CO-PO-PSO Mapping CHEM (UG)

Course Code	Course Name	COs	CO Description	PO							PSO					
				1	2	3	4	5	6	Average mapping strength	1	2	3	4	5	Average mapping strength
Semester I																
UGCHEMCC1	CHEMISTRY -CC I: ORGANIC CHEMISTRY-I	CO1	Analyse different types of chemical forces and interactions to predict the structure-activity relationships of different organic molecules		3					3				2		2.83
		CO2	Apply the knowledge of VBT and MOT to discuss structure of molecules		3									3		
		CO3	Apply and analyse the knowledge addition reactions in alkenes and alkynes in organic synthesis		3								3			
		CO4	Analyse and apply the concept of crystallisation and purification of organic compounds	3								3				
		CO5	Evaluate boiling and melting points of unknown organic compounds		3							3				
		CO6	Apply the concept of asymmetric synthesis to design novel organic molecules				3							3		
UGCHEMCC2	CHEMISTRY -CC II: PHYSICAL CHEMISTRY-I	CO1	Explain the theories of kinetic model of an ideal gas		3					3	3					2.67
		CO2	Analyse and explain theoretical basis of Equipartition principle and its limitation		3								3			
		CO3	Apply the concepts of thermodynamics in different chemical reactions		3								3			
		CO4	Analyse how fast a chemical reaction can occur under certain physical conditions and what are the specific roles of different parameters		3									2		
		CO5	Analyse role of catalysts and biocatalyst (e.g., enzymes, etc.) in a catalyzed reaction and design new catalysts		3								3			
		CO6	Analyse and apply the theoretical knowledge to do the different thermodynamic and kinetic based experiments	3										2		
Semester 2																
:MCC3	: III: INORGANIC ISTRY-I	CO1	Apply the classical and quantum mechanical ideas to analyze different numerical problems		3					3		3				
		CO2	Recall the periodic table and explain the periodic variation of different periodic properties		3						3					
		CO3	Explain and analyse acid-base behaviour of different organic and inorganic compounds		3								3			

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				1	2	3	4	5	6	Average mapping strength	1	2	3	4	5	Average mapping strength
UGCHE	CHEMISTRY -CC CHEMI	CO4	Evaluate and apply the mathematical ideas based on pH in acid base reaction system		3									2		2.83
		CO5	Apply the redox chemistry to design advanced materials like, solar cell, fuel cell, supercapacitors, batteries etc.					3						3		
		CO6	Analyse and apply the concept of pH and redox potential in respective quantitative analysis			3						3				
UGCHEMCCIV	CHEMISTRY -CC IV: ORGANIC CHEMISTRY-II	CO1	Apply the knowledge of stereochemistry in different enzymatic reactions		3								3			
		CO2	Apply the fundamental principles of different spectroscopy to solve spectroscopic aspects of molecules			3						3				
		CO3	Interpret reactivity of different organic molecules, and justify the mechanism of different organic reactions		3					3	3					3
		CO4	Apply the fundamental concepts learnt to design different important organic compounds.		3									3		
Semester 3																
UGCHEMCCV	CHEMISTRY -CCV: PHYSICAL CHEMISTRY-II	CO1	Explain the basic laws governing the adsorption, different adsorption isotherms and apply the knowledge to analyze the role of heterogeneous		3								3			
		CO2	Apply the concepts and principles of chemical equilibrium in analyzing chemical reactions			3							3			
		CO3	Summerize the basic and fundamental concepts classical and quantum mechanics and evaluate different quantum mechanical problems				3			3		3				3
		CO4	Apply the knowledge of physical chemistry to estimate different parameters in practical experiments					3				3				
UGCHEMCCVI	CHEMISTRY -CC VI: INORGANIC CHEMISTRY-II	CO1	Demonstrate the concepts, theories and parameters related to ionic, covalent, metallic and H-bonding	3							3					
		CO2	Apply the knowledge of bonding in explaining the structures, interactions and reactions of molecules and ions		3								3			
		CO3	Elaborate the concept of radioactivity in promising fields like, nuclear power generation, radiation therapy etc.		3					3			3			2.75
		CO4	Apply the knowledge of volumetric and gravimetric analysis in different chemical reactions		3							2				
	NIC	CO1	Explain and illustrate the reactivity of carbonyl and related organic compounds		3								2			

