

**Criterion**: I – Curricular Aspects

Metric: 1.1.1 - Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

**Course Outcomes (COs) – M.Sc. CHEMISTRY** 

Year : 2015 - 2020



### FATIMA COLLEGE (AUTONOMOUS), MADURAI - 625018

NAME OF THE PROGRAMME: M.Sc. CHEMISTRY

PROGRAMME CODE: PSCH

#### **PROGRAMME OUTCOMES:**

Students will be able to

**PO1:** Apply acquired scientific knowledge to solve major and complex issues in the society/industry.

**PO2:** Attain research skills to solve complex cultural, societal and environmental issues.

**PO3:** Employ latest and updated tools and technologies to solve complex issues.

**PO4:** Demonstrate Professional Ethics that foster Community, Nation and Environment Building Initiatives.

#### PROGRAMME SPECIFIC OUTCOMES:

**PSO1:** Equipped with an in-depth knowledge of varied fields namely Organic Chemistry, Inorganic Chemistry, Physical and nano chemistry.

**PSO1:** Training in problem solving procedures enables to interpret the experimental data into structures and mechanisms.

**PSO2:** Provides a tremendous exposure and cultivates analytical and synthesising measures necessary to take up project work in reputed institutions.

**PSO3:** Programme renders diversified thinking thereby promotes creative skills.



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**PSO4:** Directed to solve the problems that cause a negative impact on surroundings to pursue salient steps to safeguard environment,.

**PSO5:** Application-oriented input sharpens the skill to undertake CSIR-NET exam.

**PSO6:** Knowledge with practical dimensions becomes a driving power to undertake research in different areas at a global level.

**PSO7:** Multi-layered input enables to avail opportunities at chemical, pharmaceutical industries.

**PSO8:** Becomes a contributing force and development agent in society.





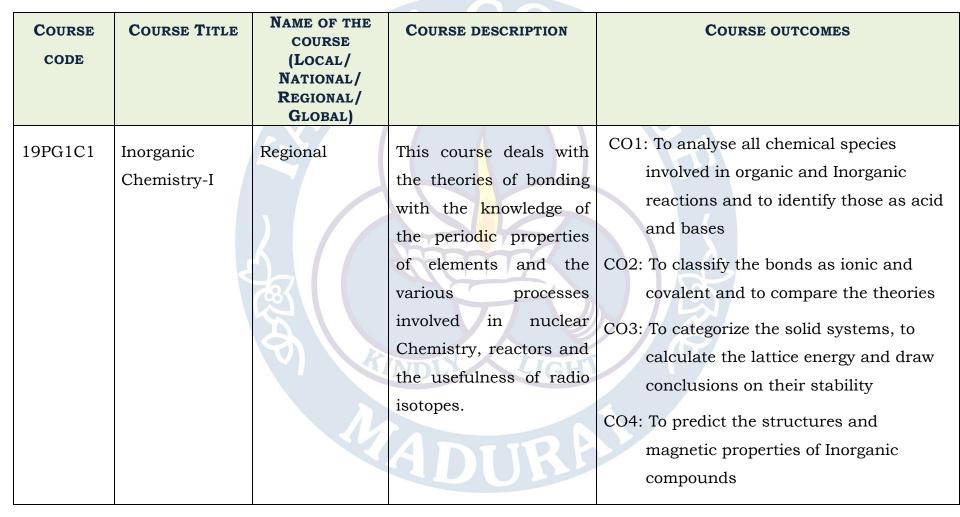
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#### 2019-2020





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			ACOZ	CO5: To gain in-depth knowledge of nuclear reactions, reactors and the applications of radio isotopes in all fields
19PG1C2	Organic Chemistry-I	Regional	This paper focuses on all the important aspects of organic chemistry like aromaticity, reaction intermediates, chirality and hetero cyclic.	and the main properties of aromatic compounds.  CO2: To explore reactivity patterns of conjugated ,aromatic molecules and to



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				CO5:.To sketch the preparation and properties of heterocyclic compounds.
19PG1C3	Physical Chemistry-I	Regional	This course gives detailed account of all the important concepts of electrochemistry and statistical thermodynamics.	CO1: To gain knowledge Kohlrausch's law and electrolytic conductance  CO2: Calculate the molar conductance, degree of dissociation and electrical potential Possess thorough understanding of Debye- Huckel equation  CO3:To gain knowledge of Electro catalysis and Electro synthesis  CO4: Describe in detail about the three laws of thermodynamics  CO5: Restate in their own words about the concept of distribution, thermodynamic probability and most probable distribution



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				CO6: Correlate and explain the partial
			A COZ	molar properties, chemical potential  CO7: Categorize and compare various
			LEAD	partition functions - translational, rotational , vibrational and electronic partition functions  CO8: Distinguish various Fermi-Dirac and Bose-Einstein statistics and Maxwell-Boltzmann statistics based on the nature of the particles.
19PG1C4	Inorganic	Global	This paper gives hands	CO1: To study the principle of distribution
	Practicals-I		on experience of	
		(A) (B)	Qualitatively analysing	different groups.
		N V	the inorganic salts containing simple and	CO2: To know the inter- and intra group precipitation and separation of metal
			rare earth metal	ions.
			cations.	CO3: To improve the skill in the qualitative



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			A COZ	analysis of rare metal ions in different groups.  CO4: To identify the methodology to analyse a metal ion in the presence of another metal ion.
19PG1C5	Organic Practicals-I	Global	This course gives hands on experience of qualitatively analyzing organic compounds and to synthesis simple organic compounds.	binary organic mixtures  CO2: To gain knowledge on the skills of doing micro level analysis
19C1EDC	Essentials Of	Global	This paper is an inter disciplinary optional	CO1:To acquire knowledge of common



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	Life		paper gives an account	medicine.
	Life		of preparation of house hold items, various analytical techniques such as, volumetric methods, and chromatographic methods	CO2: To express the concentration of solution in volumetric analysis.  CO3: To differentiate column and TLC technique.  CO4: To classify the different types of polymer s and its characteristics.
				CO5: To analyze the different types of soil and differentiate natural fertilizer from artificial fertilizer.
19PG2C6	Inorganic Chemistry-Ii	Global	This paper enables the students to understand the chemistry of complexes and their characterization and reaction mechanisms.	CO1: Compare the stabilities of complexes using stability constants and to identify the types of isomers  CO2: To describe the theories of coordination compounds to understand the colours and magnetic properties and their position in the spectra



