DEPARTMENT OF CHEMISTRY
PROGRAMME OUTCOMES AND COURSE OUTCOMES OF UNDER GRADUATE & POST GRADUATE PROGRAMME (2023 ONWARDS)

NAME OF THE PROGRAMME: BACHELOR OF CHEMISTRY– PROGRAMME OUTCOME	
PO1	**Disciplinary knowledge:** Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate Programme of study
PO2	**Communication Skills:** Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.
PO3	**Critical thinking:** Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.
PO4	**Problem solving: Capacity** to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations.
PO5	**Analytical reasoning**: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.
PO6	**Research-related skills**: A sense of inquiry and capability for asking relevant/appropriate questions, problem arising, synthesising and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation
PO7	**Cooperation/Team work:** Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team
PO8	**Scientific reasoning**: Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.
PO9	**Reflective thinking**: Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.
PO10	**Information/digital literacy:** Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.
PO11	**Self-directed learning**: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.
PO12	**Multicultural competence:** Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.
PO13	**Moral and ethical awareness/reasoning**: Ability toembrace moral/ethical

	values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstratingthe ability to identify ethical issues related to one‟s work, avoid unethical behaviour such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
PO14	**Leadership readiness/qualities:** Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way.
PO15	**Lifelong learning:** Ability to acquire knowledge and skills, including,learning how to learn‟, that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling.
MASTER OF CHEMISTRY	
PO1	**Problem Solving Skill** Apply knowledge of Management theories and Human Resource practices to solve business problems through research in Global context
PO2	**Decision Making Skill** Foster analytical and critical thinking abilities for data-based decision-making.
PO3	**Ethical Value** Ability to incorporate quality, ethical and legal value-based perspectives to all organizational activities.
PO4	**Communication Skill** Ability to develop communication, managerial and interpersonal skills.
PO5	**Individual and Team Leadership Skill** Capability to lead themselves and the team to achieve organizational goals.
PO6	**Employability Skill** Inculcate contemporary business practices to enhance employability skills in the competitive environment.
PO7	**Entrepreneurial Skill** Equip with skills and competencies to become an entrepreneur.
PO8	**Contribution to Society**Succeed in career endeavors and contribute significantly to society.
PO9	**Multicultural competence** Possess knowledge of the values and beliefs of multiple cultures and a global perspective.
PO10	**Moral and ethical awareness/reasoning** Ability to embrace moral/ethical values in

	conducting one's life.

NAME OF THE PROGRAMME: B.Sc CHEMISTRY – COURSE OUTCOMES	
SEMESTER I	
GENERAL CHEMISTRY-I	1.Explain the atomic structure, wave particle duality of matter, periodic properties bonding, and properties of compounds. 2.Classify the elements in the periodic table, types of bonds, reaction intermediates electronic effects in organic compounds, types of reagents. 3.Apply the theories of atomic structure, bonding, to calculate energy of a spectral transition, x, p electronegativity, percentage ionic character and bond order. 4.Evaluate the relationship existing between electronic configuration, bonding, geometry of molecules and reactions; structure reactivity and electronic effects 5.Construct MO diagrams, predict trends in periodic properties, assess the properties of elements, and explain hybridization in molecules, nature of H – bonding and organic reaction mechanisms.
Quantitative Inorganic Estimation (titrimetry) and Inorganic Preparations	1.Explain the basic principles involved in titrimetric analysis and inorganic preparations. 2.Compare the methodologies of different titrimetric analysis. 3.Calculate the concentrations of unknown solutions in different ways and develop the skill to estimate the amount of a substance present in a given solution. 4.Assess the yield of different inorganic preparations and identify the end point of various titrations.
FOOD CHEMISTRY	1.Learn about Food adulteration - contamination of Wheat, Rice, Milk, Butter. 2. Get an awareness about food poisons like natural poisons (alkaloids - nephrotoxin) pesticides, DDT, BHC, Malathion 3..Get an exposure on food additives, artificial sweeteners, Saccharin, Cyclomate and Aspartate in the food industries. 4.Acquire knowledge on beverages, soft drinks, soda, fruit juices and alcoholic beverages examples. 5. Study about fats and oils - Sources of oils - production of refined vegetable oils - preservation. Saturated and unsaturated fats –MUFA and PUFA.