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Course Code	Course Name	COs	CO Description	PO							PSO					
				1	2	3	4	5	6	Average mapping strength	1	2	3	4	5	Average mapping strength
UGCHEMCCVII	CHEMISTRY -CC VII: ORGANIC CHEMISTRY-III	CO2	Interpret the concepts of reaction mechanism in organic synthesis	3						3				3		2.8
		CO3	Apply the fundamental principles of different spectroscopies and solve different spectrochemical data		3							3				
		CO4	Explain and interpret the reactivity of organometallic compounds in organic synthesis		3								3			
		CO5	Apply the concepts of synthesis in organic preparation		3								3			
Semester 4																
UGCHEMCCVIII	CHEMISTRY -CCVIII: PHYSICAL CHEMISTRY-III	CO1	Compare and explain the activity and activity coefficient of various ionic species present in the solution		3					3	3					3
		CO2	Classify different types of electrodes and electrode processes	3									3			
		CO3	Demonstrate Nernst equation using laws of Thermodynamics and solve numerical problems	3										3		
		CO4	Recall historical chronology leading to the development of Quantum Mechanics and explain different fundamental theories of Quantum	3							3					
		CO5	Interpret and illustrate Schrodinger's wave equation (time-independent), and several other mathematical techniques to determine		3									3		
UGCHEMCCIX	CHEMISTRY -CC IX: INORGANIC CHEMISTRY-III	CO1	Outline the principles of extraction and purification of metals based on redox potential		3					3	3					3
		CO2	Explain and illustrate the chemistry of various compounds of the s-block and p-block elements		3								3			
		CO3	Discuss the basic theories of coordination bonding and coordination chemistry	3										3		
		CO4	Solve new research problems based on the knowledge on isomerism				3				3					
		CO5	Plan and design novel research ideas based on inorganic synthesis					3						3		
CX	: ORGANIC Y-IV	CO1	Outline the preparation and explain the reactivity of nitrogen based organic compounds		3							3				
		CO2	Apply the concept of retro synthesis and asymmetric synthesis to design new target			3								3		

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				1	2	3	4	5	6	Average mapping strength	1	2	3	4	5	Average mapping strength
UGCHEMC	CHEMISTRY -CC X CHEMISTR	CO3	Solve and interpret the mechanism of different new organic rearrangement reactions					3		3				3		3
		CO4	Apply the knowledge of pericyclic reactions to solve new related problems	3										3		
		CO5	Quantitatively estimate composition of different organic compounds		3							3				
Semester 5																
UGCHEMCCXI	CHEMISTRY -CCXI: INORGANIC CHEMISTRY-IV	CO1	Apply the knowledge of crystal field theory and its related aspects to discuss the chemistry of coordination compounds		3					3	3					3
		CO2	Explain the colour, magnetic properties and chemical potentials of novel coordination compounds		3									3		
		CO3	Explain the colour, magnetic properties and chemical potentials of coordination compounds of lanthanoids and actinoids		3									3		
		CO4	Elaborate the principles of semimicro qualitative analysis to determine the presence of different elements in test samples			3							3			
UGCHEMCCXII	CHEMISTRY -CC XII: ORGANIC CHEMISTRY-V	CO1	Classify and summarize heterocyclic compounds of different sizes especially 5 and 6-membered heterocycles	3						3	3					2.8
		CO2	Apply the concepts of synthesis and reactions of heterocycles in designing novel drug molecules			3								3		
		CO3	Demonstrate the key biological functions of heterocycles	3									2			
		CO4	Illustrate and interpret the chemistry of carbohydrate, amino acids, peptides, proteins and nucleic acids		3									3		
		CO5	Apply the chromatographic techniques in separation of organic mixtures			3						3				
Semester 6																
HEMCCXIII	-CC XIII: INORGANIC EMISTRY-V	CO1	Evaluate the role of metal ions in biological systems	3						3	3					3
		CO2	Apply the knowledge of redox reactions in biological systems in designing model biological systems			3								3		
		CO3	Illustrate the structure, bonding and reactivity of new organometallic complexes and apply the concept in designing novel organometallic		3								3			