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				chemical series
			A COZ	CO3: Investigate the structures of complexes using IR,NMR ,E SR and other spectral techniques  CO4: To .Possess a thorough understanding of electronic spectra of complexes  CO5: To arrive at the mechanisms of substitution reactions in six and four coordinated complexes using kinetic studies
19PG2C7	Organic Chemistry-II	SEASON AND AND AND AND AND AND AND AND AND AN	This course enables the students to get a thorough knowledge of elimination and addition reactions, conformational analysis and selective organic name reactions and	elimination and substitution reactions



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	rearrangements, study	reactions and metal hydride reduction
	of organic spectroscopy	and to discriminate the reactivity of
	and their applications in	organometallic reagents.
	structural elucidation of	CO3: To explore reactivity patterns of
	organic compounds.	substituted cyclohexanes and to
		employ conformational reactivity in cis
		and trans decalins and to apply
		conformations in SN1, SN2, ionic,
		pyrolytic eliminations and NGP
		reactions.
40		CO4: To acquire a complete knowledge of
		the principles of UV, IR spectroscopy
A		and to examine the various functional
	K MDIN LIGHT	groups present in organic
	MDP GIGIT	molecules using λmax and IR
		frequency values .
	JANITAP	CO5: To differentiate the molecular
		rearrangements and to solve the



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		A COL	simple problems and to recall the various naming reactions and to interpret the products.
Chemistry-II	Regional	This paper provides an extensive study of the topics such as Chemical kinetics and Quantum mechanics.	<ul> <li>CO1: To acquire knowledge about the basic concepts of chemical kinetics</li> <li>CO2: To identify and analyze the effect of physical parameters µ, □, D on rate of reaction</li> <li>CO3: To derive rate constant for reactions using Lindeman, Hinshelwood, RRK, RRKM Theories</li> </ul>
		ADURA	CO4: To develop a knowledge and understanding of the concept Normalisation and orthogonalisation and to solve Schrodinger wave equation for particle in a one dimensional box, three dimensional



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			A COZ	box and Rigid rotator.  CO5: To apply variation and perturbation method to He atom  CO6: To calculate Delocalisation energy and π- bond order of conjugated molecules like cyclobutadiene, cyclopropenyl system and 1,3 butadiene.
19PG2C9	Inorganic Practicals-II	Global	This course gives training to prepare inorganic complexes in a pure form and to estimate metal ions present in the solution.	CO1: To enable the students to acquire the quantitative skills in volumetric analysis and gravimetric analysis  CO2: To improve the skill in quantitative estimation of metal ions by various titric methods  CO3: To identify the methodology to estimate a metal ion in the presence of another metal ion.



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				CO4: To be skilled in synthesis of inorganic complexes.
19PG2C10	Organic Practicals-II	Global	This course gives hands on experience of quantitatively analyzing organic compounds and to synthesis organic compounds using two stages.	
19C2EDC	Essentials Of Life	Global	This paper is an inter disciplinary optional paper gives an account of preparation of house hold items, various analytical techniques such as, volumetric methods, and chromatographic	<ul> <li>CO1: To acquire knowledge of common medicine.</li> <li>CO2: To express the concentration of solution in volumetric analysis.</li> <li>CO3: To differentiate column and TLC technique.</li> <li>CO4: To classify the different types of polymer s and its characteristics.</li> </ul>



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			methods	CO5:To analyze the different types of soil
			100	and differentiate natural fertilizer
			ACU	from artificial fertilizer.
COURSE CODE	Course Title	NATURE OF THE COURSE	Course Description	Course Objectives
		(LOCAL/NATION AL/REGIONAL/		
		GLOBAL)		
PG3C11	Organic	Global	This paper provides an	To acquire a complete knowledge of the
	Chemistry-III		elaborate study of	working principles of 1H-NMR, 13C-
			organic spectroscopy	NMR and Mass spectroscopy.
		叔	and their applications in	• To develop an understanding of the
			structural elucidation of	significance of the number, positions,
			organic compounds.	intensities and splitting of signals in
			This paper also deals	nuclear magnetic resonance spectra.
			with reactions that are	
			taking place under	
			photochemical	
			conditions and peri	



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			cyclic reactions and terpenoids.	
PG3C12	Physical Chemistry-III	Regional	This course covers the detailed study of group theory and its application and also covers the principles of surface chemistry, and a brief study of macromolecules.	<ul> <li>To differentiate the types of elements and symmetry operations.</li> <li>To recognize the reducible &amp; irreducible Representation.</li> </ul>
PG3CE1	Material Chemistry	Global	This course deals with study of synthesis, properties, structure and applications of nano particles.	<ul> <li>To gain knowledge about the basic principles of nano chemistry and classification of nano materials.</li> <li>To describe several synthesis of inorganic nano particles, one-dimensional nanostructures (nano tubes, nano rods, nano wires), thin films, nano porous materials, and nano</li> </ul>



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				structured bulk materials.
PG3CE2	Bio-Organic Chemistry	Global	This paper deals with the molecular drug designing, classification of proteins, enzymes	<ul> <li>To tabulate the functions and uses of enzymes</li> <li>To design of drugs using molecular modelling</li> </ul>
PG4C13	Inorganic Chemistry-III	Regional	This course covers the structure and Bonding of organ metallic compounds and basic concepts of bioinorganic compounds	<ul> <li>To calculate the SEP and identification of structure of boranes and carboranes</li> <li>To describe the basic concepts of bioinorganic compounds</li> </ul>
PG4C14	Organic Chemistry-IV	Regional	This course paper deals with types of synthetic compounds, basic concepts of photochemistry, nucleic acids and steroids	<ul> <li>To know the Retro synthesis of achiral open chain molecules and cyclic target molecules,</li> <li>To identify the suitable reagents in synthesis of organic compounds</li> </ul>



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PG4C15	Physical Chemistry-IV	Regional	This paper deals with many spectroscopic techniques like Microwave, IR, Raman and Photoelectron, ESR, NQR and Mossbauer.	<ul> <li>To calculate the bond lengths of diatomics from the value of their rotational constant.</li> <li>To Outline the selection rules for rotational and vibrational spectra and rationalize the role of the molecular dipole moment in the selection rules.</li> </ul>
PG4CE3	Analytical Chemistry	Global	This course deals with chromatographic techniques, spectroscopic methods, applications of C-programmes in chemistry	<ul> <li>To educate to calculate error analysis for various tests</li> <li>To identify the applications of C-programming in chemistry</li> </ul>
PG4CE4	Chemical Engineering	Global	This paper deals with analytical methods. It also deals with programming in C	<ul> <li>To demonstrate an understanding of computer programming language concepts</li> <li>To explain the aim of water treatment,</li> </ul>