SEMESTER-II	
GENERAL CHEMISTRY-II	1.Explain the concept of acids, bases and ionic equilibria; periodic properties of s and p block elements, preparation and properties of aliphatic and aromatic hydrocarbons 2.Discuss the periodic properties of sand p- block elements, reactions of aliphatic and aromatic hydrocarbons and strength of acids 3.Classify hydrocarbons, types of reactions, acids and bases, examine the properties s and p-block elements, reaction mechanisms of aliphatic and aromatic hydrocarbons 4.Explain theories of acids, bases and indicators, buffer action and important compounds of s-block elements 5. Assess the application of hard and soft acids indicators, buffers, compounds of s and p block elements and hydrocarbons
QUALITATIVE ORGANIC ANALYSIS AND PREPARATION OF ORGANIC COMPOUNDS	1.Observe the physical state, odour, colour and solubility of the given organic compound. 2.Identify the presence of special elements and functional group in an unknown organic compound performing a systematic analysis. 3.Compare mono and dicarboxylic acids, primary, secondary and tertiary amines, mono and diamides, mono and polyhydric phenols, aldehyde and ketone, reducing and non- reducing sugars and explain the reactions behind it. 4.Exhibit a solid derivative with respect to the identified functional group.
DAIRY CHEMISTRY	1.Understand about general composition of milk – constituents and its physical properties. 2.Acquire knowledge about pasteurization of Milk and various types of pasteurization - Bottle, Batch and HTST Ultra High Temperature Pasteurization. 3.learn about Cream and Butter their composition and how to estimate fat in cream and Ghee 4.Explain about Homogenized milk, flavoured milk, vitaminised milk and toned milk. 5.Have an idea about how to make milk powder and its drying process - types of drying process
COSMETICS AND PERSONAL GROOMING	1.Know about the composition of various cosmetic products 2.Understand chemical aspects and applications of hair care and dental care and skin care products. 3. Understand chemical aspects and applications of perfumes and skin care products. 4.To understand the methods of beauty treatments their advantages and disadvantage 5.Understand the hazards of cosmetic products.

SEMESTER III	
GENERAL CHEMISTRY -III	1.Explain the kinetic properties of gases by using mathematical concepts. 2. Describe the physical properties of liquid and solids; identify various types of crystals with respect to its packing and apply the XRD method for crystal structure determinations. 3. Investigate the radioactivity, nuclear energy and it's production, also the nuclear waste management. 4. write the nomenclature, physical & chemical properties and basic mechanisms of halo organic compounds and alcohols. 5.Investigate the named organic reactions re
ENTREPRENEURIAL SKILLS IN CHEMISTRY	1.Identify adulterated food items by doing simple chemical tests. 2. Prepare cleaning products and become entrepreneurs 3.Educate others about adulteration and motivate them to become entrepreneurs.
PESTICIDE CHEMISTRY	1.Teach about the pesticides and their toxicity with respect to structure and category. 2.Explain the preparation and property of pesticides 3.Investigate the pesticide residues, prevention and care 4.Demonstrate the extraction and analytical methods of pesticide residues 5.Make awareness to the public on bio-pesticides
QUALITATIVE INORGANIC ANALYSIS	1.Acquire knowledge on the systematic analysis of Mixture of salts. 2i.Identify the cations and anions in the unknown substance. 3.Identify the cations and anions in the soil and water and to test the quality of water. 4. Assess the role of common ion effect and solubility product
SEMESTER IV	
GENERAL CHEMISTRY-IV	1.Explain the terms and processes in thermodynamics; discuss the various laws of thermodynamics and thermo chemical calculations. 2.Discuss the second law of thermodynamics and its application to heat engine; discuss third law and its application on heat capacity measurement. 3. Investigate the chemistry of transition elements with respect to various periodic properties and group wise discussions. 4.Dscuss the fundamental organic chemistry of ethers, epoxides and carbonyl compounds including named organic reactions. 5.Discuss the chemistry and named reactions related to carboxylic acids and their derivatives; discuss chemistry of active methylene compounds, halogen substituted acids and hydroxyl acids.
PHYSICAL CHEMISTRY PRACTICAL – I	1.Describe the principles and methodology for the practical work 2.Explain the procedure, data and methodology for the practical work. 3.Apply the principles of electrochemistry, kinetics for carrying out the practical work. 4.Demonstrate laboratory skills for safe handling of the equipment