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				1	2	3	4	5	6	Average mapping strength	1	2	3	4	5	Average mapping strength
UG	CHEMISTRY CH	CO4	Make use of the knowledge of inorganic reaction mechanism to explain new reactions			3								3		
		CO5	Elaborate the principles of semimicro qualitative analysis to determine the presence of different elements in test samples				3						3			
UGCHEMCCXIV	CHEMISTRY -CCXIV: PHYSICAL CHEMISTRY-IV	CO1	Apply the knowledge of spectroscopy in solving related problems in chemistry			3						3				
		CO2	Apply the concepts of photochemistry to interpret different photochemical reactions			3						3				
		CO3	Apply the concepts of surface tension, adsorption etc. to analyse different surface phenomena			3				3			3			3
		CO4	Designing new formulations for cosmetics, surfactants, medicines utilizing the concepts of colloid chemistry				3							3		
		CO5	Apply the knowledge of surface properties to determine the related parameters		3							3				
Discipline Specific Electives																
UGCHEMDSE1	DSE-1: ADVANCED PHYSICAL CHEMISTRY	CO1	Explain and illustrate the structural features of different ionic solids based on crystallography		3						3					
		CO2	Classify and discuss the lattice systems and lattice parameters newly synthesized crystalline materials		3									3		
		CO3	Apply statistical thermodynamics to solve new related problems			3								3		
		CO4	Apply third law of thermodynamics to interpret related systems				3			3	3					3
		CO5	Design new polymer for advanced applications				3							3		
		CO6	Develop computer programs based on numerical methods for applications in chemistry						3					3		
MDSE2	AL METHODS IN ISTRY	CO1	Analyse analytical data based on statistical treatment		3						3					
		CO2	Apply the knowledge on instrumentation techniques for optical method of analysis to solve related analytical problems			3								3		
		CO3	Apply the different analytical techniques to estimate industrial samples quantitatively		3					3				3		

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				1	2	3	4	5	6	Average mapping strength	1	2	3	4	5	Average mapping strength
UGCH	DSE-2: ANALYTIC CHEM	CO4	Adapt the chromatographic separation techniques in research and development areas of both industry and academia				3				3					2.83
		CO5	Analyse samples spectrophotometrically and interpret the data		3									3		
		CO6	Apply the titrimetric methods of analysis in analysing geochemical samples		3									2		
UGCHEMDSE3	DSE-3: GREEN CHEMISTRY	CO1	Select green chemistry-based methods for synthesis		3						3					
		CO2	Apply the fundamental principles of green chemistry design new experiments			3								3		
		CO3	Apply the green chemistry techniques to maximize environmental benefits				3			3				3		3
		CO4	Plan new green methodologies for applications in real world systems				3				3					
		CO5	Apply the concept of combinatorial chemistry in formulations of new drug molecules		3									3		
UGCHEMDSE4	DSE-4: INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE	CO1	Demonstrate and compare the chemistry of glass, ceramics and cements		3						3					
		CO2	Design novel glass and ceramic materials for advanced applications					3						3		
		CO3	Design new methods for synthesis and applications of novel nanomaterials				3					3				3
		CO4	Design novel composite materials and conducting polymers in advanced versatile fields					3		3			3			
		CO5	Analyse commercial fertilizer samples and formulate new fertilizers		3								3			
		CO6	Develop new nano scale materials for advanced applications						3					3		
MDSE5	L CHEMICALS AND NMENT	CO1	Take part in large scale production, storage and hazards in handling of industrial gases		3								3			
		CO2	Develop new methodologies for manufacturing and safe handling of industrial chemicals			3								3		
		CO3	Develop strategies to minimize environmental pollution				3			3			3			