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			language and its	and discuss the required characteristics	
			applications to solve	should the drinking water have.	
			problems in chemistry		
PG4C16	Physical	Global	This lab course is	To demonstrate conduct metric Titration	
	Practicals		course gives lab	of Strong acid with a Strong Base.	
			experience on physical experiments	• To determine CST for the partial miscible solutions	
PG4C17	Project	Global	This paper is designed to increase the skill of students in problem solving, critical thinking and analytical reasoning as applied to scientific problems	<ul> <li>To carry out scientific experiments</li> <li>To accurately record and analyze the results of such experiments.</li> </ul>	
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# Faima College

## 2018-2019

COURSE	Course Title	NAME OF THE COURSE (LOCAL/ NATIONAL/ REGIONAL/ GLOBAL)	COURSE DESCRIPTION	Course Objectives
PG1C1	Inorganic Chemistry-I	Regional	This course deals with the theories of bonding with the knowledge of the periodic properties of elements and the various processes involved in nuclear Chemistry, reactors and the usefulness of radio isotopes.	<ul> <li>To analyse all chemical species involved in organic and Inorganic reactions and to identify those as acid and bases</li> <li>To classify the bonds as ionic and covalent and to compare the theories</li> </ul>
PG1C2	Organic Chemistry-I	Regional	This paper focuses on all the important	To interpret the concept of aromaticity and the main properties of aromatic



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			aspects of organic chemistry like aromaticity, reaction intermediates, chirality and heterocyclics.	compounds.  • To explore reactivity patterns of conjugated, aromatic molecules and to evaluate the kinetics and thermodynamics controlled reactions.
PG1C3	Physical Chemistry-I	Regional	This course gives detailed account of all the important concepts of electrochemistry and statistical thermodynamics.	<ul> <li>To gain knowledge Kohlrausch's law and electrolytic conductance</li> <li>Calculate the molar conductance, degree of dissociation and electrical potential</li> </ul>
PG1C4	Inorganic Practicals-I	Global	This paper gives hands on experience of Qualitatively analysing the inorganic salts containing simple and rare earth metal cations.	<ul> <li>To study the principle of distribution of common and rare metal ions in different groups.</li> <li>To know the inter- and intra group precipitation and separation of metal ions.</li> </ul>



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PG1C5	Organic Practicals-I	Global	This course gives hands on experience of qualitatively analyzing organic compounds and to synthesis simple organic compounds.	<ul> <li>To be skilled in the separation of binary organic mixtures</li> <li>To gain knowledge on the skills of doing micro level analysis</li> </ul>
PGCEDC	Analytical Techniques	Global	This paper is an inter disciplinary optional paper gives an account of various analytical techniques such as optical methods, electro analytical methods, chromatographic methods and spectroscopic methods.	<ul> <li>To be skilled in the various types of chromatographic techniques</li> <li>To attain knowledge on optical spectroscopy, EPR, Mass spectroscopy.</li> </ul>



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PG2C6	Inorganic	Global	This paper enables the	•	Compare the stabilities of complexes
	Chemistry-II		students to		using stability constants and to identify
			understand the	1	the types of isomers
			chemistry of complexes	4	To describe the theories of co-ordination
			and their		compounds to understand the colours
			characterization and		and magnetic properties and their
		27	reaction mechanisms.		position in the spectro chemical series
PG2C7	Organic	Global	This cours <mark>e e</mark> nables	•	To comprehend the mechanism of
	Chemistry-II		the students to get a		elimination and substitution reactions
	_		thorough knowledge of		and to apply the stereochemistry in E1,
		<b>37</b>	elimination and		E2, ionic and pyrolytic eliminations.
			addition reactions,	<b>)):</b>	To interpret the concept of nucleophilic
		\$\ \ <b>\</b>	conformational		and free radical addition reactions and
		4	analysis and selective	1	metal hydride reduction and to
			organic name reactions		discriminate the reactivity of
		14	and rearrangements,		organometalic reagents.
			study of organic		
			spectroscopy and their		



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			applications in structural elucidation of organic compounds.	
PG2C8	Physical Chemistry-II	Regional	This paper provides an extensive study of the topics such as Chemical kinetics and Quantum mechanics.	<ul> <li>To acquire knowledge about the basic concepts of chemical kinetics</li> <li>To identify and analyze the effect of physical parameters μ, □, D on rate of reaction</li> </ul>
PG2C9	Inorganic Practicals-II	Global	This course gives training to prepare inorganic complexes in a pure form and to estimate metal ions present in the solution.	<ul> <li>To enable the students to acquire the quantitative skills in volumetric analysis and gravimetric analysis</li> <li>To improve the skill in quantitative estimation of metal ions by various titric methods</li> </ul>
PG2C10	Organic Practicals-II	Global	This course gives hands on experience of quantitatively	<ul> <li>Students understand the quantitative analysis</li> <li>To develop the ability for synthesizing</li> </ul>



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			analyzing organic compounds and to synthesis organic compounds using two stages.	organic compounds by single stage.
PGCEDC	Analytical Techniques	Global	This paper is an inter disciplinary optional paper gives an account of various analytical techniques such as optical methods, electro analytical methods, chromatographic methods and spectroscopic methods.	<ul> <li>To be skilled in the various types of chromatographic techniques</li> <li>To attain knowledge on optical spectroscopy, EPR, Mass spectroscopy</li> </ul>
PG3C11	Organic Chemistry-III	Global	This paper provides an elaborate study of	To acquire a complete knowledge of the working principles of 1H-NMR, 13C-NMR



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			organic spectroscopy	and Mass spectroscopy.
			and their applications	• To develop an understanding of the
			in structural	significance of the number, positions,
			elucidation of organic	intensities and splitting of signals in
			compounds. This	nuclear magnetic resonance spectra.
			paper also deals with	
		3.9	reactions that are	
		4	taking place under	
			photochemical	
			conditions and	
	المح المحادث		pericyclic reactions	3
PG3C12	Physical	Regional	This course covers the	To differentiate the types of elements and
	Chemistry-III		detailed study of group	symmetry operations.
		D) CA	theory and its	• To recognize the reducible & irreducible
			application and also	Representation.
			covers the principles of	
			surface chemistry, and	
			a brief study of	



