K4]:	discover the	e types of drugs and drug action.	

Core Course			
Course Code:RDCH13A		Course Title: ADVANCED ORGANIC CHEMISTRY	
On successful completion of the course, the learners should be able to			
CO1 [K2]:	summarize the basic concepts of conformational analysis, organic reagents, enzymes and enolates.		
CO2 [K3]:	apply the basics to solve real time research problems		
CO3 [K3]:	relate the conformation, reactivity and energy in biosystems		
CO4 [K4]:	categorize the	e simple organic and organometallic reagents based on their applications	
CO5 [K5]:	discuss the application of enolates.		

Core Course			
Course Code:RDCH13B		Course Title: ADVANCED INORGANIC CHEMISTRY	
On successful completion of the course, the learners should be able to			
CO1 [K2]:	realize the principles of inorganic polymers, rearrangements and reactions of organometallic compounds, coordinated ligands, importance of Metal in Medicine and energies in environment.		
CO2 [K3]:	understand the different types of non - conventional energy systems.		
CO3 [K3]:	identify the general properties and reactions of coordinated ligands.		
CO4 [K4]:	Utilize the chemistry of organometallic compounds		
CO5 [K5]:	study the application of metal ions in medicine.		

Core Course			
Course Cod	e:RDCH13C	Course Title: ADVANCED PHYSICAL CHEMISTRY	
On successful completion of the course, the learners should be able to			
CO1 [K2]:	understand the fundamental concepts of chemical sensors and bio electrochemistry.		
CO2 [K3]:	relate the fullerenes and catalytic action.		
CO3 [K3]:	analyze the knowledge in conducting polymer and gel type polymer electrolyte for lithium batteries, chemical sensors and bio electrochemistry, chemical kinetics.		
CO4 [K4]:	derive advanced knowledge on novel materials.		
CO5 [K5]:	assess the application of chemical kinetics		