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				1	2	3	4	5	6	Average mapping strength	1	2	3	4	5	Average mapping strength
UGCHE	DSE-5: INDUSTRIAL ENVIRO	CO4	Plan to manage industrial waste to maximize environmental and economical benefits				3							3		3
		CO5	Propose conserving natural sources of energy and design alternate energy resources					3						3		
		CO6	Determine parameters related to environmental pollution		3							3				
Skill Enhancement Courses																
UGCHEMSEC1	SEC-1: PHARMACEUTICAL CHEMISTRY	CO1	Outline the procedure to design and develop new drug molecules		3					3				3		3
		CO2	Plan retrosynthetic approach to target new drug molecule				3						3			
		CO3	Develop and analyse different classes of drug molecules					3						3		
		CO4	Apply aerobic and non-aerobic fermentation procedure for developing new drugs						3				3			
		CO5	Take part in large scale production of different drugs					3						3		
UGCHEMSEC2	SEC-2: FUEL CHEMISTRY	CO1	Select renewable and non-renewable sources of energy			3				2.8	3					3
		CO2	Apply carbonization of coal to maximize its calorific value				3						3			
		CO3	Refine crude petroleum and formulate different petroleum products						3				3			
		CO4	Take part in different industrial procedures like, fractional distillation, thermal cracking, reforming etc.				2						3			
		CO5	Develop different types of lubricant as per user requirement					3						3		
Generic Electives																
GE1	GE-1	CO1	Explain different physical properties of liquid, like, surface tension, viscosity etc.		3							2				
		CO2	Define different thermodynamic terms and apply first law of thermodynamics in chemical reactions			3						2				

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				1	2	3	4	5	6	Average mapping strength	1	2	3	4	5	Average mapping strength
UGCHEMC	CHEMISTRY	CO3	Choose correct reaction pathway or stable product utilizing the related concepts and theories		3					3		3				2.6
		CO4	Interpret basic stereochemistry of organic molecules	3							3					
		CO5	Estimate the metal ions quantitatively in an unknown sample				3							3		
UGCHEMGE2	CHEMISTRY GE-2	CO1	Analyse how fast a chemical reaction can occur under certain physical conditions and what are the specific roles of different parameters		3					3				2		2.6
		CO2	Apply laws of photochemistry to explain different photochemical reactions			3					3					
		CO3	Design new drug molecule utilizing the concepts of carbohydrate and proteins					3						3		
		CO4	Interpret theories, stereochemistry and IUPAC nomenclature of coordination compounds	3							3					
		CO5	Elaborate the principles of semimicro qualitative analysis to determine the presence of different elements in test samples				3					2				
UGCHEMGE3	CHEMISTRY GE-3	CO1	Apply the theories of thermochemistry in different chemical reactions		3					3	3					3
		CO2	Solve various related problems utilizing the concepts and equations of salt hydrolysis			3					3					
		CO3	Explain different chemical reactions considering solubility product principle		3							3				
		CO4	Design new chemical reactions of aromatic hydrocarbon applying the preparation and reactions of them					3						3		
		CO5	Explain different organic reactions of alcohols, phenols, ethers, esters		3							3				
		CO6	Determine physical parameters, like, pH, enthalpy, heat capacity of chemical compound or reaction		3								3			
CHEMGE4	MISTRY GE-4	CO1	Apply the knowledge of crystal field theory and its related aspects to discuss the chemistry of coordination compounds			3				3	3					3
		CO2	Explain the colour, magnetic properties and chemical potentials of novel coordination compounds		3									3		
		CO3	Explain the theories of kinetic model of an ideal gas	3							3					

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				1	2	3	4	5	6	Average mapping strength	1	2	3	4	5	Average mapping strength
UG	CHE	CO4	Analyse and explain theoretical basis of Equipartition principle and its limitation		3								3			
		CO5	Explain and illustrate the structural features of different ionic solids based on crystallography		3						3					
ABILITY ENHANCEMENT COMPULSORY COURSES (AECC)																
UGCHEMAECC01	ENGLISH FOR COMMUNICATION	CO1	Enhance their English language proficiency in the aspects of reading, writing, listening and speaking			3				3	2					2.4
		CO2	Develop academic literacy required for undergraduate learning, further studies and research		3							3				
		CO3	Apply the requisite communicative skills and strategies to future careers	3								1				
		CO4	Gain an insight into cultural literacy and cross-cultural awareness and engage in self-directed English language learning		3										3	
		CO5	Be responsible and ethical English users		3						3					
UGCHEMAECC02	ENVIRONMENTAL SCIENCES	CO1	Define and demonstrate the concept, components and function of natural resources and ecosystems.	3						2.6			2			2.6
		CO2	Define, illustrate and analyse the cause, effects and control measures of various environmental pollutants.			3							3			
		CO3	Demonstrate the basic idea about the disasters and its management.			3							2			
		CO4	Illustrate and apply the knowledge about the social, environmental issues and environmental legislation.				1						3			
		CO5	Define, demonstrate and evaluate the impact of human population on the Environment						3				3			