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			macromolecules.		
PG3CE1	Material	Global	This course deals with	•	To gain knowledge about the basic
	Chemistry		study of synthesis,		principles of nanochemistry and
			properties, structure		classification of nonmaterial's.
			and applications of	•	To describe several synthesis of inorganic
			nano particles.		nanoparticles, one-dimensional
		4/			nanostructures (nanotubes, nanorods,
					nanowires), thin films, nanoporous
					materials, and nanostructured bulk
	<u>_</u>				materials.
PG3CE2	Bio-Organic	Global	This paper deals with	•	To tabulate the functions and uses of
	Chemistry		the molecular drug		enzymes
		8) (B)	designing,	•	To design of drugs using molecular
	,		classification of		modelling
			proteins, enzymes		
PG4C13	Inorganic	Regional	This course covers the	•	To calculate the SEP and identification
	Chemistry-III		structure and Bonding		of structure of boranes and carboranes



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			of organ metallic compounds and basic concepts of bioinorganic compounds	To describe the basic concepts of bio- inorganic compounds
PG4C14	Organic Chemistry-IV	Regional	This paper deals with introduction to organic synthesis, preparation and synthetic applications of some organic reagents used for synthesis, structural elucidation of few alkaloids, terpenoids, steroids and nucleic acids	<ul> <li>To know the Retro synthesis of achiral open chain molecules and cyclic target molecules,</li> <li>To identify the suitable reagents in synthesis of organic compounds</li> </ul>
PG4C15	Physical Chemistry-IV	Regional	This paper deals with many spectroscopic	To calculate the bond lengths of diatomics from the value of their



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			techniques like Microwave, IR, Raman and Photoelectron, ESR, NQR and Mossbauer.	rotational constant.  • To Outline the selection rules for rotational and vibrational spectra and rationalize the role of the molecular dipole moment in the selection rules.
PG4CE3	Analytical Chemistry	Global	This course deals with chromatographic techniques, spectroscopic methods, applications of C-programms in chemistry	<ul> <li>To educate to calculate error analysis for various tests</li> <li>To identify the applications of C-programming in chemistry</li> </ul>
PG4CE4	Chemical Engineering	Global	This paper deals with analytical methods. It also deals with programming in C language and its applications to solve	<ul> <li>To demonstrate an understanding of computer programming language concepts</li> <li>To explain the aim of water treatment, and discuss the required characteristics should the drinking water have.</li> </ul>



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			problems in chemistry	
PG4C16	Physical Practicals	Global	This lab course is course gives lab experience on physical experiments	<ul> <li>To demonstrate conduct metric Titration of Strong acid with a Strong Base.</li> <li>To determine CST for the partial miscible solutions</li> </ul>
PG4C17	Project	Global	This paper is designed to increase the skill of students in problem solving, critical thinking and analytical reasoning as applied to scientific problems	<ul> <li>To carry out scientific experiments</li> <li>To accurately record and analyze the results of such experiments.</li> </ul>



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PG1C1	Inorganic Chemistry-I	Regional	This course deals with the theories of bonding with the knowledge of the periodic properties of elements and the various processes involved in nuclear Chemistry, reactors and the usefulness of radio isotopes.	<ul> <li>To analyse all chemical species involved in organic and Inorganic reactions and to identify those as acid and bases</li> <li>To classify the bonds as ionic and covalent and to compare the theories</li> </ul>
PG1C2	Organic	Regional	This paper focuses	To interpret the concept of aromaticity



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	Chemistry-I		on all the important	and the main properties of aromatic
			aspects of organic	compounds.
		S. C.	chemistry like	• To explore reactivity patterns of
			aromaticity, reaction	conjugated, aromatic molecules and to
			intermediates,	evaluate the kinetics and
			chirality and	thermodynamics controlled reactions.
	E		heterocyclics.	
PG1C3	Physical	Regional	This course gives	• To gain knowledge Kohlrausch's law and
	Chemistry-I		detailed account of	electrolytic conductance
			all the important	Calculate the molar conductance , degree
	(2)		concepts of	of dissociation and electrical potential
			electrochemistry and	
			statistical	
		) KIN	thermodynamics.	
PG1C4	Inorganic	Global	This paper gives	To study the principle of distribution of
	Practicals-I	1/1	hands on experience	common and rare metal ions in different
			of Qualitatively	groups.
			analysing the	• To know the inter- and intra group



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			inorganic salts	precipitation and separation of metal
			containing simple	ions.
			and rare earth metal	
			cations.	
PG1C5	Organic Practicals-	Global	This course gives	• To be skilled in the separation of binary
	I	70	hands on experience	organic mixtures
		3/	of qualitatively	To gain knowledge on the skills of doing
			analyzin <mark>g</mark> organic	micro level analysis
			compou <mark>nds</mark> and to	
			synthesis simple	
		7	organic compounds.	
PGCEDC	Analytical	Global	This paper is an	• To be skilled in the various types of
	Techniques	3 1	inter disciplinary	chromatographic techniques
		AIV	optional paper gives	• To attain knowledge on optical
			an account of	spectroscopy, EPR, Mass spectroscopy.
		1/1	various analytical	
			techniques such as	
			optical methods,	



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			electro analytical methods, chromatographic methods and spectroscopic methods.	
PG2C6	Inorganic Chemistry-II	Global	This paper enables the students to understand the chemistry of complexes and their characterization and reaction mechanisms.	<ul> <li>Compare the stabilities of complexes using stability constants and to identify the types of isomers</li> <li>To describe the theories of co-ordination compounds to understand the colours and magnetic properties and their position in the spectrochemical series</li> </ul>
PG2C7	Organic Chemistry-II	Global	This course enables the students to get a thorough knowledge of elimination and	• To comprehend the mechanism of elimination and substitution reactions and to apply the stereochemistry in E1, E2, ionic and pyrolytic eliminations.



**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

Course Outcomes (COs) – M.Sc. CHEMISTRY



			addition reactions,	• To interpret the concept of nucleophilic
			conformational	and free radical addition reactions and
			analysis and	metal hydride reduction and to
			selective organic	discriminate the reactivity of
			name reactions and	organometalic reagents.
			rearrangements,	Yal
			study of organic	
			spectroscopy and	
			their ap <mark>pli</mark> cations in	
			structu <mark>ral</mark>	
	4		elucidation of	A. C.
		87	organic compounds.	
PG2C8	Physical	Regional	This paper provides	To acquire knowledge about the basic
	Chemistry-II		an extensive study	concepts of chemical kinetics
		1	of the topics such as	• To identify and analyze the effect of
			Chemical kinetics	physical parameters $\mu$ , $\square$ , D on rate of
			and Quantum	reaction
			mechanics.	