	and chemicals
INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS	1.Apply error analysis in the calibration and use of analytical instruments, explain theory, instrumentation and application of flame photometry and Atomic Absorption spectrometry 2.Explain theory, instrumentation and application of UV visible and Infrared spectroscopy. 3. Able to discuss instrumentation, theory and applications of thermal and electrochemical techniques 4: Explain the use of chromatographic techniques in the separation and identification of mixtures CO5: explain preparation of solutions, stoichiometric calculations
FORENSIC SCIENCE	1.Learn about the Poisons - types and classification of poisons in the living and the dead organisms and also get information about Postmortem. 2. Get awareness on Human bombs, possible explosives (gelatin sticks and RDX) and metal defector devices and other security measures for VVIP - composition of bullets and detecting powder burns 3.Detect the forgery documents, different types of forged signatures 4. Have an idea about how to tracks and trace using police dogs, foot prints identification and gain the knowledge in analyzing biological substances - blood, semen, saliva, urine and hair - DNA Finger printing for tissue identification in dismembered bodies 5. Get the awareness on Aids - causes and prevention and also have an exposure on handling fire explodes.
SEMESTER V	
ORGANIC CHEMISTRY - I	1.Assign RS notations to chirals and EZ notations to olefins and explain conformations of ethane and butane. 2. Explain preparation and properties of aromatic and aliphatic nitro compounds and amines 3.Explain colour and constitution of dyes and food additives 4.DIscuss preparation and properties of five membered heterocycles like pyrrole, furan and thiophene 5.Discuss preparation and properties of six membered heterocycles like pyridine, quinoline and isoquinoline
INORGANIC CHEMISTRY -I	1.Explain isomerism, Werner's Theory and stability of chelate complexes 2.Discuss crystal field theory, magnetic properties and spectral properties of complexes. 3.Explain preparation and properties of metal carbonyls 4.Give a comparative account of the characteristics of lanthanoids and actinoids

	5.Explain properties and uses of inorganic polymers of silicon, sulphur, boron and phosphorous
PHYSICAL CHEMISTRY -I	1.Explain Gibbs and Helmholtz free energy functions, partial molar quantities and Ellinghams 2.Apply the concepts of chemical kinetics to predict the rate of the reaction and order of the reaction, demonstrate the effect of temperature on reaction rate, and the significance of free energy and entropy of activation. 3. Compare chemical and physical adsorption, Freundlich and Langmuir adsorption isotherms, and differentiate between homogenous and heterogeneous catalysis. 4.Demonstrate the types and characteristics of colloids, preparation of sols and emulsions, and determine the molecular weights of macromolecules. 5. Utilize the concepts of photochemistry in fluorescence, phosphorescence, chemiluminescence and color perception of vision.
INDUSTRIAL CHEMISTRY	1.summarize the properties of fuels which include petroleum, water gas, natural gas and propellents 2.Evaluate cosmetic products, soaps, detergents. 3.Explain manufacture of sugar, food spoilages and food additives 4.Explain properties of abrasives, manufacture of leather and paper 5. Explain properties and manufacture of lubricants and cement, and intellectual property rights
BIOCHEMISTRY	1.Explain molecular logic of living organisms, composition of blood and blood coagulation 2.Explain synthesis and properties of amino acids, determination of structure of peptides and proteins 3.Explain factors influencing enzyme activity and vitamins as coenzymes 4.Explain RNA and DNA structure and functions 5. Explain biological significance of simple and compound lipids
SEMESTER VI	
ORGANIC CHEMISTRY - II	1.Explain isolation and properties of alkaloids and terpenes 2.Explain preparation and reactions of mono and disaccharides 3.Classify biomolecules and natural products based on their structure, properties, reactions and uses. 4. Explain molecular rearrangements like benzidine, Hoffmann etc., 5.Preparation and properties of organolithium compounds
INORGANIC CHEMISTRY –II	1.Ability to explain the importance of tracer elements on biological system. 2.Explain the metal ion transport, Bohr effect, Na, K, Ca pump. 3.Explain the function of Vitamin B12, Zn-Cu enzyme, ferredoxin, cluster enzymes.