Grand Average (PO.) = 2.98 Grand Average (PSO) = 2.88

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CO-PO-PSO Mapping M.Sc in Chemistry

Course Code	Course Name	COs	CO Description	PO					PSO					
				1	2	3	4	Average	1	2	3	4	5	Average
Semester I														
PGCHEMMCT01	CHEMISTRY -MCT01: INORGANIC CHEMISTRY-1	CO1	Evaluate symmetry properties of different molecules			3			3					
		CO2	Apply the knowledge of crystal field theory and its related aspects to discuss the chemistry of coordination compounds	3							3			
		CO3	Apply the concepts on crystal field theory to explain colour, magnetic properties and chemical potentials of coordination compounds of transition metals	3								3		
		CO4	Basic principle of inorganic analysis and different instrumentation techniques			3		3			3			3
PGCHEMMCT02	CHEMISTRY -MCT02: ORGANIC CHEMISTRY-1	CO1	Explain the conformation of new sugar molecules utilizing the concepts of stereochemistry for cyclic compounds	3						3				
		CO2	Apply the reactivity of organometallic compounds in different reactions			2					3			
		CO3	Evaluate structure of different natural products		3					3				
		CO4	Design new molecules via retrosynthetic approach				3	2.75					2	2.75
PGCHEMMCT03	CHEMISTRY -MCT03: PHYSICAL CHEMISTRY-1	CO1	Recall the thermodynamic principles and applying the laws of thermodynamics in different chemical reactions	3						2				
		CO2	Analyse how fast a chemical reaction can occur under certain physical conditions		3						3			
		CO3	Explain rates and mechanisms of photochemical, chain and oscillatory reactions			3					3			
		CO4	Apply the classical and quantum mechanical ideas to analyze different numerical problems		3			3			3			2.75
PGCHEMMCP01	CHEMISTRY -MCP01: INORGANIC CHEMISTRY PRACTICAL-1	CO1	Estimate metal ion quantitatively based on spectrophotometry		3					2				
		CO2	Estimate metal ions in a binary mixture spectrophotometrically			3							3	
		CO3	Estimate metal ions based on ion-exchange separation, acid-base, complexometric and argentometric titrations			3							3	
		CO4	Analyse ternary and quaternary mixture to estimate each component present in the mixture			3		3					3	2.75

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				1	2	3	4	Average	1	2	3	4	5	Average
PGCHEMMCP02	CHEMISTRY -MCP02: ORGANIC CHEMISTRY PRACTICAL-I	CO1	Identify unknown organic compound (solid and liquid) by qualitative tests		2					2				
		CO2	Apply chromatographic and or spectroscopic techniques to analyze single organic compound			3					3			
		CO3	Predict, separate, and purify organic compounds in binary mixtures (two solids, one solid + one liquid)				3						3	
		CO4	Apply the knowledge of volumetric and gravimetric analysis in different chemical reactions		3			2.75		3				2.75
PGCHEMMCP03	CHEMISTRY - MCP03: PHYSICAL CHEMISTRY PRACTICAL-I	CO1	Determine of critical solution temperature of two component systems		3					2				
		CO2	Construct phase diagram of three component systems		3								3	
		CO3	Analyze surface adsorption behaviour of heterogeneous systems		3						3			
		CO4	Measure kinetics of chemical reactions of different orders		3			3			3			2.75
PGSOC01	SOC 1: YOGA	CO1	Attainment of general awareness about health	3					3					
		CO2	Management life style of students' life			2					3			
		CO3	Increase of concentration			2					3			
		CO4	Improvement the decision-making capacity			3		2.5			3			3
Semester 2														
PGCHEMMCT04	CHEMISTRY -MCT04: INORGANIC CHEMISTRY -2	CO1	Apply Wade's rule and related theories to determine structure of boranes, metal clusters and metal carbonyl clusters	3					3					
		CO2	Classify supramolecular ligands and discuss their applications in coordination chemistry	1							3			
		CO3	complex chemistry, spectral and magnetic properties of compounds of d and f block elements		3								3	
		CO4	Design new organometallic complexes and evaluate their structure, bonding and reactions		3			2.5					3	3