**Criterion**: I - Curricular Aspects

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PG2C9	Inorganic	Global	This course gives	• To enable the students to acquire the
	Practicals-II		training to prepare	quantitative skills in volumetric analysis
			inorganic complexes	and gravimetric analysis
			in a pure form and	• To improve the skill in quantitative
			to estimate metal	estimation of metal ions by various titric
		V7/	ions present in the	methods
			solution.	
PG2C10	Organic Practicals-	Global	his cour <mark>se</mark> gives	Students understand the quantitative
	II		hands o <mark>n e</mark> xperience	analysis
			of quantitatively	To develop the ability for synthesizing
	6	7	analyzing organic	organic compounds by single stage.
			compounds and to	
			synthesis organic	
		AIV	compounds using	
			two stages.	
PGCEDC	Analytical	Global	This paper is an	• To be skilled in the various types of
	Techniques		interdisciplinary	chromatographic techniques
			optional paper gives	• To attain knowledge on optical



**Criterion**: I - Curricular Aspects

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			an account of	spectroscopy, EPR, Mass spectroscopy
			various analytical	
			techniques such as	
			optical methods,	
			electro analytical	
			methods,	
	//		chromatographic	
		7	methods and	
			spectros <mark>co</mark> pic	
			methods.	
PG3C11	Organic	Global	This paper provides	To acquire a complete knowledge of the
	Chemistry-III		an elaborate study	working principles of 1H-NMR, 13C-NMR
			of organic	and Mass spectroscopy.
		RIA	spectroscopy and	• To develop an understanding of the
			their applications in	significance of the number, positions,
			structural	intensities and splitting of signals in
			elucidation of	nuclear magnetic resonance spectra.
			organic compounds.	
			This paper also	
	<u> </u>	1	<u> </u>	



**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

Course Outcomes (COs) – M.Sc. CHEMISTRY



			deals with reactions	
			that are taking place	
			under	
			photochemical	
			conditions and	
		-3/	pericyclic reactioter	Yal
	R		penoids.	
PG3C12	Physical	Regional	This course covers	To differentiate the types of elements and
	Chemistry-III		the deta <mark>ile</mark> d study of	symmetry operations.
			group theory and its	To recognize the reducible & irreducible
	(2)		application and also	Representation.
			covers the principles	
			of surface chemistry,	
		V KIN	and a brief study of	
			macromolecules.	
PG3CE1	Material Chemistry	Global	This course deals	To gain knowledge about the basic
			with study of	principles of nanochemistry and
			synthesis,	classification of nonmaterial's.



**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

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			properties, structure and applications of nano particles.	• To describe several syntheses of inorganic nanoparticles, one-dimensional nanostructures (nanotubes, nanorods, nanowires), thin films, nanoporous materials, and nanostructured bulk materials.
PG3CE2	Bio-Organic Chemistry	Global	This paper deals with the molecular drug designing, classification of proteins, enzymes	<ul> <li>To tabulate the functions and uses of enzymes</li> <li>To design of drugs using molecular modelling</li> </ul>
PG4C13	Inorganic Chemistry-III	Regional	This course covers the structure and Bonding of organ metallic compounds and basic concepts of bioinorganic compounds	<ul> <li>To calculate the SEP and identification of structure of boranes and carboranes</li> <li>To describe the basic concepts of bioinorganic compounds</li> </ul>



**Criterion**: I - Curricular Aspects

Metric : 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

Course Outcomes (COs) – M.Sc. CHEMISTRY



PG4C14	Organic	Regional	This paper deals	• To know the Retrosynthesis of achiral
	Chemistry-IV		with introduction to	open chain molecules and cyclic target
			organic synthesis,	molecules,
			preparation and	• To identify the suitable reagents in
			synthetic	synthesis of organic compounds
			applications of some	
		27	organic reagents	
			used for synthesis,	
			structur <mark>al</mark>	
			elucidation of few	
	٤)	4	alkaloids,	
	To the second se	K	terpenoids, steroids	<b>1 1 1 1 1 1 1 1 1 1</b>
			and nucleic acids	
PG4C15	Physical	Regional	This paper deals	• To calculate the bond lengths of
	Chemistry-IV		with many	diatomics from the value of their
		110	spectroscopic	rotational constant.
			techniques like	• To Outline the selection rules for
			Microwave, IR,	rotational and vibrational spectra and



**Criterion**: I - Curricular Aspects

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			Raman and	rationalize the role of the molecular
			Photoelectron, ESR,	dipole moment in the selection rules.
			NQR and	
			Mossbauer.	
PG4CE3	Analytical	Global	This course deals	To educate to calculate error analysis for
	Chemistry		with	various tests
		4	chromat <mark>o</mark> graphic	• To identify the applications of C-
			techniques,	programming in chemistry
	)		spectros <mark>co</mark> pic	
			methods,	$\lambda$
	(2)		applications of C-	1 63
			programmes in	
			chemistry	
PG4CE4	Chemical	Global	This paper deals	• To demonstrate an understanding of
	Engineering		with analytical	computer programming language
		1/1	methods. It also	concepts
			deals with	• To explain the aim of water treatment,
			programming in C	and discuss the required characteristics



**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

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			language and its applications to solve problems in chemistry	the drinking water has.
PG4C16	Physical Practicals	Global	This lab course is course gives lab experience on physical experiments	<ul> <li>To demonstrate conduct metric Titration of Strong acid with a Strong Base.</li> <li>To determine CST for the partial miscible solutions</li> </ul>
PG4C17	Project	Global	This paper is designed to increase the skill of students in problem solving, critical thinking and analytical reasoning as applied to scientific problems	<ul> <li>To carry out scientific experiments</li> <li>To accurately record and analyze the results of such experiments.</li> </ul>