	4. Classification and structure of silicates. 5. Explain the manufacture of refractories, explosives, paints and pigments
PHYSICAL CHEMISTRY-II	1.Construct the phase diagram for one component and two component systems, explain the properties of freezing mixture, component with congruent melting points and solid solutions. 2.Apply the concepts of chemical equilibrium in dissociation of PCl5, N2O4 and formation of HI, NH3, SO3 and decomposition of calcium carbonate. Demonstrate important principles such as Le chatelier principle, van't Hoff reaction isotherm and ClausiusClayperon equation. 3.Identify an appropriate distillation method for the separation of binary liquid mixtures such as azeotropic mixtures, partially miscible mixtures and immiscible liquids. 4. Explain the significance of Arrhenius theory, Debye-Huckel theory, Onsager equation and Kohlrausch's law in conductance. 5.Construct electrochemical cell with the help of electrochemical series and calculate cell EMF. Demonstrate the applications of EMF and significance of potentiometric titrations.
PHYSICAL CHEMISTRY PRACTICAL – II	1.Describe the principles and methodology for the practical work. 2.Explain the procedure, data and methodology for the practical work 3.Apply the principles of phase rule and electrochemistry for carrying out the practical work 4. Demonstrate laboratory skills for safe handling of the equipment and chemicals
FUNDAMENTALS OF SPECTROSCOPY	1.Explain electrical and magnetic properties of materials and microwave spectroscopy 2.Explain theory, instrumentation and applications of Infrared and Raman spectroscopy 3. Apply selection rules to understand spectral transitions, explain Woodward – Fieser's rule for the calculation of wavelength maximum of conjugated dienes 4. Explain theory, instrumentation and applications of NMR spectroscopy 5.Explain theory, instrumentation and applications of Mass spectrometry
PROFESSIONAL COMPETENCY SKILL	1.Identify adulterated food items by doing simple chemical tests. 2:Prepare cleaning products and become entrepreneurs 3.Educate others about adulteration and motivate them to become entrepreneurs.
CHEMISTRY FOR PHYSICAL SCIENCES I (FOR MATHEMATICS & PHYSICS STUDENTS)	