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				1	2	3	4	Average	1	2	3	4	5	Average
PGCHEMMCT05	CHEMISTRY -MCT05: ORGANIC CHEMISTRY -2	CO1	Apply qualitative M.O. approach and Huckel's theory to explain bonding in organic molecules	3					3					
		CO2	Apply the principles of heterocycles in organic synthesis to design functional organic molecules		3								3	
		CO3	Apply the principles of photochemistry to design new photochemical reaction		3								3	
		CO4	electrocyclic reactions, cycloaddition reactions and sigmatropic reactions.		3			3			3			3
PGCHEMMCT06	CHEMISTRY -MCT06: PHYSICAL CHEMISTRY -2	CO1	Recall the fundamental theories and equations of classical and quantum mechanics to apply in solving problems	3							3			
		CO2	Apply the fundamental principles of rotational, vibrational, and Raman spectroscopy in molecular characterizations			2				3				
		CO3	Apply the basic principles of electrochemistry to analyze different electrode reactions	3							3			
		CO4	Develop new electrocatalysts and electrode materials for applications in energy related research		3			2.75					3	3
PGCHEMMCP04	CHEMISTRY -MCP04: INORGANIC CHEMISTRY PRACTICAL -2	CO1	Apply basic principles of semi-micro qualitative inorganic analysis to analyze different industrial samples		3					3				
		CO2	Apply the basic principles of semi-micro qualitative inorganic analysis to identify different rare elements in soil and industrial samples		3						3			
		CO3	Develop new analytical methods of separation of metal ions from their mixture			3							3	
		CO4	Analyze the presence of metal ions in different insoluble geochemical residue		3			3					2	2.75

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				1	2	3	4	Average	1	2	3	4	5	Average
PGCHEMMCP05	CHEMISTRY -MCP05: ORGANIC CHEMISTRY PRACTICAL -2	CO1	Design new methodologies for synthesising new organic compounds		3						3			
		CO2	Develop new techniques for work-up and purification of new organic compounds		3								3	
		CO3	Elaborate the synthesis knowledge to develop novel drug molecules				3						3	
		CO4	Apply the spectroscopic and chromatographic techniques for characterization			2		2.75			3			3
PGCHEMMCP06	CHEMISTRY -MCP06: PHYSICAL CHEMISTRY PRACTICAL -2	CO1	Determine physical parameters like, strength, concentration, CMC etc. by conductometric methods	3						3				
		CO2	Determine physical parameters like, concentration, electrode potentials, pH etc. by potentiometry and pH-metry	3						3				
		CO3	Apply the colorimetric methods to determine the rate constant of related reaction			2					3			
		CO4	Determine the rate constant of reactions, like, inversion of sucrose mutarotation of glucose by polarimeter		3			2.75		3				3
PGSOC02	SOC 2: COMMUNICATIVE ENGLISH	CO1	Enhance their English language proficiency in the aspects of reading, writing, listening and speaking.			2					3			
		CO2	Develop academic literacy required for undergraduate learning, further studies and research			3					3			
		CO3	Apply the requisite communicative skills and strategies to future careers			2					3			
		CO4	Gain an insight into cultural literacy and cross- cultural awareness and engage in self-directed english language learning			3		2.5			3			3

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				1	2	3	4	Average	1	2	3	4	5	Average
Semester 3														
PGCHEMMCT07	CHEMISTRY -MCT07: INORGANIC CHEMISTRY-2	CO1	Apply the techniques of chromatography, and solvent extraction methods in the separation of organic compounds		3					3				
		CO2	Analyze environmental parameters and identify their corelations		3						3			
		CO3	Evaluate the causes of different environmental pollution and design remedies to resolve it			3					3			
		CO4	Interpret the importance of essential and trace elements in the biological systems, their roles and reactions	3				3					3	3
PGCHEMMCT08	CHEMISTRY -MCT08: ORGANIC CHEMISTRY-2	CO1	Explain structure and properties of different important biomolecules and enzymes		3						3			
		CO2	Understand the mechanism of different organometallic reactions		3						3			
		CO3	Design new organometallic complexes for catalysis		3								3	
		CO4	Apply the fundamental knowledge of green chemistry and combinatorial chemistry for sustainable development	3				3			3			3
PGCHEMMCP07	CHEMISTRY -MCP07: INORGANIC CHEMISTRY PRACTICAL-3	CO1	Apply the knowledge of inorganic synthesis for preparation of novel inorganic compounds		2					3				
		CO2	Develop new methodologies for work-up and purification of the reaction product		3								3	
		CO3	Analyse qualitatively and quantitatively new inorganic compounds			3					3			
		CO4	Interpret the spectroscopic and magnetic moment results to characterize the prepared compounds		3			2.75			3			3