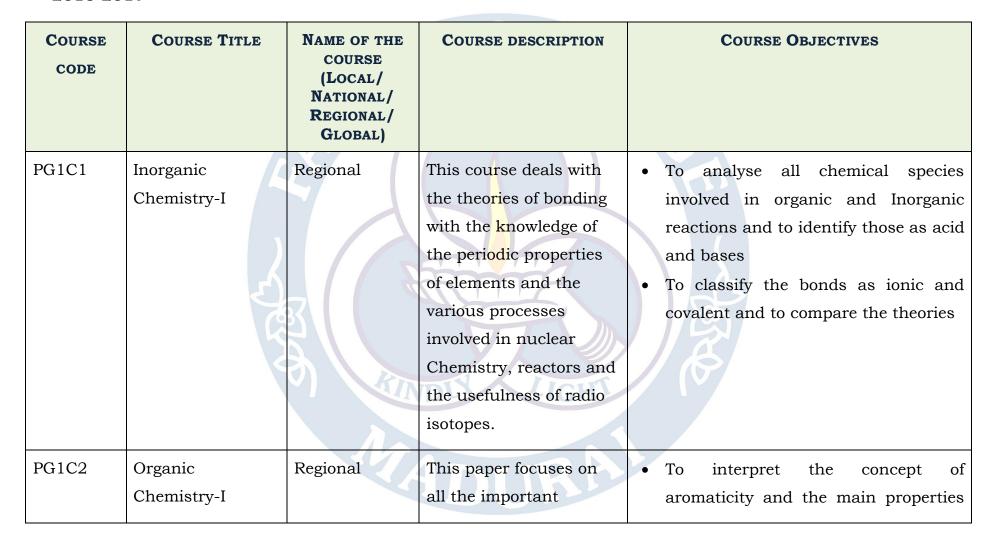
**Criterion**: I – Curricular Aspects

Metric: 1.1.1 - Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

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Year : 2015 - 2020

#### 2016-2017





**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

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			aspects of organic	of aromatic compounds.
			chemistry like	• To explore reactivity patterns of
		6	aromaticity, reaction	conjugated, aromatic molecules and
			intermediates, chirality	to evaluate the kinetics and
			and heterocyclics.	thermodynamics controlled reactions.
PG1C3	Physical	Regional	This course gives	To gain knowledge Kohlrausch's law
	Chemistry-I	43/	detailed account of all	and electrolytic conductance
			the imp <mark>ort</mark> ant concepts	• Calculate the molar conductance,
			of electr <mark>oc</mark> hemistry and	degree of dissociation and electrical
			statistical	potential
			thermodynamics.	\sigma_88\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
PG1C4	Inorganic	Global	This paper gives hands	To study the principle of distribution
	Practicals-I		on experience of	of common and rare metal ions in
		131	Qualitatively analysing	different groups.
			the inorganic salts	To know the inter- and intra group
		1/1	containing simple and	precipitation and separation of metal
		- V	rare earth metal cations.	ions.



**Criterion**: I - Curricular Aspects

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Course Outcomes (COs) – M.Sc. CHEMISTRY



organic compounds and to synthesis simple organic compounds.  PGCEDC Analytical Global This paper is an inter disciplinary optional chromatograph.	in the separation of
organic compounds and doing micro level to synthesis simple organic compounds.  PGCEDC Analytical Global This paper is an inter disciplinary optional chromatograph.	mixtures
to synthesis simple organic compounds.  PGCEDC Analytical Global This paper is an inter disciplinary optional chromatograph.	rledge on the skills of
PGCEDC Analytical Global This paper is an inter disciplinary optional chromatograph.	vel analysis
PGCEDC Analytical Global This paper is an inter disciplinary optional chromatograph.	
Techniques disciplinary optional chromatograph	
	in the various types of
paper gives an account • To attain kr	nic techniques
	nowledge on optical
of various analytical spectroscopy,	EPR, Mass
techniques such as spectroscopy.	
optical methods, electro	
analytical methods,	
chromatographic	
methods and	
spectroscopic methods.	
PG2C6 Inorganic Global This paper enables the Compare the s	stabilities of complexes
students to understand using stability	y constants and to



**Criterion**: I - Curricular Aspects

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	Chemistry-II		the chemistry of	identify the types of isomers
			complexes and their	• To describe the theories of co-
			characterization and	ordination compounds to understand
			reaction mechanisms.	the colours and magnetic properties
			LEAD	and their position in the
				spectrochemical series
PG2C7	Organic	Global	This course enables the	• To comprehend the mechanism of
	Chemistry-II		students to get a	elimination and substitution
			thoroug <mark>h k</mark> nowledge of	reactions and to apply the
			elimination and addition	stereochemistry in E1, E2, ionic and
	€		reactions,	pyrolytic eliminations.
		<b>2011</b>	conformational analysis	• To interpret the concept of
			and selective organic	nucleophilic and free radical addition
	,	TO BY	name reactions and	reactions and metal hydride
			rearrangements, study	reduction and to discriminate the
			of organic spectroscopy	reactivity of organometalic reagents.
			and their applications in	
			structural elucidation of	



**Criterion**: I - Curricular Aspects

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			organic compounds.	
PG2C8	Physical Chemistry-II	Regional	This paper provides an extensive study of the topics such as Chemical kinetics and Quantum mechanics.	<ul> <li>To acquire knowledge about the basic concepts of chemical kinetics</li> <li>To identify and analyze the effect of physical parameters µ, □, D on rate of reaction</li> </ul>
PG2C9	Inorganic Practicals-II	Global	This course gives training to prepare inorganic complexes in a pure form and to estimate metal ions present in the solution.	<ul> <li>To enable the students to acquire the quantitative skills in volumetric analysis and gravimetric analysis</li> <li>To improve the skill in quantitative estimation of metal ions by various titric methods</li> </ul>
PG2C10	Organic Practicals-II	Global	This course gives hands on experience of quantitatively analyzing organic compounds and to synthesis organic	<ul> <li>Students understand the quantitative analysis</li> <li>To develop the ability for synthesizing organic compounds by single stage.</li> </ul>



**Criterion**: I - Curricular Aspects

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			compounds using two stages.	
PGCEDC	Analytical Techniques	Global	This paper is an inter disciplinary optional paper gives an account of various analytical techniques such as optical methods, electro analytical methods, chromatographic methods and spectroscopic methods.	<ul> <li>To be skilled in the various types of chromatographic techniques</li> <li>To attain knowledge on optical spectroscopy, EPR, Mass spectroscopy</li> </ul>
PG3C11	Organic Chemistry-III	Global	This paper provides an elaborate study of organic spectroscopy and their applications in structural elucidation of organic compounds.	<ul> <li>To acquire a complete knowledge of the working principles of 1H-NMR, 13C-NMR and Mass spectroscopy.</li> <li>To develop an understanding of the significance of the number, positions, intensities and splitting of signals in</li> </ul>