ALLIED CHEMISTRY FOR PHYSICAL SCIENCES I	1.Gain in-depth knowledge about the theories of chemical bonding, nuclear reactions and its applications. 2. Evaluate the efficiencies and uses of various fuels and fertilizers 3.Explain the type of hybridization, electronic effect and mechanism involved in the organic reactions. 4.Apply various thermodynamic principles, systems and phase rule. 5.Explain various methods to identify an appropriate method for the separation of chemical components
CHEMISTRY FOR PHYSICAL SCIENCES II (FOR MATHEMATICS & PHYSICS STUDENTS)	
ALLIED CHEMISTRY FOR PHYSICAL SCIENCES II	1.Write the IUPAC name for complex, different theories to explain the bonding in coordination compounds and water technology 2. Explain the preparation and property of carbohydrate, amino acids and nucleic acids. 3.Apply/demonstrate the electrochemistry principles in corrosion, electroplating and fuel cells. 4.Identify the reaction rate, order for chemical reaction and explain the purpose of a catalyst. 5.Outline the various type of photochemical process.
ALLIED CHEMISTRY FOR BIOLOGICAL SCIENCES	
CHEMISTRY FOR BIOLOGICAL SCIENCES I (FOR BOTANY AND ZOOLOGY STUDENTS)	1.state the theories of chemical bonding, nuclear reactions and its applications. 2. Evaluate the efficiencies and uses of various fuels and fertilizers. 3.Explain the type of hybridization, electronic effect and mechanism involved in the organic reactions. 4. Demonstrate the structure and uses of antibiotics, anaesthetics, antipyretics and artificial sugars. 5. Analyse various methods to identify an appropriate method for the separation of chemical components.
CHEMISTRY FOR BIOLOGICAL SCIENCES II (FOR BOTANY AND ZOOLOGY STUDENTS)	1.Write the IUPAC name for complex, different theories to explain the bonding in coordination compounds and water technology. 2.Explain the preparation and property of carbohydrate. 3.Enlighten the biological role of transition metals, amino acids and nucleic acids. 4.Apply/demonstrate the electrochemistry principles in corrosion, electroplating and fuel cells. 5.Outline the various type of photochemical process.

NAME OF THE PROGRAMME: MASTERS IN CHEMISTRY – COURSE OUTCOMES	
SEMESTER I	
ORGANIC REACTION	1.To recall the basic principles of organic chemistry.

MECHANISM - I	2. To understand the formation and detection of reaction intermediates of organic reactions. 3. To predict the reaction mechanism of organic reactions and stereochemistry of organic compounds. 4. To apply the principles of kinetic and non-kinetic methods to determine the mechanism of reactions. 5.To design and synthesize new organic compounds by correlating the stereochemistryof organic compounds.
STRUCTURE AND BONDING IN INORGANIC COMPOUNDS	1. Predict the geometry of main group compounds and clusters. 2. Explain about the packing of ions in crystals and apply the radius ratio rule to predict the coordination number of cations. 3. Understand the various types of ionic crystal systems and analyze their structural features. 4. Explain the crystal growth methods. 5.To understand the principles of diffraction techniques and microscopic techniques.
ORGANIC CHEMISTRY PRACTICAL	1.To recall the basic principles of organic separation, qualitative analysis and preparation. 2.To explain the method of separation and analysis of separated organic mixtures and convert them as derivatives by suitable preparation method. 3. To determine the characteristics of separation of organic compounds by various chemical reactions. 4.To develop strategies to separate, analyze and prepare organic compounds. 5.To formulate a method of separation, analysis of organic mixtures and design suitable procedure for organic preparations.

PHARMACEUTICAL CHEMISTRY	1.To identify the suitable drugs for various diseases. 2. To apply the principles of various drug action and drug design. 3.To acquire the knowledge on product development based on SAR. 4.To apply the knowledge on applications of computers in chemistry. 5.To synthesize new drugs after understanding the concepts SAR.
ELECTROCHEMISTRY	1.To understand the behaviour of electrolytes in solution and compare the structures of electrical double layer of different models. 2. To predict the kinetics of electrode reactions applying Butler-Volmer and Tafel equations 3.To study different thermodynamic mechanism of corrosion, 4. To discuss the theories of electrolytes, electrical double layer, electrodics and activitycoefficient of electrolytes 5.To have knowledge on storage devices and electrochemical reaction mechanism.
NANO MATERIALS AND NANO TECHNOLOGY	1.To explain methods of fabricating nanostructures. 2. To relate the unique properties of nanomaterials to reduce dimensionality of the material. 3.To describe tools for properties of nanostructures. 4. To discuss applications of nanomaterials. 5.To understand the health and safety related to nanomaterial.
MOLECULAR SPECTROSCOPY	1. To understand the importance of rotational and Raman spectroscopy. 2. 2. To apply the vibrational spectroscopic techniques to diatomic and polyatomic molecules. 3. To evaluate different electronic spectra of simple molecules