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Rahara, Kolkata-700 118

Course Code	Course Name	COs	CO Description	PO					PSO					
				1	2	3	4	Average	1	2	3	4	5	Average
PGCHEMMCP08	CHEMISTRY -MCP08: ORGANIC CHEMISTRY PRACTICAL-3	CO1	Estimate different drugs such as, paracetamol / aspirin, ascorbic acid (vitamin-C), isoniazide quantitatively		3								3	
		CO2	Quantitatively estimate nitrogen in soil and fertilizers		3								3	
		CO3	Determine DO, COD, BOD and hardness of water sample of different natural sources		3								3	
		CO4	Apply spectrophotometric and titrimetric techniques to estimate iron, phosphate, halides in water samples				3	3					3	3
PGCHEMSCC	CHEMISTRY -SCC: INTERDISCIPLINARY ADVANCED CHEMISTRY	CO1	Apply the instrumental techniques like UV-VIS, IR, ORD-CD, Mass, NMR spectroscopy to analyze chemical samples			3					3			
		CO2	Apply the instrumental techniques like electronic, ESR, NQR, MB, PES spectroscopy to analyze new chemical samples			3					3			
		CO3	Apply the instrumental techniques like X-Ray, electron and neutron diffraction techniques to analyze chemical samples			2							3	
		CO4	Design new reactions and characterize the product applying the different instrumentation techniques			3		2.75					3	3
PGCHEMOE01	CHEMISTRY -OE01: OPEN ELECTIVE-01	CO1	Take part in large scale production, storage and hazards in handling of industrial gases		3						3			
		CO2	Develop new methodologies for manufacturing and safe handling of industrial chemicals				3						3	
		CO3	Develop strategies to minimize environmental pollution			3					3			
		CO4	Plan to manage industrial waste to maximize environmental and economical benefits				3	3					3	3
PGCHEMOE02	CHEMISTRY -OE02: OPEN ELECTIVE-02	CO1	Understand types of drugs, drug – receptor interactions, and mechanisms of drug actions.	3					3					
		CO2	Apply the mechanism of drug actions to design new drug molecules			3							3	
		CO3	Design next generation antibiotics			2							1	
		CO4	Analyze the activity of different vitamins in biological systems		3			2.75		3				2.5

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PGSOC03	SOC 3: VALUE EDUCATION AND INDIANCULTURE	CO1	Understand types of drugs, drug – receptor interactions, and mechanisms of drug actions.	3							3			
		CO2	Apply the mechanism of drug actions to design new drug molecules				1				3			
		CO3	Design next generation antibiotics				3				2			
		CO4	Analyze the activity of different vitamins in biological systems				3	2.5			3			2.75
Semester 4														
PGCHEMMCT09	CHEMISTRY -MCT09: PHYSICAL CHEMISTRY-3	CO1	Recall the fundamentals of group theory to explain the related problems	3					3					
		CO2	Apply the CFT and MO concepts to explain the bonding and molecular properties		3						3			
		CO3	Evaluate the crystal structures, crystal defects and electronic properties of new crystalline solids			3							3	
		CO4	Apply the concepts of biophysical chemistry in different enzymatic reactions			2		2.75		3				3
PGCHEMMCP09	CHEMISTRY -MCP09: PHYSICAL CHEMISTRY PRACTICAL-3	CO1	Determine molecular weight of polymer by viscometric method		3					3				
		CO2	Analyse different aspects of kinetic study of chemical reactions.		3					3				
		CO3	Analyse experimental data to determine of order, rate constant, variation of rate constant with ionic strength, etc.		3					3				
		CO4	Apply spectrophotometric method to determine of composition of metal – ligand complex and hands-on experience in using UV-Visible spetroscope.				3	3					3	3