**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

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			This paper also deals	nuclear magnetic resonance spectra.
			with reactions that are	
			taking place under	
			photochemical	
			conditions and	
			pericyclicreactiofew	
	//		alkaloids and	
		7	terpenoi <mark>d</mark> s.	
PG3C12	Physical	Regional	This course covers the	To differentiate the types of elements
	Chemistry-III		detailed study of group	and symmetry operations.
	(3)		theory and its	• To recognize the reducible
			application and also	&irreducible Representation.
			covers the principles of	1/8/
		O) AIN	surface chemistry, and	
			a brief study of	
		10	macromolecules.	
PG3CE1	Material	Global	This course deals with	To gain knowledge about the basic
	Chemistry		study of synthesis,	principles of nanochemistry and



**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

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			properties, structure	classification of nanomaterials.
			and applications of	• To describe several synthesis of
		S	nano particles.	inorganic nanoparticles, one-
			LEAD	dimensional nanostructures (nanotubes, nanorods, nanowires), thin films, nanoporous materials, and nanostructured bulk materials.
PG3CE2	Bio-Organic Chemistry	Global	This paper deals with the molecular drug designing, classification of proteins, enzymes	<ul> <li>To tabulate the functions and uses of enzymes</li> <li>To design of drugs using molecular modelling</li> </ul>
PG4C13	Inorganic Chemistry-III	Regional	This course covers the structure and Bonding of organ metallic compounds and basic concepts of bioinorganic compounds	<ul> <li>To calculate the SEP and identification of structure of boranes and carboranes</li> <li>To describe the basic concepts of bioinorganic compounds</li> </ul>



**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

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PG4C14	Organic Chemistry-IV	Regional	This paper deals with introduction to organic synthesis, preparation and synthetic applications of some organic reagents used for synthesis, structural elucidation of few alkaloids, terpenoids, steroids and nucleic acids	<ul> <li>To know the Retrosynthesis of achiral open chain molecules and cyclic target molecules,</li> <li>To identify the suitable reagents in synthesis of organic compounds</li> </ul>
PG4C15	Physical Chemistry-IV	Regional	This paper deals with many spectroscopic techniques like Microwave, IR, Raman and Photoelectron, ESR, NQR and Mossbauer.	<ul> <li>To Calculate the bond lengths of diatomics from the value of their rotational constant.</li> <li>To Outline the selection rules for rotational and vibrational spectra and rationalize the role of the molecular dipole moment in the selection rules.</li> </ul>



**Criterion**: I - Curricular Aspects

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PG4CE3	Analytical Chemistry	Global	This course deals with chromatographic techniques, spectroscopic methods, applications of C-programms in chemistry	<ul> <li>To educate to calculate error analysis for various tests</li> <li>To identify the applications of C-programming in chemistry</li> </ul>
PG4CE4	Chemical Engineering	Global	This paper deals with analytical methods. It also deals with programming in C language and its applications to solve problems in chemistry	<ul> <li>To demonstrate an understanding of computer programming language concepts</li> <li>To explain the aim of water treatment, and discuss the required characteristics should the drinking water have.</li> </ul>
PG4C16	Physical Practicals	Global	This lab course is course gives lab experience on physical experiments	<ul> <li>To demonstrate conduct to metric Titration of Strong acid with a Strong Base.</li> <li>To determine CST for the partial</li> </ul>



**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

Course Outcomes (COs) – M.Sc. CHEMISTRY

Year : 2015 - 2020



				miscible solutions
PG4C17	Project	Global	This paper is designed	To carry out scientific experiments
			to increase the skill of	To accurately record and analyze the
			students in problem	results of such experiments.
			solving, critical thinking	
		V	and analytical reasoning	
		3/	as applied to scientific	
			problems	

#### 2015-2016

COURSE	Course Title	NAME OF THE COURSE (LOCAL/NATIO NAL/REGIONAL /GLOBAL)	Course description	Course Objectives
PG1C1	Inorganic	Regional	This course deals with the theories of bonding	To analyse all chemical species involved in organic and Inorganic



**Criterion**: I - Curricular Aspects

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	Chemistry-I		with the knowledge of	reactions and to identify those as
			the periodic properties	acid and bases
		N.	of elements and the	To classify the bonds as ionic and
			various processes	covalent and to compare the theories
			involved in nuclear	
			Chemistry, reactors and	YO
			the usefulness of radio	
			isotopes.	
PG1C2	Organic	Regional	This paper focuses on	To interpret the concept of
	Chemistry-I		all the important	aromaticity and the main properties
			aspects of organic	of aromatic compounds.
		CI	chemistry like	To explore reactivity patterns of
			aromaticity, reaction	conjugated ,aromatic molecules and
			intermediates, chirality	to evaluate the kinetics and
			and heterocyclics.	thermodynamics controlled
		1		reactions.
PG1C3	Physical	Regional	This course gives	To gain knowledge Kohlrausch's law
	Chemistry-I		detailed account of all	and electrolytic conductance



**Criterion**: I - Curricular Aspects

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			the important concepts of electrochemistry and statistical thermodynamics.	·	Calculate the molar conductance, degree of dissociation and electrical potential
PG1C4	Inorganic Practicals-I	Global	This paper gives hands on experience of Qualitatively analysing the inorganic salts containing simple and rare earth metal cations.		To study the principle of distribution of common and rare metal ions in diffferent groups.  To know the inter- and intra group precipitation and separation of metal ions.
PG1C5	Organic Practicals-I	Global	This course gives hands on experience of qualitatively analyzing organic compounds and to synthesis simple organic compounds.		To be skilled in the separation of binary organic mixtures  To gain knowledge on the skills of doing micro level analysis
PGCEDC	Analytical	Global	This paper is an inter	•	To be skilled in the various types of



**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

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	Techniques		disciplinary optional	chromatographic techniques
			paper gives an account	To attain knowledge on optical
			of various analytical	spectroscopy, EPR, Mass
			techniques such as	spectroscopy.
			optical methods, electro	
			analytical methods,	YO
			chromatographic	
			methods and	
			spectroscopic methods.	
PG2C6	Inorganic	Global	This paper enables the	Compare the stabilities of complexes
	Chemistry-II		students to understand	using stability constants and to
		5	the chemistry of	identify the types of isomers
			complexes and their	To describe the theories of co-
		O KIN	characterization and	ordination compounds to
			reaction mechanisms.	understand the colours and
				magnetic properties and their
			1 DITO	position in the spectrochemical
				series