	using electronic spectroscopy. 4. 4. To outline the NMR, ^{13}C NMR, 2D NMR – COSY, NOESY, Introduction to ^{31}P, ^{19}FNMR and ESR spectroscopic techniques. 5. 5.To develop the knowledge on principle, instrumentation and structural elucidation ofsimple molecules using Mass Spectrometry, EPR and Mossbauer Spectroscopytechniques.
SEMESTER-II	
ORGANIC REACTION MECHANISM-II	1.To recall the basic principles of aromaticity of organic and heterocyclic compounds. 2. To understand the mechanism of various types of organic reactions. 3.To predict the suitable reagents for the conversion of selective organic compounds. 4.To correlate the principles of substitution, elimination, and addition reactions. 5.To design new routes to synthesis organic compounds.
PHYSICAL CHEMISTRY-I	1.To explain the classical and statistical concepts of thermodynamics. 2.To compare and correlate the thermodynamic concepts to study the kinetics of chemical reactions. 3. To discuss the various thermodynamic and kinetic determination 4. To evaluate the thermodynamic methods for real gases ad mixtures. 5.To compare the theories of reactions rates and fast reactions.
INORGANIC CHEMISTRY PRACTICAL	1.To identify the anions and cations present in a mixture of salts. 2. To apply the principles of semi micro qualitative analysis to categorize acid radicals and basic radicals. 3. To acquire the qualitative analytical skills by selecting suitable confirmatory tests andspot tests. 4.To choose the appropriate chemical reagents for the detection of anions and cations. 5.To synthesize coordination compounds in good quality.
MEDICINAL CHEMISTRY	1.Predict a drugs properties based on its structure. 2.Describe the factors that affect its absorption, distribution, metabolism, and excretion,and hence the considerations to be made in drug design. 3.Explain the relationship between drug's chemical structure and its therapeutic properties. 4. Designed to give the knowledge of different theories of drug

	actions at molecularlevel. 5.To identify different targets for the development of new drugs for the treatment of infectious and GIT.
GREEN CHEMISTRY	1.To recall the basic chemical techniques used in conventional industrial preparations and in green innovations. 2. To understand the various techniques used in chemical industries and in laboratory. 3.To compare the advantages of organic reactions assisted by renewable energy sources and non-renewable energy sources. 4.To apply the principles of PTC, ionic liquid, microwave and ultrasonic assisted organicsynthesis. 5. To design and synthesize new organic compounds by green methods.
BIO-INORGANIC CHEMISTRY	1.The students will be able to analyses trace elements. 2. Students will be able to explain the biological redox systems. 3. Students will gain skill in analyzing the toxicity in metals. 4.Students will have experience in diagnosis. 5.Learn about the nitrogen fixation and photosynthetic mechanism.
MATERIAL SCIENCEAND NUCLEAR CHEMISTRY	1.To understand and recall the synthesis and characteristics of crystal structures,semiconductors, magnets, nanomaterials and renewable energy materials. 2. To integrate and assess the structure of different materials and their properties. 3. To analyse and identify new materials for energy applications. 4. To explain the importance of crystal structures, piezoelectric and pyroelectricmaterials, nanomaterials, hard and soft magnets, superconductors, solar cells, electrodes, LEDuses, structures and synthesis. 5.To design and develop new materials with improved property for energy applications.
SEMESTER III	
ORGANIC SYNTHESIS AND PHOTOCHEMISTRY	1.To recall the basic principles of organic chemistry and to understand the various reactions of organic compounds with reaction mechanisms. 2.To understand the versatility of various special reagents and to correlate their reactivity with various reaction conditions. 3.To implement the synthetic strategies in the preparation of various organic compounds. 4.To predict the suitability of reaction conditions in the preparation of tailor-made organic compounds. 5.To design and synthesize novel organic compounds with the methodologies learnt during the course.
COORDINATION CHEMISTRY – I	1.Understand and comprehend various theories of coordination compounds.