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PGCHEMME01	CHEMISTRY -ME01: ADVANCED INORGANIC CHEMISTRY-1	CO1	Determine stability constants of metal ligand complexes		3						3			
		CO2	Analyse the factors affecting the stability of complex in solution		3						3			
		CO3	Understand the mechanism of redox enzymes, vitamins and coenzymes and apply the concept to explain different biological phenomenon		3						3			
		CO4	Develop new nuclear medicine and radiation technique in the medical field				3	3					3	3
PGCHEMME02	CHEMISTRY -ME02: ADVANCED INORGANIC CHEMISTRY-2	CO1	Design new inorganic polymer for with versatile application				3						3	
		CO2	Explain the mechanism of substitution, electron transfer and photochemical reactions of transition metal complexes			3					3			
		CO3	Determine the magnetic susceptibility of materials by different methods		3						3			
		CO4	Apply different laws and equations of magnetochemistry to explain related systems			2		2.75				3		3
PGCHEMME03	CHEMISTRY -ME03: ADVANCED ORGANIC CHEMISTRY-1	CO1	Apply different NMR techniques in the structure elucidation of newly synthesized organic molecules			2					3			
		CO2	Apply mass, UV-VIS, IR and NMR spectroscopy to evaluate simple structural molecules			3							3	
		CO3	Design new organic molecules following stereoselective and stereospecific synthesis				3						3	
		CO4	Design new organic molecules following enantio- and diastereo-selective synthesis				3	2.75					3	3

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PGCHEMME04	CHEMISTRY -ME04: ADVANCED ORGANIC CHEMISTRY-2	CO1	Design new synthetic strategy for functional biomolecules				3						3	
		CO2	Apply the knowledge of carbohydrate chemistry in the synthesis of new drug molecules		2					3				
		CO3	Develop new drug molecules with hetero aromatic rings containing one/two hetero atom				3						3	
		CO4	Apply the knowledge for isolation of different natural products			3		2.75			3			3
PGCHEMME05	CHEMISTRY -ME05: ADVANCED PHYSICAL CHEMISTRY-1	CO1	Apply the knowledge to classify the real systems into different statistical models		2					3				
		CO2	Solve problems related to the non-equilibrium thermodynamics and applications of statistical formulation of problems related to chemical kinetics reaction dynamics				3					3		
		CO3	Understand different polymerization reactions and design new functional polymers			3					3			
		CO4	Compare the kinetics and various mechanisms of polymerization		3			2.75			3			3
PGCHEMME06	CHEMISTRY -ME06: ADVANCED PHYSICAL CHEMISTRY-2	CO1	Apply the knowledge of surface phenomena including heterogeneous catalysis and their physicochemical characterizations			2					3			
		CO2	Interpret the dielectric behaviour of molecules and related theoretical equations from molecular level		3						3			
		CO3	Apply n-dimensional vector space model to solve many electrons Hamiltonian		3						3			
		CO4	Apply variation method and perturbation theory to explain degenerate and non-degenerate systems	3				2.75	3					3
PGSOC04	PGCHEMSOC: COMPUTER FOR CHEMISTS	CO1	Interpret different 2D and 3D plots			3							3	
		CO2	Analyze data and plots		3								2	
		CO3	Construct new chemical structures and reaction schemes		3			3					3	2.666667

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PGCHEMOT01	CHEMOT01: PROJECT AND PRESENTATION	CO1	Choose new research problems			2					3			
		CO2	Design new reactions/materials				3						3	
		CO3	Analyze the properties of the materials		3						3			
		CO4	Compile the experimental and theoretical data and build the project report		3			2.75			3			3
PGCHEMOT02	PGCHEMOT02: GRAND VIVA AND SEMINAR	CO1	Compose seminar report and presentation		2						3			
		CO2	Take part in lectures, presentation and debates		3						3			
		CO3	Develop own scientific understanding and self-confidence to face interviews				3	2.66667					3	3

Grand Average (PO) 2.82 Grand Average (PSO) 2.92

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