**Criterion**: I - Curricular Aspects

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PG2C7	Organic	Global	This course enables the	•	CO1- To comprehend the
	Chemistry-II	2 2 2 2 2	students to get a		mechanism of elimination and
			thorough knowledge of		substitution reactions and to apply
			elimination and addition		the stereochemistry in E1, E2, ionic
			reactions,	O	and pyrolytic eliminations.
			conformational analysis		CO2- To interpret the concept of
			and selective organic		nucleophilic and free radical
			name reactions and		addition reactions and metal hydride
			rearrang <mark>em</mark> ents, study		reduction and to discriminate the
			of organic spectroscopy		reactivity of organometalic reagents.
	(2)		and their applications in		
		3	structural elucidation of		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
			organic compounds.		B
PG2C8	Physical	Regional	This paper provides an		To acquire knowledge about the
	Chemistry-II		extensive study of the		basic concepts of chemical kinetics
		110	topics such as Chemical	•	To identify and analyze the effect of
			kinetics and Quantum		physical parameters $\mu$ , $\square$ , D on rate
			mechanics.		of reaction



**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

Course Outcomes (COs) – M.Sc. CHEMISTRY



PG2C9	Inorganic	Global	This course gives	•	To enable the students to acquire
	Practicals-II		training to prepare		the quantitative skills in volumetric
			inorganic complexes in		analysis and gravimetric analysis
			a pure form and to		To improve the skill in quantitative
			estimate metal ions		estimation of metal ions by various
		T	present in the solution.		titric methods
PG2C10	Organic	Global	This course gives hands	•	Students understand the
	Practicals-II		on exper <mark>ie</mark> nce of		quantitative analysis
			quantita <mark>tiv</mark> ely analyzing	•	To develop the ability for
	الحر		organic compounds and		synthesizing organic compounds by
		7	to synthesis organic		single stage.
		311	compounds using two	/	
		3	stages.		
PGCEDC	Analytical	Global	This paper is an inter	•	To be skilled in the various types of
	Techniques		disciplinary optional		chromatographic techniques
			paper gives an account		To attain knowledge on optical
			of various analytical		spectroscopy, EPR, Mass
			techniques such as		
	ı	1	F.7	L	



**Criterion**: I - Curricular Aspects

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Course Outcomes (COs) – M.Sc. CHEMISTRY



			optical methods, electro analytical methods, chromatographic methods and spectroscopic methods.	\$	spectroscopy
PG3C11	Organic Chemisty-III	Global	This paper provides an elaborate study of organic spectroscopy and their applications in structural elucidation of organic compounds.  This paper also deals with reactions that are taking place under photochemical conditions and pericyclic reactions		To acquire a complete knowledge of the working principles of 1H-NMR, 13C-NMR and Mass spectroscopy.  To develop an understanding of the significance of the number, positions, intensities and splitting of signals in nuclear magnetic resonance spectra.
PG3C12	Physical	Regional	This course covers the	•	To differentiate the types of elements



**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

Course Outcomes (COs) – M.Sc. CHEMISTRY



	Chemistry-III		detailed study of group		and symmetry operations.
			theory and its	•	To recognize the reducible &
			application and also		irreducible Representation.
			covers the principles of		
			surface chemistry, and		
			a brief study of		
			macromolecules.		
PG3CE1	Material	Global	This course deals with	•	To gain knowledge about the basic
	Chemistry		study of <mark>sy</mark> nthesis,		principles of nanochemistry and
			properties, structure		classification of nanomaterials.
	(3)		and applications of	•	To describe several synthesis of
			nano particles.		inorganic nanoparticles, one-
		3.			dimensional nanostructures
		O RIM	DIX		(nanotubes, nanorods, nanowires),
			DE MOII		thin films, nanoporous materials,
		1/1			and nanostructured bulk materials.
PG3CE2	Bio-Organic	Global	This paper deals with	•	To tabulate the functions and uses
	Chemistry		the molecular drug		of enzymes
	•	•	EQ.	•	



**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

Course Outcomes (COs) – M.Sc. CHEMISTRY



			designing, classification of proteins, enzymes	•	To design of drugs using molecular modelling
PG4C13	Inorganic Chemistry-III	Regional	This course covers the structure and Bonding of organ metallic compounds and basic concepts of bioinorganic compounds	•	To calculate the SEP and identification of structure of boranes and carboranes  To describe the basic concepts of bio-inorganic compounds
PG4C14	Organic Chemistry-IV	Regional	This paper deals with introduction to organic synthesis, preparation and synthetic applications of some organic reagents used for synthesis, structural elucidation of few alkaloids, terpenoids,	•	To know the Retrosynthesis of achiral open chain molecules and cyclic target molecules,  To identify the suitable reagents in synthesis of organic compounds



**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

Course Outcomes (COs) – M.Sc. CHEMISTRY



			steroids and nucleic acids		
PG4C15	Physical Chemistry-IV	Regional	This paper deals with many spectroscopic techniques like Microwave, IR, Raman and Photoelectron, ESR, NQR and Mossbauer.		To calculate the bond lengths of diatomics from the value of their rotational constant.  To Outline the selection rules for rotational and vibrational spectra and rationalize the role of the molecular dipole moment in the selection rules.
PG4CE3	Analytical Chemistry	Global	This course deals with chromatographic techniques, spectroscopic methods, applications of C-programms in chemistry		To educate to calculate error analysis for various tests  To identify the applications of C-programming in chemistry
PG4CE4	Chemical	Global	This paper deals with	•	To demonstrate an understanding of



**Criterion**: I - Curricular Aspects

Metric: 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and

Course Outcomes (COs) – M.Sc. CHEMISTRY



	Engineering		analytical methods. It		computer programming language
			also deals with		concepts
			programming in C	•	To explain the aim of water
			language and its		treatment, and discuss the required
			applications to solve	$\bigcirc$	characteristics should the drinking
			problems in chemistry		water have.
PG4C16	Physical Practicals	Global	This lab course is	•	To demonstrate conductometric
			course g <mark>iv</mark> es lab		Titration of Strong acid with a
			experien <mark>ce</mark> on physical		Strong Base.
			experiments	•	To determine CST for the partial
		37			miscible solutions
PG4C17	Project	Global	This paper is designed		To carry out scientific experiments
		3) ( )	to increase the skill of		Toaccurately record and analyze the
		A STAN	students in problem solving, critical thinking		results of such experiments.
			and analytical reasoning		
		11/1	as applied to scientific		
			problems		