	2.Understand the spectroscopic and magnetic properties of coordination complexes. 3.Explain the stability of complexes and various experimental methods to determine the stability of complexes. 4.Predict the electronic transitions in a complex based on correlation diagrams and UV┐ visible spectral details. 5.Comprehend the kinetics and mechanism of substitution reactions in octahedral and square planar complexes.
PHYSICAL CHEMISTRY PRACTICAL	1.To recall the principles associated with various physical chemistry experiments. 2. To scientifically plan and perform all the experiments. 3.To observe and record systematically the readings in all the experiments. 4.To calculate and process the experimentally measured values and compare with graphical data. 5. To interpret the experimental data scientifically to improve students' efficiency for societal developments.
ANALYTICAL INSTRUMENTATION TECHNIQUES Practical	1.To recall the principles associated with various inorganic organic and physical chemistry experiments 2. To scientifically plan and perform all the experiments 3. To observe and record systematically the readings in all the experiments 4. To calculate and process the experimentally measured values and compare with graphical data. 5.To interpret the experimental data scientifically to improve students efficiency for societal developments.
PHARMOCOGNOSY AND PHYTOCHEMISTRY	1.To recall the sources of natural medicines and analysis of crude drugs. 2. To understand the methods of evaluation based on various parameters. 3.To analyze the isolated drugs 4.To apply various techniques to discover new alternative medicines. 5.To evaluate the isolated drugs for various pharmacological activities
BIOMOLECULES AND HETEROCYCLIC COMPOUNDS	1.To understand the basic concepts of biomoleculesand natural products. 2.To integrate and assess the different methods of preparation of structurally different biomolecules and natural products. 3.To illustrate the applications of biomolecules and their functions in the metabolism of living organisms. 4. To analyse and rationalise the structure and synthesis of heterocyclic compounds.

	5.To develop the structure of biologically important heterocyclic compounds by different methods.
SEMESTER IV	
COORDINATION CHEMISTRY – II	1.Understand and apply 18 and 16 electron rule for organometallic compounds 2. Understand the structure and bonding in olefin, allyl, cyclopentadienyl and carbonyl containing organometallic compounds 3. Understand the reactions of organometallic compounds and apply them in 4. Understanding the catalytic cycles 5. Identify / predict the structure of coordination complexes using spectroscopic tools such as IR, NMR, ESR, Mossbauer and optical rotatory dispersion studies to interpret the structure of molecules by various spectral techniques.
PHYSICAL CHEMISTRY-II	1.To discuss the characteristics of wave functions and symmetry functions. 2. To classify the symmetry operation and wave equations. 3.To apply the concept of quantum mechanics and group theory to predict the electronic structure. 4.To specify the appropriate irreducible representations for theoretical applications. 5.To develop skills in evaluating the energies of molecular spectra.
CHEMISTRY OF NATURAL PRODUCTS	1.To understand the biological importance of chemistry of natural products. 2.To scientifically plan and perform the isolation and characterization of synthesized natural products. 3.To elucidate the structure of alkaloids, terpenoids, carotenoids, falvanoids and anthocyanins. 4.To determine the structure of phytochemical constituents by chemical and physical methods. 5. To interpret the experimental data scientifically to improve biological activity of active components.
POLYMER CHEMISTRY	1.To understand the bonding in polymers. 2. To scientifically plan and perform the various polymerization reactions. 3.To observe and record the processing of polymers. 4.To calculate the molecular weight by physical and chemical methods. 5.To interpret the experimental data scientifically to improve the quality of synthetic polymers.